Annotated Bibliography on Urban Agriculture

prepared for the

Swedish International Development Agency (Sida)

by

ETC - Urban Agriculture Programme

in cooperation with TUAN and other organisations

ETC Urban Agriculture Programme

***November 2001 (updated March 2003)*, Leusden, The Netherlands**

Sida

ETC NETHERLANDS Urban Agriculture Programme

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ETC Urban Agriculture Programme

ETC International is an independent professional -but not-for-profit- organisation, which executes programmes and projects, implements studies, gives policy advice and organises training.

ETC's main objectives are to encourage and support local initiatives aimed at sustainable development, to strengthen local institutions and the participation of local stakeholders in the formulation and implementation of adequate policies and programmes for sustainable rural and urban development.

ETC has a strong record in natural resource management, low external input agriculture, sustainable energy, and integrated land use systems, both in rural and urban environments.

ETC's Urban Agriculture Programme was established in 1994 and has since then implemented various projects and advisory services in the field of urban and periurban agriculture.

The most important project under implementation at the moment is the **Resource Centre on Urban Agriculture and Forestry** (RUAF) funded by DGIS (Directorate General for International Development Cooperation of the Ministry of Foreign Affairs, the Netherlands) and IDRC (International Development Research Centre, Canada).

RUAF aims at integration of urban agriculture in the policies and programmes of national and city governments and international organisations, by:

- Collecting and disseminating research data and and project experiences in the field of urban agriculture a/o by maintaining databases, publication of the *Urban Agriculture Magazine* and the maintenance of a website (www.ruaf.org)
- Promoting exchange of experiences and debate on key issues in the field of urban agriculture by organising electronic conferences and international workshops in collaboration with regional institutes and networks.
- Provision of assistance to regional and local partners in the organisation of policy seminars and training workshops and the formulation of policies and action programmes

TUAN

TUAN is a non-profit organisation located in Washington, D.C., USA.

TUAN was founded in 1992 in response to the increasing food insecurity in urban areas both in poor and rich countries and in response to the degradation of the environment in cities throughout the world. TUAN serves as a focal point and research centre for the promotion of urban farming and is functioning a/o as RUAF's liason in the United States.

Annotated Bibliography on Urban and Periurban Agriculture

Leusden, March 2003

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Acknowledgements

This production has been made possible by a grant from **Sida**, the Swedish International Development Cooperation Agency, for which we are most grateful.

The production of the bibliography would not have been possible without the co-operation of a large number of institutions and persons.

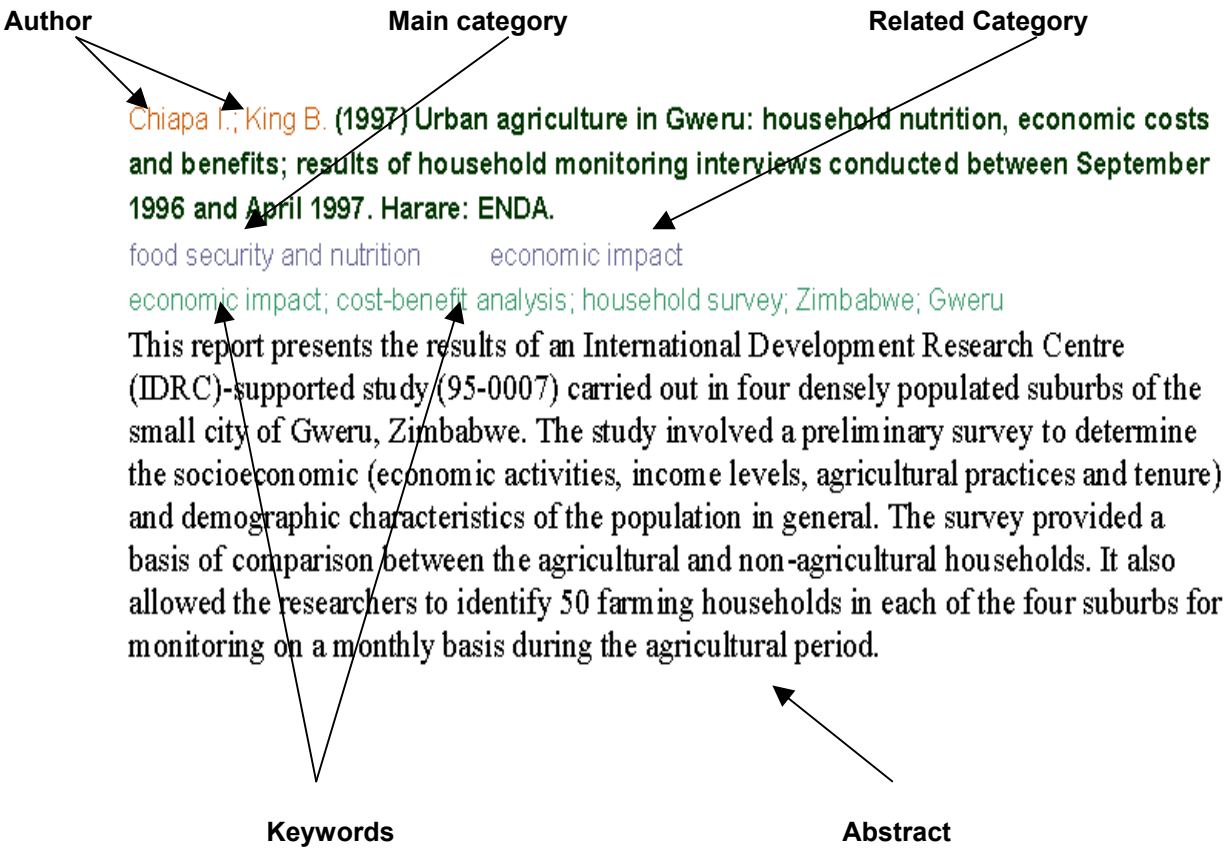
Various institutions shared bibliographic information with us:

- IDRC (International Development Research Centre), Ottawa, Canada
- TUAN (The Urban Agriculture Network), Washington DC, United States
- FAO (Food and Agriculture Organization of the United Nations), Rome, Italy

A large number of experts collaborated by preparing introductions to the various sections of the annotated bibliography and suggestion literature to be abstracted. We are very grateful to them for their contributions (and we owe especially to those of them that contributed without any or very low remuneration for their precious time):

- Arturo Perez Vazquez and Simon Anderson (Wye College, London, UK)
- Hubert de Bon (CIRAD-AVRDC, Hanoi, Vietnam)
- Tjeerd Deelstra and Maaike van den Biggelaar (International Institute for the Urban Environment, Delft, The Netherlands)
- Axel Drescher (University of Freiburg, Freiburg, Germany)
- Nadine Dulac (WASTE, Gouda, the Netherlands)
- Alice Hovorka (Clark University, Worcester, United States)
- Guido Kuchelmeister (Tree City, Illertissen, Germany)
- Daniel Maxwell (CARE, East Africa Regional Management Unit, Nairobi, Kenya)
- Rachel Nugent (National Institutes of Health, Bethesda, United States)
- Hans Schiere and Gera den Dikken (IAC, Wageningen, The Netherlands)
- Martin Strauss (EAWAG/SANDEC, Duebendorf, Switzerland)
- René van Veenhuizen (ETC-RUAF, Leusden, The Netherlands)
- Henk de Zeeuw (ETC-RUAF, Leusden, The Netherlands)
- Stuart Bunting and David C. Little (Institute of Aquaculture, Stirling, Scotland)

Example of annotated reference



Example of the Index

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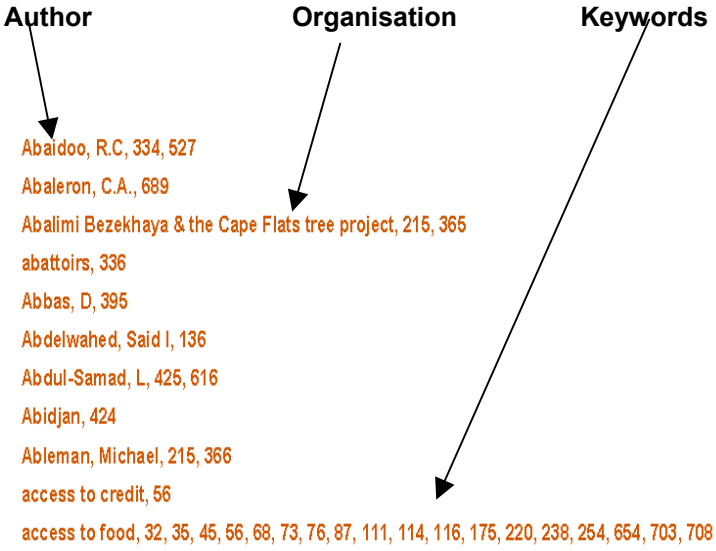

Introduction

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1. An annotated bibliography on urban agriculture

Food production in cities has a long tradition in many countries and the UNDP (1996) has estimated that urban agriculture produces between 15 and 20 % of the world's food.

Urban planners commonly used to consider urban gardening and livestock keeping as merely 'hang-overs ' of rural habits, a marginal activity of little economic importance, or as a health risk and a source of pollution that has to be curtailed. Such biases, sustained by the limited exposure of policy makers and planners to grounded information on urban agriculture, have resulted in important legal restrictions on urban agriculture. Nevertheless, urban agriculture has continued to grow in most cities in the South.

Over the last decade an increasing number of national governments and city authorities, supported by international development agencies (including IDRC, FAO, UNCHS, UNDP, CIRAD, NRI, CGIAR, GTZ, ETC and others) have started to integrate urban agriculture into their policies and programmes, recognising the importance of (intra- and peri-) urban agriculture for solving persistent urban problems, such as increasing urban poverty and food insecurity, increasing problems with the disposal of urban wastes and wastewater, the growing ecological footprint of the city and the lack of green spaces in the urban environment.

One of the constraints that is encountered by these local policy makers, planners, researches, NGO's and other stakeholders in urban agriculture, is the limited access to relevant information on the presence, characteristics and impacts of urban agriculture. There is a rapidly growing body of literature, but a systematic overview of the more important documents is lacking.

The production of an annotated bibliography and its publication on Internet (www.ruaf.org) and as CD-rom will resolve this bottleneck to a great extent.

The present document is a product in development. The Resource Centre on Urban Agriculture and Forestry (RUAF) will continue to update and complement the existing bibliographic database and we hope and expect that organisations involved in the development of urban agriculture in one way or another will help us to do so by sending us their research and project reports, evaluation studies, policy documents and the like, both formally published documents and grey materials.

2. Types and characteristics of urban agriculture

Urban agriculture is not easy to define since a large variety of urban farming systems can be encountered, with varying characteristics according to local socio-economic, physio-geographic and political conditions.

One has to consider various aspects of urban agriculture in order to arrive at a definition that is meaningful in the local context:

- **Types of products**
  Urban agriculture may include different types of crops (grains, root crops, vegetables, mushrooms, fruits) or animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.) or combinations of these. Often the more perishable and relatively highly valued vegetables and animal products and by-products are favoured. Non-food products include aromatic and medicinal herbs, ornamental plants, tree products (seed, wood, fuel, etc.), tree seedlings, and so on. Production units in urban agriculture in general tend to be more specialised than rural enterprises, and exchanges take place across production units.
- **Types of economic activities**
  Urban agriculture includes production activities as well as related processing and marketing activities, input production, services delivery (e.g. animal health services) by specialised micro-enterprises or NGOs, etc. The interactions between these activities are also important (chains, clusters). In urban agriculture, production and marketing (and also processing) tend to be more interrelated in terms of time and space than is the case for rural agriculture, as a result of greater geographic proximity and quicker resource flow. Economies of agglomeration seem to prevail over those of scale.
- **Types of location**
  Urban agriculture may take place in locations inside the cities (intra-urban) or in the periurban areas. The activities may take place on the homestead (on-plot) or on land away from the residence (off-plot), on private land (owned, leased) or on public land (parks, conservation areas, along roads, streams and railways), or semi-public land (schoolyards, grounds of schools and hospitals).
- **Scales of production and technology used**
  In the city, we may encounter individual or family farms, group or cooperative farms and enterprises, micro-, small- and medium-sized enterprises, as well as large-scale undertakings. The technological level of the majority of urban agriculture enterprises in developing countries is still rather low. However, the tendency is towards more technically advanced and intensive agriculture and various examples of such can be found in all cities.
- **Product destination / degree of market orientation**
  In most cities in developing countries, an important part of urban agricultural production is for domestic consumption, with surpluses being traded. However, the importance of market-oriented urban agriculture, both in volume and economic value, should not be underestimated (as will be shown later). Products are sold at the farm gate, from the cart in the same or other neighbourhoods, in local shops, on local (farmers) markets or to intermediaries and supermarkets. Mainly fresh products are sold, but part of these are processed for own use, cooked and sold on the streets, or processed and packaged for sale to one of the outlets mentioned above.
- **Types of actors involved**
  Many of the people involved in urban agriculture belong to the urban poor. However, they are often not the most disadvantaged people, nor are they - contrary to general belief - recent immigrants from rural areas (since the urban farmer needs time to gain access to urban land, water and other productive resources). In many cities, one will often also find lower and mid-level government officials, school teachers and the like involved in agriculture, as well as richer people who are seeking a good investment for their capital.

Women constitute an important part of the urban farmer population, since agriculture and related processing and selling activities can often be more easily combined with their other tasks in the household. It is however more difficult to combine these with urban jobs that require travelling to the town centre, industrial areas or to the houses of the rich.

One striking feature of urban agriculture which distinguishes it from rural agriculture, is that it is **integrated into the urban economic and ecological system** (hereafter referred to as the "ecosystem"). It is not its urban location which distinguishes urban from rural agriculture, but the fact that it is embedded in and interacts with the urban ecosystem. Such linkages include the use of urban residents as labourers, use of typical urban resources (such as organic waste as compost and urban wastewater for irrigation), direct links with urban consumers, direct impacts on urban ecology (positive and negative), being part of the urban food system, competing for land with other urban functions, being influenced by urban policies and plans, etc. (Mougeot, 2000).

3. The impacts of urban agriculture

Urban agriculture plays an important role in enhancing urban food security and nutrition, local economic development, poverty alleviation and social inclusion of disadvantaged groups and sustainable environmental management in the cities.

3.1 Urban food security and nutrition

Research data clearly indicate that urban agriculture forms an important component of the urban food system

The local production of food, and associated local marketing of fresh and processed products, increase the food security of the poor by making food locally available, and at lower prices, and by improving the nutritional balance of the family diet. Creation of better conditions for periurban and urban families to produce and market vegetables, fruits, livestock products and fish, can positively affect the nutrition and health of vulnerable urban groups, especially in situations where women gain control over the destination of the produce and revenues from sales.

Food production in the city is in many cases a response of the urban poor to inadequate, unreliable and irregular access to food, and the lack of purchasing power. Most cities in developing countries are not able to generate sufficient (formal or informal) income opportunities for the rapidly growing population. The World Bank (2000) estimates that approximately 50% of the poor live in urban areas (25% in 1988). In urban settings, lack of income translates more directly into lack of food than in a rural setting (cash is needed).

The costs of supplying and distributing food from rural areas to the urban areas or importing food for the cities, are rising continuously, and it is expected that urban food insecurity will increase (Argenti 2000). Food prices in Harare, for example, rose by 534 percent between 1991 and 1992 due to the removal of subsidies and price controls, spurring poor urban consumers to gain access to food outside of market channels through home production or bartering (Tevera, 1996).

Urban agriculture may improve both food intake (improved access to a cheap source of proteins) and the quality of the food (poor urban families involved in farming eat more fresh vegetables than other families in the same income category).

In **Harare,** sixty percent of food consumed by low-income groups was self-produced (Bowyer-Bower and Drakakis-Smith,1996). In **Kampala,** children aged five years or less in low-income farming households were found to be significantly better-off nutritionally (less stunted) than counterparts in non-farming households (Maxwell, Levin and Csete 1998). Urban producers obtained 40 to 60 percent or more of their household food needs from their own urban garden (Maxwell and Zziwa 1992). In **Cagayan de Oro,** urban farmers generally eat more vegetables than non-urban farmers of the same wealth class, and also more than consumers from a higher wealth class (who consume more meat) (Potutan et al.1999).

In addition to production for their own consumption needs, large amounts of food are produced for other categories of the population. It is estimated (UNDP 1996; FAO 1999) that 200 million urban residents provide food for the market and 800 million urban dwellers are actively engaged in urban agriculture in one way or another. These urban farmers produce substantial amounts of food for urban consumers. A global estimate (data 1993) is that 15-20% of the world's food is produced in urban areas (Margaret Armar-Klemesu 2000).

Research on specific cities and products yields data such as the following:

- in **Hanoi,** 80% of fresh vegetables, 50% of pork, poultry and freshwater fish, as well as 40% of eggs, originate from urban and periurban areas (Nguyen Tien Dinh, 2000);
- in the urban and periurban area of **Shanghai,** 60% of the city's vegetables, 100% of the milk, 90% of the eggs, and 50% of the pork and poultry meat is produced (Cai Yi-Zhang and Zhang Zhangen in Bakker et al. 2000);
- in **Java**, home gardens provide for 18% of caloric consumption and 14% of protein intake of the urban population (Ning Purnomohadi 2000);
  * **Dakar** produces 60% of the national vegetable consumption whilst urban poultry production amounts to 65% of the national demand (Mbaye and Moustier 1999). Sixty percent of the milk consumed in Dakar is produced in or around the city;
- in **Accra**, 90% of the city's fresh vegetable consumption is from production within the city (Cencosad 1994).
- over 26,000 popular gardens cover 2,438.7 hectares in **Havana** producing 25,000 tons of food each year; a total of 299 square kilometres of urban agriculture produces 113,525 tons/year (Mario Gonzalez Novo and Catherine Murphy in Bakker et al. 2000);
- in **Mexico City** production of swine can bring in 10-40% of household earnings, urban cowshed-based milk can supply up to 100% of household income and in sub and periurban areas maize production provides 10-30%, vegetable and legume production even up to 80% of the household income (Pablo Torres Lima, L.M.R. Sanchez, B.I.G. Uriza in Bakker et al. 2000).

Urban agriculture complements rural agriculture to a large extent and increases the efficiency of the national food system in that it provides products that rural agriculture cannot supply easily (e.g. perishable products, products that require rapid delivery upon harvest), that can

replace food imports and it can thus release rural lands for export production of commodities (IDRC, 1998).

3.2. Local economic development

Urban production of food reduces food costs in view of the savings in transport, and storage, and because fewer middlemen and lower marketing costs may be involved.

Since the largest component of household expenditure is that spent on food (low-income households usually spend over 50-70 % of their income on basic food), any savings on food expenditure translates into a significant portion of the family income becoming available for other, non-food expenditures.

If urban agriculture results in surpluses that are sold, the resulting addition to the income can be sizeable.

In **Dar es Salaam** urban agriculture is the second largest urban employer (20 percent of those employed). Urban fresh milk production was worth an estimated USD 7 million in 1993 (Mougeot 1994). The annual gross output of over ten thousand urban agriculture enterprises in the city of Dar es Salaam totalled 27.4 million USD, with an annual added value amounting to 11.1 million USD. In 1991, the individual urban farmer's annual average profit was estimated at 1.6 times the annual minimum salary (Sawio 1998).

In **Addis Abeba,** above-average profits are earned by even the smallest-scale backyard producers with very low capital (Staal 1997).

In **Harare**, savings accruing to small-scale urban farmers are equivalent to more than half a month's salary (Sanyal (1986,1987) cited in Tevera, 1996).

In **Nairobi** in the early 1990s, agriculture provided the highest self-employment earnings among small-scale enterprises and the third highest earnings in all of urban Kenya (House et al. 1993).

The commercial agriculture in **Mexico City's** periurban area contributes substantially to the local economy. In the periurban regions, up to 19 percent of total employment is in agriculture (Pablo Torres Lima, L.M.R. Sanchez, B.I.G. Uriza in Bakker et al. 2000).

In addition to the economic benefits to the urban agricultural producers, urban agriculture stimulates the development of related micro-enterprises: the production of necessary agricultural inputs and the processing, packaging and marketing of outputs. The activities or services rendered by these enterprises may owe their existence wholly or in part to urban agriculture. Other services may also be rendered by independent families and groups (e.g. animal health services, bookkeeping, transportation).

Input production and delivery may include activities such as the collection and composting of urban wastes, production of organic pesticides, fabrication of tools, delivery of water, buying and delivery of chemical fertilisers, etc.

Transformation of foodstuffs may include the making of yoghurt from milk, or the frying of plantains or yams, chicken or eggs, etc. This might be done at the household level, to sell at

the farm gate or in a local shop or market, and in larger units to sell to supermarkets or even for export.

The urban farmers and the small agro-enterprises often form informal clusters or networks.

3.3 Poverty alleviation: social integration of disadvantaged groups

Urban agriculture may function as an important strategy for poverty alleviation and social integration, as should have become clear from the above.

There are several examples of municipalities or NGOs that have initiated urban agriculture projects that involve disadvantaged groups such as orphans, disabled people, women, recent immigrants, or elderly people, with the aim of integrating them more strongly into the urban network and thereby providing them with a decent livelihood. The participants in these projects feel enriched by having the opportunity of working constructively, building their community, working together and in addition producing food and other products for consumption and for sale.

In more developed cities, urban agriculture may be undertaken to enhance the physical and/or psychological relaxation it provides, rather than for food production *per se*. Urban and periurban farms may take on an important role in providing recreational opportunities for citizens (recreational routes, food buying and meals on the farm, visiting facilities) or having educational functions (bringing youth in contact with animals, teaching about ecology, etc.).

3.4 Urban environmental management

Urban agriculture is part of the urban ecological system and can play an important role in the urban environmental management system.

The growing cities produce more and more wastewater and organic waste products. For most cities the disposal of waste has become a serious problem. Urban agriculture can help to solve such problems by turning urban waste into a productive resource.

In many cities initiatives have been taken (by groups of poor people, NGOs, municipal departments or private enterprises) to collect organic refuse from households, vegetable markets and agro-industries in order to produce compost or animal feed. Quality compost is an important input that can fetch a good price. Compost allows an urban farmer to use less chemical fertilisers and pesticides and by doing so preventing problems related to the contamination of groundwater. In addition, compost-making initiatives create employment and provide income for the urban poor. One can also find urban farmers who use fresh organic waste (which may cause environmental and health problems) which is often bought from the drivers of the lorries belonging to the municipal waste collection system.

Urban wastewater may be wholly or partly treated and used for irrigation in agriculture.

However, the wastewater system in most cities is still mainly oriented to disposal of the urban wastewater (with or without treatment) and so far little attention has been paid to the possibilities for recycling this water. In a growing number of cities untreated or partially treated wastewater is used to water parks, woodlands, pastures, orchards, tree nurseries, etc.

Farmers may use fresh wastewater for irrigating their farms when they lack access to other sources of water or because of its high price. The use of fresh (untreated) wastewater has the additional advantage for poor urban farmers that it contains a lot of nutrients (although often not in the proportions required by their soils and crops). It was estimated that at least one tenth of the world's population consumes food produced on wastewater (Lundven, 1992). Increasing water scarcity forces people to make optimal use of available water. However, without proper guidance, the use of untreated wastewater may lead to health and environmental problems.

Therefore, cities need to improve the facilities for treatment and recycling of urban wastewater in agriculture, especially decentralised treatment facilities applying low cost and bio-technologies. However, in most municipalities, the treatment capacity will remain far lower than what is needed for many years to come, and farmers will continue to use raw wastewater - a fact that should prompt municipalities and other actors to take proper accompanying measures. Farmers need to be trained in self-protection during handling of the wastewater, proper crop selection and adequate irrigation methods, in order to minimise the risks associated with the use of raw wastewater.

Technologies such as hydroponics or organoponics, drip irrigation, zero tillage etc. substantially reduce water needs as well as health risks and are very interesting for the urban environment.

Urban agriculture and forestry also contribute to the greening of the city, improve the micro-climate (shade, windbreaks) and the air quality and prevent erosion by planting and managing bare lands and steep slopes.

Urban agriculture may also have a positive impact on the cleanness of the city by turning derelict open spaces into green zones. Degraded open spaces and vacant land are often used as informal waste dumpsites and are a source of crime and health problems. When such zones are turned into productive green spaces, not only is an unhealthy situation cleared, but also the neighbours will passively or actively enjoy the green area.

Urban agriculture can be used to maintain reserve zones free of housing and to act as a buffer zone between conflicting land uses (e.g. between residential and industrial zones).

Urban agriculture conserves energy (less transport, lower storage losses, less packaging).

3.5 Health and environmental risks associated with urban agriculture

The risks that may be associated with the promotion of urban agriculture must be recognised. Food produced in or near cities may be detrimental to human health if soils or irrigation water are contaminated by industries (heavy metals), if untreated urban wastewater is used for irrigation of food crops or fresh solid organic wastes are used as fertiliser, or if hygiene is lacking in the processing and marketing of food. Traffic may have a direct polluting effect on urban crops (lead contamination). Cultivated areas and livestock in cities may attract or provide breeding grounds for rodents and flies and thus can contribute to the spread of diseases they may carry if proper precautions are not taken. Urban agriculture may

contaminate local water sources if high input levels of fertilisers and pesticides are used. Neighbours may complain of the dust, smell and noise created by urban farms.

However, such risks can be prevented and managed by appropriate urban policies, including the provision of adequate extension services to urban farmers. Experience has indicated that urban farming does not stop because city policies prohibit such activities. Hence, a shift is needed from prohibitive regulations to policies oriented towards managing the risks associated with urban agriculture and creating the right conditions for safe food production in urban and periurban areas. In the section on health policy in the next part of this introduction a number of policy measures and actions that may be effective are suggested.

4. Suggested policy measures

The experts participating in the international workshop “Growing Cities, Growing Food”, (Cuba, 1999) recommended a series of policy measures and actions to secure sustainable development of urban agriculture and to enhance its importance for urban policies on urban land use, on urban environmental management, on public health, and economic development.

The workshop on "Appropriate methodologies in urban agriculture research, policy development, planning and implementation" (Nairobi, October 2001) came up with a number of additional recommendations.

The overview presented below provides the local actors with a repertoire of policy options to consider when designing local policies and programmes on urban agriculture. Each of these options requires specification according to local priority needs and conditions.

4.1 A framework for policy and programme development on urban agriculture

Urban agriculture is a cross-sectoral issue that requires a multi-sectoral and multidisciplinary approach, and active participation by the direct stakeholders (farmers' groups, small enterprises involved in input delivery, processing and marketing) and indirect stakeholders (advisory services, credit services, city authorities, health departments, etc.) in the planning and implementation of policies and action programmes.

Analysis of a number of experiences in several cities regarding the integration of urban agriculture in urban planning and programmes (Dubbeling et al., 2001) leads to the conclusion that these experiences, although developed separately, follow a similar logic and methodological process.

In general, the following phases can be identified:

a. Creation of an enabling institutional policy framework

Historically urban agriculture does not have an institutional home, institutions with primary responsibility in agriculture lack a political mandate for urban agriculture, urban agriculture projects are rarely integrated in overall urban planning and little co-ordination between farmers, NGOs and municipal agencies is found.

Against this background, it is recommended that the sectoral department be selected that will act as the *lead agency on urban agriculture.* The lead agency will facilitate communication and co-ordination between the various stakeholders in urban agriculture, guide the process of policy formulation and action planning on urban agriculture, support local initiatives and stimulate documentation and exchange of experiences.

The lead agency will also facilitate the organisation of a *city working group on urban agriculture* and the establishment of *stakeholder platforms* for dialogue and consensus building at neighbourhood levels. All indirect and direct stakeholders in urban agriculture will be invited to participate in the city working group and stakeholder platforms. The city working group and local platforms are the main mechanism for diagnosis of the situation, prioritisation, development of workable solutions for technical problems and resource conflicts, action planning and monitoring.

b. Diagnosis and prioritisation

In this phase, consultative and participatory processes are developed to facilitate and strengthen dialogue between the urban administration and local stakeholders (farmer groups, NGOs, community groups, universities and research centres, the private sector, etc.), in order to decide how best to address and solve priority problems. Diagnosis and prioritisation are implemented using various tools:

- *Participatory diagnosis of the actual situation* through community mapping, field visits, focus group interviews, etc., in order to gain a better idea of the present state of farming in the city (or in a specific part of the city): types of farming, their locations, characteristics of the people involved, inputs used and outputs produced, processing and marketing, main problems, main development potentials, the perspectives of the stakeholders on causes of and solutions to the main problems and future development of UPA.
- *Definition of priorities/objectives and general strategies* with active participation of the various actors involved (local government, farmers groups, NGOs, government sectoral organisations, private enterprises) through discussion meetings or consultative workshops.

Such joint diagnosis and planning is crucial in order to arrive at common understanding of the situation and to create a social and institutional basis for the development of effective policies and action programmes. Working relationships among various actors are thus established or strengthened, and commitments and resources for further action programming are generated.

c. Elaboration of Action Plans

The results of the first phase lead to a period of participatory action planning and budgeting and definition of the commitments and contributions of each of the partners through working groups and plenary sessions of the local stakeholder forums and city working group. The general aim is not only to identify operative solutions to local needs and problems, but also the strengthening of the capacities of local actors. The resulting action plans are operational plans for action by local actors, endorsed by local governments and with identified financial and human resources for their implementation.

d. Implementation and monitoring

The action plan represents the starting point of the implementation of activities to realise the objectives set.

The implementation phase can include a combination of several types of activities:

- Implementation of specific pilot projects (farmer education and training programmes, technology development activities, creation of market infrastructure, lease of public land to farmer groups, etc.)
- Formulation of appropriate policies on urban agriculture, specified for locations and type of farming
- Revision of existing land use and city development plans to integrate urban agriculture as a legitimate form of land use
- Elaboration and adoption of an appropriate legal framework on urban agriculture and removal of unfounded legal restrictions
- Creation of new models of financing for urban agriculture and related micro-enterprises and/or integration of agriculture in existing financial programmes
- Strengthening of urban farmer organisations and related micro-enterprises and their linkages (market chain, cluster development)

Careful monitoring of the experiences gained is an important condition for continued learning and improvement of the approach. Participation of the range of stakeholders in the periodic evaluation of the ongoing process is crucial, since the various actors may have different views on the same incidents. Focus interviews and multi-actor evaluation workshops are two of the methods that may be applied.

e. Institutionalisation / upscaling

The process set in motion should be anchored within the existing institutions in order to become sustainable.

In many cities (e.g. Dar es Salaam) the success of the initial activities has led to the creation of a Department of Urban Agriculture.

The development of an appropriate and differentiated legal framework for urban agriculture is an important step. In addition, the integration of agriculture in official statistics, urban land use surveys, etcetera is important for the institutionalisation of urban agriculture.

The experiences gained with participatory planning on urban agriculture should lead to its acceptance as an integral part of urban strategic development and land use plans. Also, the inclusion of urban agriculture in the regular programmes of sectoral organisations (agriculture, environmental department, health department, economic department) deserves a lot of attention in this phase.

4.2. Integration in urban Land Use Planning

Access to land and water resources as well as security of user rights are crucial factors in the development of urban farming. Urban agriculture is - to a large extent - being done on land that is not owned by the user: roadsides, riverbanks, along railroads, vacant private lands, parks, etc. The use of such areas is, in principle, transitional and user rights are minimal.

However, various systems of informal rent, lease and inheritance exist. Fear of eviction leads people to plant quick-yielding seasonal crops and to avoid investments in soil quality, tree and shrub components, erosion prevention, water-harvesting measures, etc.

Access to prime locations is fiercely disputed. In the periurban areas the growing city leads to rising land prices and gradual conversion of agricultural lands into built up areas (with or without legal permission). The changing conditions also lead to changes in the farming systems, from extensive to more intensive production systems, both in space utilisation as well as in labour and capital investment.

Meanwhile, studies indicate that in most cities in developing countries large amounts of public and private land are vacant or under-utilised, even in the inner-city areas.

Important measures that could be taken to improve access of urban agriculturists to land and water include the following:

- The revision of actual urban zoning by-laws and indication in which zones specified modalities of urban agriculture are allowed or even promoted, and other zones where certain farming systems will be prohibited due to special conditions (capturing of drinking water; area sensitive to erosion).
- Access to land can be enhanced by offering vacant urban open spaces and semi-public spaces (grounds of schools, hospitals, prisons, etc.) with a medium-term lease for gardening and other agricultural purposes to community groups, farmer co-operatives and/or unemployed people (purpose-specific leaseholds).
- Promotion of multifunctional land use and promotion of community participation in the management of urban open spaces. Under certain conditions urban farming can be combined with other compatible land uses; farmers can be used as co-managers of parks, recreational areas, water storage areas, nature reserves, fire break zones, zones with high earthquake or flooding risk, etc.; by doing so the management costs of such areas may be reduced, and protection against unofficial uses and informal re-zoning may be enhanced. Agriculture can be used to make degenerated “green zones" green and keep reserve areas free from being built upon. It can also act to form a buffer zone between competing land uses (e.g. residential and industrial areas).
- The inclusion of space for individual or community gardens in new public housing projects and requiring the inclusion of such spaces in private building schemes. In case of planned conversion of agricultural areas for other land uses, the urban farmers could be supplied with alternative lands (land swaps).

4.3. Inclusion of agriculture in urban food security policies

As we have shown in the first part of this introduction, urban agriculture plays a crucial role in the urban food systems and food security and nutrition of poor and disadvantaged urban citizens. Even though cities will remain largely dependent on the input from the rural areas and international supply, cities can and should consciously pursue a greater degree of self-reliance in food.

The attention of agricultural service institutions has been mainly been directed to rural agriculture. Access of urban farmers to extension services, training, technical advice and

animal health services in most cities is very restricted and focuses mainly on fulltime commercial larger scale farms. As a consequence the technologies that are applied by the large majority of the urban farmers are often underdeveloped and not well adapted to the specific requirements of the urban environment, although the scope for technology development and an increase in efficiency and output is vast.

The existing credit and marketing services and programmes supporting micro-enterprise development often pay little or no attention to agricultural micro-enterprises (involved in production and/or processing and marketing of agricultural products).

Recommended policy measures and actions include the following:

- Provision of budget and expertise to boost the preparation of broader urban agriculture programmes (see the examples of Dar es Salaam and Cuenca).
- Stimulation of participatory adapted research, oriented towards development of technologies suitable for farming in confined spaces and with low risks for health and the urban environment (ecological practices, space intensive technologies, water saving technologies, health risk reducing practices, etc.). Organisation of farmers' study clubs that actively engage in the technology development and adaptation process.
- Provision of training and technical advice to urban farmers, with a strong emphasis on ecological farming practices; organisation of low cost and participatory systems for animal health services.
- Improvement of the access of urban farmers (with an emphasis on the women producers and the resource poor) to credit schemes for investments in the production infrastructure and innovation of production technologies ; revision of loan conditions and/or establishing micro-credit schemes for urban farmers.
- Facilitating the local marketing of fresh urban produced food, by
  - Authorising local farmer markets, food box schemes and other forms of direct selling of fresh agricultural produce from urban producers to local consumers (under condition of safe-food handling requirements and control of product quality).
  - Creation of the minimum infrastructure required for local farmers markets.
- Promotion of small-scale enterprises linked with urban agriculture, i.e. input suppliers (compost production, plant and fruit tree nurseries, vermiculture, local seed and fodder production) and enterprises for processing and marketing locally produced food (processing, packaging, street vending, local markets, transport), by:
  - Provision of licences to starting micro-entrepreneurs
  - Provision of technical and management assistance to small enterprises
  - Enhancing access to credit and technical support to enable the creation and improvement of local infrastructure for small-scale food preservation and storage facilities (i.e. canning, bottling, pickling, drying, smoking).

4.4. Integration of agriculture in the urban environmental policies

The potential of urban agriculture for improving the urban ecology was explained above.

The following measures may be applied in order to enhance the positive environmental impacts of urban agriculture and to prevent negative effects on city environment:

- Establishment of low-cost facilities for sorting of organic wastes (households, vegetable markets, agro-industry) and production of compost and animal feed or biogas; stimulation of practical research to develop adequate composting and digesting technologies.
- Promotion of investments in systems for rainwater collection and storage, construction of wells and the establishment of localised water-efficient irrigation systems (e.g. drip irrigation) in order to reduce the demand for expensive piped (drinking) water.
- Implementation of pilot projects with decentralised collection and treatment of household wastewater (preferably with biological methods) with view to its reuse in agricultural production.
- Promotion of use of untreated or partially treated (household) wastewater for the irrigation of woodlands and parks, orchards, pastures, root crops and grains, nurseries for tree seedlings and ornamental plants, etc. in order to reduce the demand for expensive piped (drinking) water and make productive use of wastewater and included nutrients.
- Promotion of the supply of natural fertilisers, biopesticides, soil amendments and quality seeds to urban farmers, e.g. by providing incentives (such as reduced taxes) for enterprises that produce ecological friendly agricultural inputs.

4.5 Integration of agriculture in urban health policies

Urban agriculture has a important role in improving the health and nutrition status of large groups of the urban population and elsewhere in this introduction various measures have been mentioned that may lead to further development of that potential.

We have also indicated that urban agriculture may have some detrimental effects on the city environment and health if no proper guidelines are offered or regulatory measures taken.

City managers will have to combine the stimulation of urban food production (with a view to enhancing food security, local economic development, recycling, etc.) with preventive and regulating measures to address the health risks associated with food production in the city.

The following measures may be taken to prevent and diminish the health risks associated with urban and periurban food production:

- Farmer education on the health risks associated with urban farming, their causes and practical ways to prevent such problems can be highly effective. Examples of preventive measures that can be taken by farmers themselves include proper choice of crops in relation to the location of production and the quality of the soils and water, proper choice of irrigation methods, proper handling of the products (e.g. washing or scraping of products in areas with air pollution), adequate siting of animal housing, hygienic handling of feed and manure handling, proper handling of waste products and wastewater.
- Promotion of ecological farming practices such as integrated pest and disease management, ecological soil fertility management, soil and water conservation, etc. through:
  - Farmer training and practical demonstrations
  - Promotion of the production and supply of natural fertilisers, biopesticides, soil amendments and quality seeds to urban farmers, by providing incentives (e.g. reduced

taxes) for enterprises that produce environment-friendly agricultural inputs and meet certain quality standards (nutrients, health standards)
- Support to local initiatives for marketing of ecologically grown food and the establishment of “green labels” for organically grown and safe urban produced food.

- Consumer education on preventive measures (washing, cooking), safe food labels and locations where these can be obtained, etc.
- Organisation of joint agriculture/health programmes on prevention of vector born diseases with emphasis on adequate environmental management (e.g. proper design of irrigation systems, good drainage of surface water and proper selection of crops in malaria sensitive periurban areas).
- Restrictions on production of certain types of crops or animals or certain farming practices in specific parts of the city where such crops, animals, practices may cause unacceptable health risks (and related measures to effectively control and maintain that restriction).
- Education of food processing and marketing micro-enterprises on health risks and the hygienic standards to be maintained and strict control of slaughterhouses.

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UNDP. 1996. *Urban Agriculture: Food, Jobs and Sustainable cities*

1. Impacts of Urban Agriculture

1.1 Foodsecurity and Nutrition

A variety of green vegetables is produced and sold in the city.

(Picture: UMP-LAC)

The Importance of Urban Agriculture to Food and Nutrition

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Introduction

Few trends seem more certain at the dawn of the 21st century than the rapid urbanisation of the global population, especially in developing countries. Sixty-six percent of the world's urban population lives in developing countries—a proportion that will increase to 80 percent by the year 2030. By 2030, almost 85 percent of Latin Americans will live in cities, as will over 50 percent of the African and Asian populations (United Nations 1998). Poverty, food insecurity and malnutrition—long thought of as predominantly rural problems—are increasingly becoming urban concerns (Atkinson, 1992; von Braun et al., 1993; Ruel, et al., 1998; Haddad et al., 1998). In general, current-status comparisons between rural and urban populations tend to portray urban populations as having better food security and nutritional status. However, the rate at which urban poverty is increasing—compounded by the rate at which urban populations are growing—indicates that that food security and malnutrition are going to be critical problems in urban areas in the 21st century (Ruel et al., 1998; Koc et al., 1999; Maxwell et al., 2000). Urban agriculture is therefore a critical topic to examine: to understand urban food insecurity and malnutrition; to understand ways in which urban residents have mobilised resources to meet some of their own food needs, and to develop appropriate strategies to ensure food security in urban areas.

Much of the resurgent interest in urban agriculture in the 1980s was sparked by studies in developing countries—mainly Africa (Sanyal 1985; Rakodi 1988; Lee-Smith et al., 1987; Freeman, 1991; Mvena et al., 1991; Sawio, 1993; Drakakis-Smith, 1991; Egziabher et al., 1994; Maxwell, 1995; Maxwell and Zziwa, 1992; Rogerson, 1993; Mbiba, 1995), or populations struggling with the transition from centrally-planned to free-market economies (Rose and Tikhominov, 1993; Bellows, 1999). This literature examined the extent to which urban populations were meeting some of their food requirements through home production. This literature largely reflects the original conclusions of Sanyal (1985) on the primary reasons for urban agriculture in Lusaka, Zambia: it is predominantly a strategy adopted by households whose monetary incomes are not enough to purchase sufficient food. In Latin America and Asia, commercial urban farming is more highly developed, especially with regard to vegetable and perishable-food production, but some of this production is also for home consumption (Yeung, 1985; Prudencio-Bohrt, 1993).

Throughout the 1990s, the interest in urban agriculture was merged with consumer concerns in the industrialised countries that were concerned not only with hunger issues, but which placed higher value on community decisions about the availability of a diversity of locally produced fresh or organic foods, and food safety (Koc et al., 1999; UNDP, 1996). This literature combines the concern over food with the broader themes of land use in urban and suburban areas, the recycling of urban wastes and maintenance of sustainable urban food systems. Contemporary research on urban agriculture thus serves as a common thread among a number of diverse interest groups. One major unifying theme is the impact that urban agriculture has on some element of food security or nutrition. Several specific topics

stand out: these are briefly reviewed below.

Food Supply and Availability

The first theme is the impact of urban agriculture on the overall availability and supply of food for urban markets. Empirical findings vary widely, and comparisons are impeded greatly by differing definitions of urban areas or urban agriculture. UNDP, for example, defines urban agriculture in terms of “foodsheds” (UNDP, 1996). Others define the practice in terms strictly limited to municipal boundaries. Thus comparisons of the contribution of urban agriculture to the overall food supply are fraught with methodological difficulties. Nevertheless, some attempts have been made to quantify such contributions. One of the pioneering studies in East Africa (Memon and Lee-Smith, 1993) estimated that 44 million dollars worth of food was produced in Kenyan cities in 1985. Maxwell and Zziwa (1992) estimated 20 percent of staple food needs in Kampala, Uganda were met from urban production. Perhaps more important is the contribution of fresh or high-value foods to the urban market. The proportion of total urban consumption of vegetables or poultry coming from urban agriculture can be quite high. In Asian cities, home production accounts for up to 90% of vegetable production and as much as 70 percent of poultry products—both meat and eggs (UNDP, 1996). Generally, however, reliable data about the proportion of the total urban food supply coming from urban production are scarce: studies are scattered, location-specific, and use varying definitions of urban agriculture. Urban production is rarely a category found in national data sets.

Access to Food at the Household Level

Definitional problems also exist with urban households, but there has been much more empirical research regarding the impact of urban agriculture on access to food at the level of the urban household. Many of these studies examine the impact of urban agriculture on household income, including fungible income in-kind, as the means of measuring impact (Freeman, 1991). Other studies compare the food security of urban farming and non-farming households (Maxwell, 1995; Mwangi, 1995). Conclusions vary. A study by the Noguchi Memorial Institute for Medical Research in Ghana (Armar-Klemesu, et al., 1998) found little measurable impact on consumption or overall food security from involvement in urban farming. The other studies noted above have found a strong correlation, through both a subsistence consumption pathway and a cash income pathway, particularly among low-income households (though not the very poorest). Even if the proportion of total household access to food from home production is small, part of the importance of semi-subsistence strategies is that the household can access this food at critical times, such as when income is insufficient for food purchases, or can access foods that add to dietary diversity. Some studies also consider the impact on food consumption of urban production of fuel wood—particularly in contexts where access to fuel for cooking is a critical constraint. The general conclusion of these studies is that urban production of fuel wood is as least as critical as the production of food (Lee Smith et al., 1987).

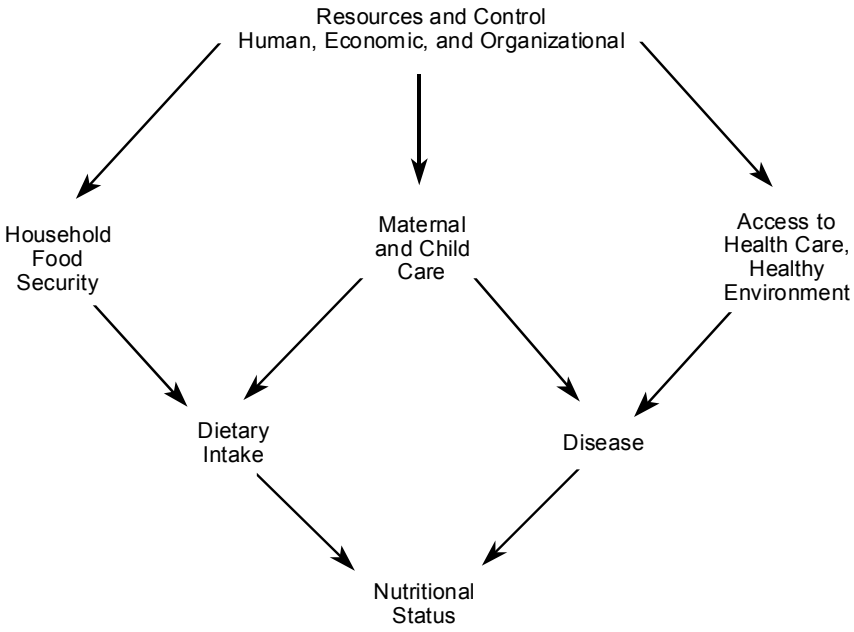
Impact on Nutrition

The UNICEF framework for understanding malnutrition has now been widely applied in urban areas. Briefly reproduced in Figure 1, the framework notes the importance not only of access to adequate food in achieving adequate nutritional status, but also the importance of health and care practices. Few studies have quantitatively measured the impact of urban agriculture on child nutritional status. One of the few that does (Maxwell, Levin and Csete, 1998), notes that not only is urban agriculture significantly correlated with higher child nutritional status in a

multi-variate analysis, it is the single most important determinant. Mwangi (1995) shows similar results in bi-variate analysis.

Other important impacts of urban agriculture on nutrition include making available at lower cost, fresh, locally grown vegetables and other perishable crops; lowering their cost and increasing their availability; and improving micronutrient content of diets. The environmental and health impacts of urban agriculture can be both positive and negative. Some research notes the potential of urban agriculture to recycle wastewater and organic materials, and thus contribute to solving waste disposal problems in rapidly growing cities (Smit and Nasr, 1992). But this suggestion increases the concern over food safety, particularly contamination from the use of untreated wastewater for irrigation. One of the few empirical analyses of this question (Akpedonu et al., 1998) compared the source of production (urban vs. rural), and the source of water (sewage vs. tap or rainwater). The study found both (source of production and source of irrigation water) to be insignificant as determinants of levels of bacterial contamination: the sanitation level in the marketing chain was the determining factor. The unregulated usage of agricultural chemicals in a densely populated environment also poses potential dangers to health. These factors make it difficult to generalise about the impact of urban agriculture on the environment and on health. Further research and improved regulatory capacity are necessary to ensure that urban farming practices actually safeguard human health (Birley and Lock, 1998; UNDP, 1996).

Figure 1. The UNICEF Framework: Food Security, Dietary Intake, and Nutritional Status



Source: Adapted from UNICEF (1990).

Concerns in Industrialised Countries

Urban agriculture has increasingly been of interest to a wealthier, more food-secure constituency in industrialised countries as well, but for different reasons. These include greater community control over local food sources and food safety, protecting where necessary small family producers that might otherwise be forced out of business, ensuring accessibility of fresh produce from local organic producers, and in general maintaining adequate dietary diversity and food freshness. This has been combined with the concern over the dismantling of state-operated safety nets and welfare systems, and increasing local or municipal responsibility for replacing such safety nets with more localised mechanisms (Bakker, et al., 2000; Allen, 1999; Power, 1999). Much of this has been accomplished through the development of formal local food policy councils, constituted from among a variety of stakeholders in local food systems including producers, wholesalers, retailers, consumers and local authorities, although a significant amount has also been achieved through purely voluntary citizen action (Dahlberg, 1999; MacRae, 1999; Lang, 1999). Many of these concerns were brought together in a recent book by Koc et al. (1999).

Gaps in Knowledge: Questions for Future Research

Despite the rapid expansion in knowledge about urban agriculture, several areas remain poorly understood, and several new trends require investigation. First, significant anecdotal evidence suggests that urban agriculture has become less a strategy of poor households as more middle and upper-class families have become involved: urban agriculture may be moving away from being a food access strategy of the poor towards a more commercialised strategy of the middle class. In a few cases, urban agriculture may have been the means of the poor reaching the middle class, and in some cases, changes may reflect broader growth and improvement in the overall urban economy. But more often this trend appears to reflect a change in access to resources—with more powerful urban interests realizing the value of under utilized urban land and the profit of urban production. Further research is required to test this hypothesis, and if true, to identify its consequences.

Second, where urban agriculture remains (or has become) a viable strategy of the urban poor to achieve food and nutrition security, more must be understood about the constraints faced by low-income urban farmers. Often these include legal and regulatory issues, as well as the question of access—often informal access—to urban land. The fact that so many urban farmers are women increases these concerns since women often have less access to recourse. There is widespread but poorly understood evidence that the manner in which urban authorities deal with a variety of urban problems—crowding, health, and the widespread failure of urban services and infrastructure to keep up with population growth—end up undermining the livelihoods of the urban poor. Knowledge and examples of best practices in this area have grown, but much remains to be done.

Third, advocates of urban agriculture need to take one step back from time to time and consider more broadly the overall role of urban agriculture vis à vis rural production. Urban agriculture advocates tend to see endless possibilities and demand; agricultural planners and economists, on the other hand, tend to be less sanguine about an overall strategy for urban agriculture. The goal, after all, is not to promote urban agriculture per se, but rather to promote food and nutrition security for the urban poor as well as middle class consumers, and to promote sustainable urban environmental systems. Urban agriculture will undoubtedly

continue to have a role to play, but strategies must be developed locally, and must take into account a broader picture than is sometimes presented. This not only ensures that urban agriculture contributes to sustainable strategies for achieving food security and nutrition, but also to the policies that will sustain the practices required for achieving those goals.

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food security and nutrition

India; food production; food distribution; food policy

In the late 1970s and early 1980s, about one million men, women and children lined up every day in front of the "fair price shop" to buy their weekly or fortnightly ration of food. There were about 50 000 of these privately-owned, government-subsidized shops in India's 3 000 urban centres. This paper examines past trends in food production, urban growth and net availability of food in urban areas. It then presents the results of a study of the organization and efficiency of food procurement by the government-owned corporation; the layout of the public food distribution system in 30 sample cities, and by income group in Delhi; and public perception of the performance of the system in the cities of Delhi, Jaipur, Patna and Ferozabad. The results highlighted glaring intracity, intercity and interregional disparities, and the urgent need to save the fast diminishing welfare content of the public distribution policy. (HC, IDRC)

Aipira, Hoffman; Cockburn, Charles **(1994). Urban farming in low-income cities: proceedings of the first workshop on 'Urban Farming: Strategy for Food and Environmental Health in Low-Income Cities. One World Series. 26 p. ISBN 0_904761_44_4. Institute of Advanced Architectural Studies (IoAAS)**

food security and nutrition city ecology

waste recycling; food security; climate amelioration; energy; land reclamation;

nutrition; garden city

This booklet contains the workshop report on the first workshop on 'Urban Farming: Strategy for Food and Environmental Health in Low-Income Cities' as well as a paper by Hoffman Aipira 'Urban farming: beyond feeding the masses'. From the notion that in many low income cities informal cultivation of crops and raising animals are increasingly adopted as a strategy for self-reliance in food and fuelwood supply, this paper introduces the concept of urban farming. Issues, policies and practices including problems are discussed. Links with other city systems such as waste management, energy, land reclamation, are evaluated. (NB)

Akinyele, Isaac O **et al (1988). Street foods. FAO Food and Nutrition Paper no. 46. 96 p.**
food security and nutrition
street food; nutrition; safe food

This is a report of an eight-expert meeting. It concludes that street food has an enormous impact on the urban food supply economically as well as socially and nutritionally. It considers their composition, availability and safety. Experiences were shared from all five continents. It is focussed on ‘food protection for urban consumers’, with the aim of generating guidelines to ensure adequate and effective measures to provide for the improved quality and safety of street foods. (JS)

Allen, Patricia **(1999). Contemporary food and farm policy in the United States. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 177-181. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition economic impact
food policy; United States; agricultural policies; food programmes; food security

Two movements affecting the food security of Americans have emerged in recent years. One is the community food-security movement, dedicated to ensuring that everyone has the ability to obtain a nutritionally adequate diet. The other is the movement to dismantle social-welfare programs to "end welfare as we know it." While interest in domestic food security is increasing in some areas the food-security safety net is unraveling in others. These notions are distinctly at odds with expectations for commercial agriculture. This paper explores the character of the disjuncture between governmental farm and food programs. It examines the demographic characteristics of those who benefit from food programs and of those who benefit from farm programs. The privileging of agricultural producers over poor consumers is framed in its political and ideological context. Ensuring food security for the poor will require innovative food policies capable of operating effectively in this political and ideological environment. (Abstract adapted from original)

Amend, Jörg (1998). Status of soil contamination and soil fertility: the case of urban agriculture in Dar es Salaam. 20 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
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health and environment food security and nutrition
soil contamination; soil fertility; lead; cadmium; zinc; pH; organic matter; Tanzania

Reports on a survey in Dar es Salaam conducted by the Urban Vegetable Promotion Project (UVPP) with the aim to obtain more information on soil contamination and soil fertility on its project sites. Generally, the contamination with lead and cadmium was very low. The highest concentrations, still below threshold values, were found along a major artery road. Zinc however might cause some problems in some areas. The highest concentrations were found in an area previously used as a dumpsite. Soil fertility was generally good due to constant provision of organic manure. (NB)

Anon., **(1998) Survival Strategy of Urban Households. Nairobi: The Regional Land Management Unit (RELMA) / Sida. Report of a Workshop on East and Southern Africa, Nairobi, Kenya, 3-5 May 1998**
food security and nutrition, rural-urban linkages
urban food production; food security; survival strategies; rural-urban linkages; workshops

Urban agriculture was neglected by researchers and policy makers alike until recently. A number of researchers who pioneered the topic in East and Southern Africa attended the workshop described here, organized jointlyu by RELMA, PROP, a Swedish population research unit, and Mazingira Institute, a Kenyan NGO. The focus is on urban food production (UFP) as a survival strategy of poor urban households.

UFP is likely to be critical to food security in the coming decades. This booklet outlines research and policy priorities in easily readable form. It highlights the importance of understanding rural/urban linkages in relation to food security.

Anon. **(1997) Myths about Food and Low Income: If they don't eat a healthy diet, it's their own fault! London: National food Alliance**
food security and nutrition
health; nutrition; food; poverty

This document for community and health workers, local and national policy makers, challenges the myths and assumptions about people’s ability to eat healthily on a low income. Myths include, "They don’t know how to shop or cook properly" and "They spend too much on take-away food".

Anon., **Food and Nutrition Action Plans on South-East Europe: A Workshop For Policy-Makers, Report on a WHO Workshop. Kranj, Slovenia 1-3 June 2000, European Health21 Target 11.**
Supplier: Scherfigsvej 8, DK-2100 Copenhagen, Denmark

food security and nutrition health / pollution
nutrition; food safety; workshops; health; Europe (Eastern)

Following a consultation in Malta in November 1999, attended by

representatives of most of the 51 Member States of the WHO European

Region, the Regional Office began a process to help develop food and nutrition action plans throughout the Region. The participants in the present workshop were from south-east Europe and neighbouring countries. They met to improve the skills needed to develop intersectoral policies in relation to food and nutrition, and to establish a food and nutrition network for south-east Europe This will enable them to promote sustainable development as well as regional cohesion and stability through the development of food and nutrition action plans. The 35 participants, who came from 8 countries and represented 7 different sectors, expressed interest in and commitment to developing vital cross-sectoral links in the areas of nutrition, food safety and sustainable development. The workshop was based on a training manual entitled Food and nutrition action plans. A manual for policy-makers, which is being developed. The Workshop therefore served to test the training manual, and the participants provided useful feedback in this respect.

Anon., **(2001) Urban and Peri-Urban Food and Nutrition Action Plan: Elements for Community Action to Promote Social Cohesion and Reduce Inequalities through Local Production for Local Consumption. WHO Regional Office for Europe Programme for Nutrition and Food Security. ETC, The Netherlands. WHO Centre for Urban Health. European Health21, Target 11**
Supplier: WHO Regional Office for Europe, Scherfigsvej 8, DK-2100 Copenhagen, Denmark
food security and nutrition health / pollution community development
action plan; nutrition; food production; agriculture; community initiatives; social issues; policy; health; food consumption, Europe (Western), Europe (Eastern)

The overall objective of the Urban and Peri-Urban Food and Nutrition Action Plan is to promote health and quality of life through an integrated, comprehensive food and nutrition policy, in local communities. The benefits of increasing the amount and distribution of locally grown food, especially vegetable and fruit include: environmental; social; and direct and indirect economic benefits in addition to health benefits. The Action Plan is written for everyone, from the local/municipal authorities through to the community itself, interested in achieving a sustainable development through food and nutrition policies. Polcicies which advocate sustainable food production, equitable distribution, wide access and increased consumption of vegetable and food is a concrete way of achieving Health for All in the 21st Century. Grwoing, buying and eating more vegetables and fruits can reduce the risk of non-communicable disease such as cardiovascular diseases and certain types of cancer and can simultaneously promote healthy environments and sustainable development. A common problem throughout the Region is the poor availability and inequitable access to micronutrient rich vegetables and fruit, especially by vulnerable groups, resulting in micronutrient deficiency. This lack of availability and access creates barriers to increasing fruit and vegetable consumption. Actions, described in

this Action Plan, to improve equity; promote local sustainability; empower vulnerable groups; reduce social and health problems and promote social justice while simultaneously preventing micronutrient deficiency and reducing the prevalence of cardiovascular disease and cancer. This document also presents options, space for creativity and adaption to local circumstances.

Anon., **(2001), The First Action Plan for Food and Nutrition Policy, WHO European Region 2000-2005. Copenhagen: WHO, Nutrition and Food Security Programme.**
Supplier: WHO, Scherfigsvej 8, 2100 Copenhagen, Denmark
food security and nutrition
nutrition; policy; regional planning; health; monitoring & evaluation; evaluation; safe food; food contamination; children's health; well-being; Europe (Western), Europe (Eastern)

Access to a safe and healthy variety of food, as a fundamental human right, was stressed by the International Conference on Nutrition in 1992 and by the World Food Summit in 1996. A supply of nutritious and safe food is a prerequisite for health protection and promotion. In spite of commitments expressed and efforts made at national and international levels, there is still a need for policies which reduce the burden of food-related ill health and its cost to society and health services. This document stresses the need to develop food and nutrition policies which protect and promote health and reduce the burden of food-related disease, while contributing to socio-economic development and a sustainable environment. It insists on the complementary roles played by different sectors in the formulation and implementation of such policies. It provides a framework within which Member States can begin to address the issue. An action plan is proposed for the period 2000-2005, with approaches and activities to support Member States who wish to develop, implement and evaluate their food and nutrition policies.

Argenti, Olivio, **(2000) Food for the cities : food supply and distribution policies to reduce urban food security. Food and Agriculture Organization (FAO) / Programa de Gestion Urbana. Food into Cities ; DT/43-OOE / Cuaderno de Trabajo, no. 77**
food security and nutrition
food supply; food distribution; food security

This briefing guide for mayors, city executives and urban planners in developing countries and countries in transition is a practical and accessible document for planners and decision makers in towns supplying a lot of basic information and solutions to common problems that arise when trying to feed a growing number of citizens. There is a main text with many pictures and frames containing extra information, case studies and summaries of the text.(WiH)

Armar-Klemesu, Margaret; Maxwell, Daniel G. **(2000). Accra: urban agriculture as an asset strategy, supplementing income and diets. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 203-208. DSE, GTZ, CTA, SIDA**
economic impact food security and nutrition
farming systems; livestock; vegetable production; asset strategy; land use systems;

food security; health; ecology; economic impact; gender; urban policies; livelihoods; reuse of waste; Accra; Ghana

Urban agriculture was identified as an important element for a study on livelihoods, food and nutrition in Greater Accra. Different farming types were distinguished and analysed with regard to food security, household economics, health ecology and gender.Farming is done for three main reasons dependent on the farming type: cash income, food subsistence and assets strategy for emergencies. Men and women do have different roles in urban agriculture whereby women's activities tend to contribute more to household food security than men's and women dominate the marketing of crops. Urban agriculture improves food security in terms of availability and access. Crops were analysed to assess health risks and it was found that for rural and urban crops the main source of bacterial contamination is in the transport of the crops. Main issues for urban farmers are land, theft and marketing. Urban agriculture is still missing from municipal planning. The loss of agricultural land is a major reason for concern. (NB)

Armar-Klemesu, Margaret **(2000). Urban agriculture and food security, nutrition and health. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 99-117. DSE, GTZ, CTA, SIDA**

food security and nutrition

food security; health risks; food contamination; food systems; urbanisation

Starting with general concepts and definitions of food security the paper explores its implications in an urban context. The availability, access and safety aspects of food security are discussed and examples of innovative practises to enhance food security are provided. It is argued success of the initiatives depends on awareness. And today city governments are beginning to recognise that local food production may be an important component of urban food systems and food security. (NB)

Asia Urbs **(2000) Feeding the Cities. In: *Asia Urbs Magazine, no. 5*, Summer 2000, pp. 7-8.**

Supplier : Asia Urbs Secretariat, Rue Belliard 205, B-1040 Brussels, Belgium

food security and nutrition

food security; Asia; non governmental organisations; development co-operation;

Importing food has always been a major activity of city life. But as the size of populations gorw and the logistics become more complex, urban planners are having to address issues of food security. Vincent Rotge, Asia Urbs Project Operations Manager, told an audience in Bangkok recently that the Asia Urbs Programme can play a key role in this area.

Atkinson, Sarah J **(1995). Approaches and actors in urban food security in developing countries. In: Habitat International vol. 19 (1995) no. 2 p. 151-163. University of Manchester, UK**

food security and nutrition

food security; consumption patterns; access to food

While much has been written concerning rural food security, associations and predictive models, work on urban food security remains fragmented with reset mostly on epidemiological nutrition or on consumption economics. The paper divides factors affecting urban food security into supply, access, choice, health and social organisation. Some of the policy options available for improving food security for the urban poor are presented in each category. The appropriateness is queried of relying on the household as the basic planning unit in urban areas and the need emphasised for immediate research which can assess the effectiveness of initiatives which attempt to bring different actors and agencies together to develop policy and strategies at the city level. (Original abstract)

Azami, Shaheda **(1996). Food processing and urbanization in Bangladesh. In: Appropriate Technology vol. 23 (1996) no. 1 p. 9-11**
services food security and nutrition
Bangladesh; Dhaka; food processing; food distribution; street vendors

Deals with street vending of snacks in Dhaka. The article describes a number of cases putting in evidence the entrepreneurship of street vendors and the problems they have to cope with. In order to expand and/or improve their businesses more training in different aspects of food processing techniques and business planning would be necessary, though. (WB)

Azuba, S.M. **(2002) The Magnitude of Urban Food Poverty in Uganda, The Case of Kampala. Paper for the "Regional Workshop on Urban Policy Implications of Enhancing Food Security in African Cities", organized by UN_HABITAT (with FAO, IDRC, SIUPA), 27-31 May 2002, Nairobi**
food security and nutrition
urban poverty; Uganda; food security

This presentation focuses on the general food situation in Kampala, with an orientation towards urban poverty and urban food insecurity. It is based on existing studies, literature and experiences from working within the city.

Ba Diao, M.**. L'élevage laitier en zone périurbaine de Dakar: situation et perspectives. Agriculture périurbaine en Afrique subsaharienne p. 149-159**
food security and nutrition urban livestock
Senegal; dairy products; public health; periurban agriculture

Senegal faces a considerable dairy product shortfall. Domestic consumption is for 50% covered by imports, primarily of powdered milk. Private or semi-public initiatives, based on importing exotic animals, have been launched, but nevertheless intensive dairy farming is still at its infancy. It is difficult to acquire inputs required, particular animal feed besides the marketing system and technical management pose problems. The socio-economic environment in the dairy sector makes dairy farming costly and thus hard to practise on small scale farms. (NB - abstract adapted form original)

Bakker, Nico; Dubbeling, Marielle; Guendel, Sabine; Sabel-Koschella, Ulrich; Zeeuw, Henk de (eds) **(2000). Growing cities, growing food: urban agriculture on the policy agenda. 542 p. ISBN 3-934068-25-1. DSE, GTZ, CTA, SIDA**

food security and nutrition R&D methodology

food security; economic aspects; ecology; waste recycling; community aspects; hydroponics; urban livestock; urban farming systems; policy environment; urban planning

This reader contributes to the debate over the value of urban agriculture for sustainable urban development in a thematic way. Definitions and presence of urban agriculture are explored. From there, potential contributions of urban agriculture on food security, household economics and city ecology are examined. Policy and institutional options and implications are discussed. The second part of the reader contains case studies from selected cities in Asia, Africa, Latin America and Europe which pursue a system-oriented approach to understanding urban agriculture and its ecological, economic and food security impacts in different political, economic, demographic and ecological conditions. The authors range from urban planners, researchers, project co-ordinators and NGO staff both from developing and northern countries. (NB)

Barrs, Rob **(1997). Sustainable urban food production in the city of Vancouver: an analytical and strategy framework for planners and decision makers. Urban Agriculture Notes; on: http://www.cityfarmer.org/barrsUAvanc.html. 42 p. School of Community & Regional Planning, Univ. of British Columbia, Canada Supplier: City Farmer, Canada's Office of Urban Agriculture**

food security and nutrition

Canada; Vancouver; urban planning

Provides a broad overview of potentialities and constraints of food production in Vancouver. Sustainability of city development is examined from ecological, social and economic viewpoints. Special focus is on growing food in interstitial and under-utilised spaces in the city. As the author states: 'it is a greening of the city that emerges from the cracks left in the contemporary asphalt. (WB)

Bastianelli, D. ; Arbelot, B.; Guérin, Hubert **Développement et organisation des filiéres avicoles autour de Dakar. II. Organisation d'un service d'appui et de controle sur la qualité des aliments de bétail Agriculture périurbaine en Afrique subsaharienne, p. 167-172**

food security and nutrition urban livestock

poultry farming; periurban agriculture; Senegal;

The project aimed at supporting the creation of a poultry feed production and raw material quality control service in the Dakar region. The urban poultry sector is characterised by a recent rapid expansion and a some what lacking structure. Other features are a larger market, more open to industrial poultry products, easier access

to supplies etc. Eventually there might occur problems regarding noise and manure disposal. This influence as described decreases in Dakar the further one moves from the city. Further development of the sector requires good availability of inputs and services. However this would require a minimum of coherence and organisation, which are lacking. As quality control in the animal feed market is sometimes inadequate producers prefer to cut costs rather than to improve the quality. The key bottlenecks can only be addressed by strong political will. However in some of the areas like organisation of interest groups farmers can organise themselves. Addressing the quality of poultry feed should imply taking into account the entire production system. (NB - abstract adapted from original)

Bellin-Sesay, F., H. Rau and M. Krawinkel **(2002) Food Safety in Crises and Emergencies. Institute of Nutritional Science. DSE/ZEL, DLG, CTA. In: *Agriculture + Rural Development, vol. 9, no. 1*, 2002, pp. 20-23. Supplier: DLG-Verlags-GmbH, Eschborner Landstrasse 122, 60489 Frankfurt am Main, Germany**

food security and nutrition

safe food; crisis response; emergency mitigation; food security

Military conflicts and natural disasters or man-made disasters significantly impede the efforts of communities living in affected regions to secure their own food supplies. The initial concern is that there is no longer sufficient food available. While these aspects of food security have been recognised for many years, this article focuses on food safety in the affected regions and especially on quality aspects such as microbe contamination and, soiling and chemical and other types of impurities.

Bellows, Anne C **(1999). Urban food, health, and the environment: the case of Upper Silesia, Poland. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 131-135. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

health and environment food security and nutrition city ecology

Poland; health; ecology; access to food; crisis response; organic agriculture; education

Allotment gardening is typically conducted by women, retirees, and other reserve labour. This local production has provided a measure of shelter from the vagaries of inefficient production and food distribution (typical of centralized socialist states) and from inaccessibly high food prices, compounded by unemployment (typical of market systems). However, the yields and safety of local food labour can be reduced in severely polluted regions. The case study from Gliwice, in Upper Silesia, southwest Poland, discusses (1) organizing an acquisition, labeling, and distribution system for retailing chemically tested organic products, linking farmers to consumers; (2) distributing chemically tested produce directly to schools and hospitals and creating subsidies for their purchase; and (3) educating community groups about food contamination and the benefits of organic and farming. (Abstract adapted from

original)

Biehler, Dawn; Sepos, Melissa **(1999). Replication manual: the Hartford food system. VISTA and World Hunger Year. 104 p.**
community development food security and nutrition
food systems; markets; community supported agriculture; policy

This comprehensive report is about 20 years of work in creating an urban-based local food system in a middle-sized city in a wealthy corner of America, where over ten percent of the population depends on emergency food aid for survival. And it is about how to replicate their success. The mission of the Hartford Food System is *to develop and equitable and sustainable food system capable of addressing the underlying causes of hunger and poor nutrition.* Their programs are grouped into four areas: (i) distribution, (ii) production, (iii) education, (iv) and policy. The first six chapters present an overview of the Hartford system and the last (7.), along with the appendices, presents a replication guide. (JS)

Bishwapriya, Saynal **(1985). Urban agriculture: who cultivates and why? A case-study of Lusaka, Zambia. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 15-24. Massachusetts Institute of Technology, Cambridge, Massachusetts, USA**
horticulture food security and nutrition
case studies; horticulture; Zambia;

Most authorities are now convinced of the fact that urban agriculture is more than an accidental activity undertaken by recent rural migrants. This survey shows once more that many urban poor, who migrated to the city a long time ago, are engaged in food production in order to survive. Most of the urban farmers stated the lack of purchasing power as the major reason for farming. There were other reasons as well, however, ranging from the wish to feel settled in their city home to simple enjoyment in gardening. The survey identified two different types of gardens in Lusaka: plot gardens and rainy-season gardens, used for cultivating different types of crops. In plot gardens, higher-grade vegetables were cultivated, such as rape, tomato, cabbage, onion and spinach, as well as fruits, while in rainy-season gardens, staple food, i.e. root crops, maize and beans, were produced. The survey stressed the need for stronger support from local authorities. At this point of time, urban farmers often experience the reverse, jeopardising their activities. In addition, land tenure policies will have to be changed so as to render more land available for the urban poor. (WB)

Blair, Dorothy; Giesecke, Carol; Sherman, Sandra **(1997). A dietary, social and economic evaluation of the Philadelphia urban gardening project. Urban Agriculture Notes on: http://www.cityfarmer.org/nutritionstudy.html#diet. 6 p. Nutrition Department, College of Health and Human Development,**

Pennsylvania State University, University Park, Pennsylvania 16802, USA Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition economic impact
Philadelphia; United States; home gardening; surveys

An evaluation study among 144 gardeners in the Philadelphia Urban Gardening Project and 67 non-gardening controls. Data collected included demographic variables, food frequencies and dietary habits, measures of life satisfaction, and neighbourhood involvement. The average value of garden site produce was assessed. Interestingly, gardening was positively associated with community involvement and life satisfaction. An interesting and important study. (WB - from original abstract)

Boncodin R. Prain, G. and Campilan, D. **(2000) Dynamics in Tropical Homegardens. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**
horticulture food security and nutrition
home gardening; Philippines;

The importance of home gardens, the small areas of cultivated land immediately surrounding a home or a homestead, is often underestimated despite its vital contribution to meeting various household-needs, especially for the poor families in developing countries. The authors explore the importance of homegardens in the Philippines and give the findings of the programme, Users' Perspectives with Agricultural Research and Development (UPWARD).

Bosch, H. van den, D. Eaton, M.S. van Wijk, J. Vlaming and A. De Jager, **(2001), Monitoring Nutrient Flows and Economic Performance in African Farming Systems: The NUTMON Approach and its Applicability to Peri-urban Agriculture. Alterra Green World Research, Wageningen, The Netherlands / Agricultural Economics Research Institute (LEI), The Hague, The Netherlands, In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 176-192, 2001.**
food security and nutrition
Kenya; nutrient balance; farming systems; urban agriculture, Africa (Eastern)

In this chapter the different phases of the NUTMON methodology to analyse nutrient flows and balances for farming systems are described as well as the possibilities of application of the methodology in the context of periurban agriculture. The farm diagnosts tool NUTShell was used to link nutrient flows with economic flows.

Botelho, Zita **(1999). Youth, urban governance, and sustainable food systems: the cases of Hamilton and Victoria, Canada. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 208-215. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa,**

Ontario, Canada K1G 3H9
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development food security and nutrition R&D methodology
youth; food systems; Canada; ecology

This paper examines the challenges that youth groups encounter in their attempts to participate in urban decision making related to developing sustainable food systems. The background for this discussion includes an examination of several important concepts. The first is urban governance, which often frustrates marginalized political actors, thus the relationship between youth and social movements is significant to this discussion. Two relevant problems with urban institutions are that they generally do not promote ecological sustainability and that they do not support youth involvement in decision-making. The barriers faced by youth groups promoting sustainable food practices in the urban environment are discussed, using two case studies. Interviews were conducted with members of the Ontario-based Hamilton Organic Mentorship Experience project to identify the barriers they encountered in trying to participate in urban governance. The second case study is of a group called LifeCycles, located in Victoria, British Columbia. Finally, different roles and strategies for youth to influence urban decisions are suggested. (Abstract adapted)

Boulianne, Manon **(2001), L'Agriculture Urbaine au Sein des Jardins Collectifs Quebecois. Empowerment des Femmes ou "Domestication de l'Espace Public"? (Urban Agriculture and Collective Gardens in Quebes. Empowerment of Women or "Domestication of the Public Space"?). Laval University, Quebec. In: *Anthropologie et Societes, vol. 25*, no. 1, 2001, pp. 63-80.**
food security and nutrition gender
women's role; urban agriculture; food security; socio-economic aspects; Quebec; community initiatives, Canada, America (Northern)

In "developed" countries, self-provisioning urban agriculture practices reappear periodically during phases of adjustment of the capitalist economy. It is actually the case in North America. The most recent experiences encourage collective production. They emerge in Quebec in the context of an increasing recognition of the social economy by the State. Supported by community groups, collective gardens appear as an alternative to food help for the impoverished and as a tool to alleviate social exclusion.

Women are the principal protagonists of these recent initiatives, either as members of the supporting groups or as producers. While certain researchers argue that feminine community organizations active in the domain of food security have a strong potential for the individual and collective empowerment of women, others think that in times of decentralization of social programs, these are rather associated with a "domestication of public space". Are the emerging experiences of collective self-provisioning gardening empowering to women or are they contributing to the domestication of the public space? Relying mainly on fieldwork data collected in Quebec, the present article seeks to bring answers to this question.

Bourque, Martin and Cañizares, K. **(2000) Urban Agriculture in Havana, Cuba. In:**

***Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**
food security and nutrition
Cuba

In this article the authors, at the time working for Food First in the USA, describe the impact of urban agriculture in Havana on availability and cost of fresh produce. The rise of urban agriculture was a clear response on the crisis of the early 1990s, and was stimulated by Government programmes and by the use of appropriate technologies.

Braun, Joachim von **et al (1992). Improving food security of the poor: concept, policy and programs. IFPRI Washington DC. 43 p.**
food security and nutrition
food security; famine; policy

This report is a very useful overview of the concepts, policies and programs dealing with food insecurity in developing countries. The action strategies explored include: macroeconomics, trade, production, credit, subsidies (safety net), relief, food for work, and education. (JS)

Braun, Joachim von **et al (1993). Urban food insecurity and malnutrition in developing countries. IFPRI Washington D.C. 47 p.**
food security and nutrition
food security; urbanisation; malnutrition; policy

In countries where per capita incomes have been falling while urbanization has continued to increase, urban food insecurity soars. Widespread efforts to reduce governments' administrative involvement in food distribution are aggravating the problem. This report reviews and takes stock of food and nutrition policy implications of urbanization in the developing world and derives policy and research implications for urban food security. It also considers urban poverty, malnutrition, sanitation and children's nutritional status. Urban agriculture is compared ineffectiveness to other interventions in the crisis. (JS)

Bromley **(2000).Allotments, Community Gardens, and Simple Gardening, Anglo-American Traditions of Urban Agriculture. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000.**
food security and nutrition
United States; economic impact

This paper reviews the long history of urban agriculture in the USA and UK over the last 200 years. It covers responses of the urban poor to economic hardship, designer visions, and institutions involved.

Bruins, Hendrik J **(1997). Drought mitigation policy and food provision for urban Africa: potential use of treated wastewater and solar energy. Arid Lands Newsletter no. 42 (fall/winter 1997)**

wastewater reuse food security and nutrition

Africa; food security; solar energy; sanitation; irrigation; home gardening

Examines the possibility of reusing treated wastewater for homegardening, and the use of solar energy in the treatment of wastewater. The author concludes that solar energy has significant potential for small-scale powering of water pumps for irrigation, water disinfection and sanitary systems. (WB)

Bulatao-Jayme J; Villavieja, GM; Domdom, AC; Jimenez, DC **(1982). Poor urban diets: causes and feasible changes. Food for the Cities Symposium of the Fourth Intercongress of the Pacific Science Association. Singapore. September 1981. WP-82-7/6. Honolulu: East West Resource Systems Institute**

food security and nutrition

urban poor; nutrition; quality of diet; small-scale agriculture; Manila; Philippines

This paper examines the nutritional intake of the urban poor and discusses various factors related to it, including household size, income, expenditure on food, mothers' employment, mothers' education, home food production, fuel, health and sanitation, and migration status. A study was cited showing that the dietary intake of earlier rural-urban migrants tended to be better than that of recent migrants and even better than that of non-migrants in the city. All three urban groups had higher nutrient intakes than the rural group. It was noted that home food production can contribute "in no small measure" to dietary adequacy and that the government has taken steps to oblige landowners to cultivate idle land or allow others to cultivate it, even in Metro Manila. (HC, IDRC)

Cabannes, Y and Dubbeling, Marielle. **(2001) Urban Agriculture and Urban Planning: what should be taken into consideration to plan the city of the 21st century? In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning food security and nutrition

Latin America; poverty; municipal planning

This is a synthesis paper, providing elements for discussion on the topic of urban agriculture and urban planning, what should be taken into consideration to plan the city of the 21st century. The paper will be based on research currently going in 10 Latin American cities, systematising and analysing experiences with municipal urban agriculture policies and its recommendations regarding policies, norms, mechanisms or structures as well as technological options to transfer or adapt these initiatives elsewhere in the Latin American and Caribbean Region. The analysis will be differentiated per ecosystem and city size involved.

Visual (video, slides) documentation supporting the synthesis paper In its programme “Urban Agriculture and Feeding the Latin American and Caribbean Cities” the Urban Management Programme for the LAC Region and IDRC-Cities Feeding People, are systematising 6 successful city experiences with municipal urban agriculture policies (as well as describing the conditions and processes that contributed to the success of these municipal policies and interventions) and implementing 4 baseline studies on the presence, potentials and obstacles to a sustainable UA development in the 4 cities.

Chakraborty SC **(1982). On feeding the cities: some aspects of the Indian scenario. Food for the Cities Symposium of the Fourth Intercongress of the Pacific Science Association. Singapore. September 1981. WP-82-7/2. Honolulu: East West Resource Systems Institute**

food security and nutrition

India; food supply; farming systems; food production systems; food policy

With reference to the literature, the author discusses such issues as food production and population growth; food production vs food importation; inequitable access to resources vs Malthusian “natural checks”; the urban dependency on the rural areas for commodities vs the rural dependency on the urban areas for inputs; social justice vs growth, with specific reference to West Bengal; and large farms vs small farms, with respect to high yield varieties. The author observes that a nation cannot practice independent policymaking — domestic or foreign — until it solves its own food problem. The key to solving the food problem lies in finding the appropriate integrative mechanisms between urban and rural society. (HC, IDRC)

Cheng LK **(1982). Fresh food supplies in Singapore. Food for the Cities Symposium of the Fourth Intercongress of the Pacific Science Association.Singapore. September 1981. WP-82-7/5. Honolulu: East West Resource Systems Institute**

food security and nutrition

food supply; food consumption; Singapore; fresh food

Based on field observation, interviews, and government and private sources of information, this paper attempts to provide an overview of fresh food supplies in Singapore. The emphasis is on patterns of food consumption, marketing structure and distribution channels of four categories of food — vegetables, meat and eggs, fish, and fruit — and trends in their development. For example, mushroom cultivation and poultry farming, which do not take up a lot land and are remunerative, are likely to continue or expand, while small-scale family farms are likely to decline or become more capital intensive. It is noted that due to its limited land base, Singapore has preferred to concentrate on industrialization rather than food production, purchasing food from competitive sources. Dependency on any single source for more than 25% of the supply of any item is precarious, however, and Singapore is striving to diversity its foreign food supply sources. (HC, IDRC)

Chiapa I.; King B. **(1997) Urban agriculture in Gweru: household nutrition, economic costs and benefits; results of household monitoring interviews conducted between September 1996 and April 1997. Harare: ENDA.**
food security and nutrition economic impact
economic impact; cost-benefit analysis; household survey; Zimbabwe; Gweru

This report presents the results of an International Development Research Centre (IDRC)-supported study (95-0007) carried out in four densely populated suburbs of the small city of Gweru, Zimbabwe. The study involved a preliminary survey to determine the socioeconomic (economic activities, income levels, agricultural practices and tenure) and demographic characteristics of the population in general. The survey provided a basis of comparison between the agricultural and non-agricultural households. It also allowed the researchers to identify 50 farming households in each of the four suburbs for monitoring on a monthly basis during the agricultural period.

The monitoring study revealed that women were the main participants in all agricultural activity, both cropping and vegetable production. Gardening activities were carried out throughout the year, while cropping is only practiced during the rainy season. Gardening relies heavily on organic manure, while chemical fertilizers are used in cropping. There was a higher use of pesticides in the garden than on the crops, however. Low-income urban farmers tended to have more meals per day than their non-farming counterparts and greater ability to purchase protein-rich foods such as meat and fish. This was reflected in their overall health and child growth rate: children under 5 years old from farming households were generally taller and heavier than those from non-farming households. Savings from urban agriculture amounted to approximately 1 287.00 ZWD per annum. It was concluded that urban agriculture benefits a significant proportion of the households in Gweru. A number of recommendations for formalizing and improving the activity are put forward. (HC, IDRC)

Chimbowu, Admos; Gumbo, Davison **(1993). Urban agriculture research in East and Southern Africa II: record, capacities and opportunities. Cities Feeding People Series report no. 4. 18 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
gender food security and nutrition
Africa (Eastern); informal sector; urban policies; urban planning; economic aspects; waste management; urban zoning; environment

Most of the studies carried out were within the context of three broad paradigms: the planning paradigm, urban informal sector studies, and the spational and functional dimensions of urban agriculture. Most studies up to now have been baseline studies covering government policy, land tenure, women practitioners, poverty, homegardens, wastewater usage and urban planning. Aspects requiring further research are land use zoning, actual production levels, urban management and its relation to urban agriculture, marketing studies and studies on the interrelations between urban agriculture, water, waste and disaster. Concretely, studies on

decolonising urban management practices in Zimbabwe towards converging and symbiosis in urban economy and the use of agrochemicals in urban agriculture are suggested. (NB)

Choguill, Charles L **(1995). Urban agriculture and cities in the developing world. In: Habitat International vol. 19 (1995) no.2 p. 149-150**
food security and nutrition
urban migrants; food security

According to this editorial the provision of food for growing numbers of urban migrants is a key component of the sustainability debate. Because of the ability, necessity and opportunity the urban migrants have, a significant proportion of a city's food requirements are supplied from within the urban boundaries. The papers presented in this issue of Habitat International serve to examine a number of aspects of urban agriculture in order to stimulate further studies and debate. (BC)

City Farmer **(1996). Food gardens in South Africa. Urban Agriculture Notes on: http://www.cityfarmer.org/s.africa.html. 2 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture
food security and nutrition horticulture
vegetable gardens; gardening practices; Soweto; South Africa

A brief description of the Food Gardens Foundation in Soweto, South Africa. The Foundation developed a method for growing vegetables which is especially useful if there is shortage of land, water or money. (NB)

City Farmer, Canada's Office of Urban Agriculture **(1999). City farms in the United Kingdom. Urban Agriculture Notes**
http://www.cityfarmer.org/cityfengland8.html. 3 p. City Farmer, Canada's Office of Urban Agriculture
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition services
city farms; United Kingdom

Brief description of some city farms organised in the Federation of City Farms in the United Kingdom. (NB)

Cohen, Monique **(1991). Use of microenterprise in the delivery of food programs to school children. World Bank Washington D.C. 39 p.**
food security and nutrition services
street food; policy; nutrition

This report finds that street foods are and essential part of urban diets and

economies. They provide valuable nutrients that may not be supplied from other sources available to some urban families. Research results and a project design are presented to integrate street food into school nutrition programs in developing countries. (JS)

Commission on Health and Environment, World Health Organisation (WHO) **(1992). Food and agriculture. In: Our planet, our health: report of the WHO Commission on Health and Environment, p. 60-105. ISBN 92-4-156148-3. Commission on Health and Environment, World Health Organisation (WHO), Geneva, Switzerland**

health and environment food security and nutrition

public health; health hazards; nutritional requirements; agricultural chemicals

Overview paper of the way environment influences human health and well-being. This chapter focuses particularly on the role agriculture plays. Figures are presented on a variety of parameters, such as the relationship between health and dietary intake. Different food contamination sources are listed and examined. In addition, there are paragraphs on occupational hazards and accidents, notably in connection with agricultural chemicals. At the end, recommendations are given for policy development and research on health and environmental effects of current trends in food consumption and agricultural production. (WB)

Committee on World Food Security, Food and Agriculture Organization (FAO) **(1996). FAO/NGO consultation on the world food summit (19-21 September 1996): keypoints of the consultation. 6 p. Committee on World Food Security, Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition

food security; policy making; international conferences; NGOs

Contains keypoints of the FAO/NGO Consultation on the World Food Summit held at Rome, November 1996. These adopted points were made on the draft Rome Declaration and Plan of Action (see also UA-524). (WB)

Cottee, P. **(ed.) (1999) Tackling Inequalities in Health and Diet-Related Disease: Developing Successful Inter-Agency Partnerships to Promote Fruit and Vegetable Consumption Particularly to Low Income Groups. London: Sustain; The alliance for better food and farming**

food security and nutrition

food consumption; vegetables; poverty

Developing successful inter-agency partnerships was the focus of a seminar to promote fruit and vegetable consumption among low income groups. Presentations by a government minister, a supermarket nutritionist, campaigning groups and public health experts are all included in the report, along with the policy recommendations and practical proposals that were generated.

Cox, Stephen **(1999). Oases of food security in the urban sprawl? The case El Alto, Bolivia. In: Gate: Technology and Development no. 2 (April-June 1999) p. 34-37**

food security and nutrition economic impact

Bolivia; El Alto; food security; ornamental plants

The South American continent has the highest degree of urbanisation in the developing world. In the light of major shortages of affordable fresh food for urban communities, the prospects of food production in El Alto are being discussed. Awareness raising on nutritional aspects of food is an issue that needs to be addressed. Furthermore, ornamental plant production by the urban poor for income generation is also included in the analysis. There are plenty of new ideas, but progress in the hard climatic conditions of El Alto has been slow. (NB)

Dahlberg, Kenneth A **(1998). The global threat to food security. In: Urban Age (Winter 1998) p. 24-26. Danish Agency for International Development**

community development food security and nutrition

food security; food systems

Cities have been lulled by the internationalisation of food and the reduced visibility of hunger. Four threats to food security are identified: (1) population explosion of people, cars and animals (2) global warming with many cities and megacities at the coasts (3) loss of biodiversity and (4) globalisation of injustice and poverty. Local responses are needed based on a shift from linear thinking to systems thinking, the use of much longer term perspectives and a shift in evaluation criteria from production/productivity to long-term health of natural and social systems. One such local response is cities growing more food. To develop adequate responses one should keep in mind that it typically takes five years to learn how the various elements of a local food system operate. (NB)

Dahlberg, Kenneth A **(1999). Promoting sustainable local food systems in the United States. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 41-45. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

food security and nutrition community development

local food system; processing; distribution; access to food; recycling; United States

This paper draws on the experience of the Local Food Systems Project, to assist six communities in the United States in strengthening their local food-policy capabilities. Underlying the effort was a broad food-systems approach that stresses not only production aspects but also processing, distribution, access, use, recycling, and

waste issues. To assist local communities in the short term, "practical theories" are needed including the interactions of key variables, such as scale and patterns in landscape, population, socio-economic characteristics, and food organization. In the longer term, both capacity- and infrastructure building are needed to strengthen the emerging community of local, regional, and national groups working on more sustainable and localized food systems. (Abstract adapted from original)

Dasso, Jose Andres; Pinzás, Teobaldo **(2000). NGO experiences in Lima targeting the urban poor through urban agriculture. In: Growing cities, growing food: urban agriculture on the policy agenda. p. 349-361. DSE, GTZ, CTA, SIDA**
food security and nutrition
poverty; vegetable production; community gardens; livestock; food security; health; ecology; economic impact; gender; water supply; NGOs; hydroponics; Peru

The article analyses intraurban agriculture as a strategy for improving the living conditions of urban poor. NGO's introduced and promoted vegetable gardens, hydroponics and the production of small animals. In general the activities have not been very successful targeting the poor because the opportunity costs (time) were high, initial investment was high and technologies were not appropriate. Nevertheless a number of families does produce vegetables and raise animals. One of the difficulties these families raise is in marketing their produce. Guinea pigs are a different case. The reasons to raise them are more than strictly economical as they are consumed for traditional food preferences. An extended market for guinea pigs exists with household producers, commercial family farms and commercial enterprises. In the first two categories mainly women are engaged in the latter almost exclusively men. Another specialised market segment is organic vegetable production. (NB)

Dennery, Pascale **(1994). Inside urban agriculture: an exploration of farmer decision-making in Nairobi: a research proposal for a masters thesis. 18 p.**
R&D methodology food security gender
Kenya; decision-making process; gender issues; family relationships; extended families

Provides the outline of a study undertaken to obtain insight in factors affecting farmers' decision-making processes: notably gender differences and resource allocation among different member of the household. Social relations, both inside and outside the family, are examined as to their influence on farmers' decisions. (WB)

Dennery, Pascale **(1995). Cities Feeding People project fact sheets. Cities Feeding People reports no. 15. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
R&D methodology food security and nutrition
development projects; food security; food supply; waste recycling; nutrition

A package of 26 fact sheets compiled by the Cities Feeding People Program. The fact sheets give a description of a selection out of more than 50 IDRC-funded projects in Africa, Asia, Latin America and Canada that were initiated between 1997 and 1998. All sheets systematically focus on urban food production and processing; reuse of urban waste; urban nutrition and food security; and research support activity. Project goals, findings and contact information are also provided. Exists also in French. (WB)

Dennery, Pascale **(1995). Inside urban agriculture: an exploration of food producer decision-making in a Nairobi slum. Wageningen Agricultural University, the Netherlands. Masters thesis, 142 p.**

food security and nutrition

Kenya; food security; micro enterprise; gender; land tenure

This study examined urban food production a large informal settlement of Nairobi. One of the main features of the study is the addition of qualitative dimension to urban agriculture research in Africa. It analyzes food production at the individual, household and community levels. Access to land is found to be the critical issue. Decision-making is the fulcrum of the study and breaks new ground in the field. (JS)

Diaz-Bonilla, E. and S. Robinson **(eds.) (2001) Shaping Globalization for Poverty Alleviation and Food Security, Focus 8. International Food Policy Research Institute (IFPRI) Washington, A 2020 Vision for Food, Agriculture and the Environment**

Supplier: IFPRI, 2033 K Street, N.W., Washington D.C. 20006-1002, USA

food security and nutrition

globalisation; poverty alleviation; food security

"A Vision for Food, Agriculture and the Environment" is an initiative of the International Food Policy Research Institute (IFPRI) to develop a shared vision and consensus for action on how to meet future world food needs while reducing poverty and protecting the environment.

This set of Focus briefs presents technical research results that encompass a wide range of subjects drawn from research on policy-relevant aspects of agriculture, poverty, nutrition and the environment. It contains materials that IFPRI believes is of key interest to those involved in addressing emerging food and development problems.

Drakakis-Smith, David; Bowyer-Bower, Tanya; Tevera, Dan **(1995). Urban poverty and urban agriculture: an overview of the linkages in Harare. In: Habitat International vol. 19 (1995) no. 2 p 183-193. University of Liverpool, UK; School of Oriental and African Studies, University of London, UK; University of Zimbabwe**

food security and nutrition

Zimbabwe; urban poor; selfhelp; home gardening; off-plot cultivation

The urban poor throughout most of Africa have experienced increasing difficulties over recent years as a result of the imposition of structural adjustment programmes. One of the main coping mechanisms has been increased self-help in satisfying basic household needs. Food is one of these basic needs and urban agriculture, both legal and illegal, has grown as a consequence of the difficult economic climate. As yet relatively few studies have attempted to assess the role that urban agriculture plays or might play in social and in environmental terms. This paper reviews the situation in Harare, Zimbabwe as the contextual setting for an on-going investigation of these two important considerations, placing the present policy responses in their appropriate historical and economic framework, and assessing the research issues which need to be addressed. (original abstract)

Drescher, Axel W. **(1998). Hausgärten in Afrikanischen Räumen: Bewirtschaftung nachhaltiger; Produktionssysteme und Strategien der Ernaehrungssicherung in Zambia und Zimbabwe = African homegardens: management of sustainable production systems and strategies of food security. Sozioökonomische Prozesse in Asien und Afrika no. 4. Centaurus, Pfaffenweiler. Habilschrift, Geowissenschaften UniFreiburg, 290 p.**

food security and nutrition

household gardening; home gardening; food security; sustainable agriculture; Africa

Major book on household gardens focussed on urban family survival strategies, food security and sustainable small-scale agriculture. Although it is based on African data and the author's African experience, the lessons can be applied in any low-income food-short country. (JS)

Drescher, Axel W.; Iaquinta, David **(1999). Urban and periurban food production: a new challenge for the Food and Agriculture Organization (FAO) of the United Nations. 53 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition rural-urban linkages

policy development; CGIARs; development strategies

Addresses both urban and periurban agriculture (together coined PUA), sets the scope, provides definitions of concepts of PUA, describes the institutional framework and gives a large number of examples. This paper serves to make a contribution to strategy development in the framework of the 15th session of the Co-ordinating Committee for Agriculture (COAG). (WB)

Drakakis-Smith, David **(1992). Strategies for meeting basic food needs in Harare. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Sseminar proceedings no. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 258-283**

food security and nutrition rural-urban linkages

Zimbabwe; food security; surveys

A survey was carried out in three areas of varying socioeconomic status in Harare to establish patterns of food production and purchasing. In descending order, these were Mabelreign, a formerly white but now ethnically mixed area; Glen View, a sites and services area reasonably well provided with garden space; and Epworth, a squatter settlement in the process of being formalized. Certain basic items (bread, sugar, tea/coffee, beef and mealie) were purchased by nearly everyone. But, the people of Mabelreign spent the most on food in absolute terms but the least in relative terms. In Mabelreign and Glen View, some four-fifths of those interviewed grew food crops in their gardens. In Epworth, the two-thirds that had gardens used them to grow food. Virtually all of the crops grown in urban gardens were consumed. Only in Epworth was a small proportion (about 5%) sold. A fairly high proportion of families kept chickens. Only 10% admitted to cultivating another plot of land — probably an underestimate as much of such cultivation is illegal — and most of these were in Epworth, where there was more open space and the influence of the authorities less marked. Other sources of food were purchase, cultivated land outside Harare and gifts from rural relatives. It was suggested that governments recognize the importance of urban agriculture by providing garden space in low-cost housing schemes, by regulating land use on the urban periphery and by designating organized areas for cultivation. (HC, IDRC)

Drescher, Axel W.; Bos, F **(1993). Report on fieldwork on homegardening in Northwestern Province (Zambia) In: Household Food Security, Nutrition and Health Monitoring Report. 1993 reports. Lusaka, Zambia: Central Statistical Office**

Supplier: Central Statistical Office. Lusaka, Zambia.

genderfood security

Africa, Zambia, garden cultivation, gender differences, periurban, rural, intervention strategy

This study describes home garden activities and the main problems experienced in maintaining home gardens. Research is conducted in relation to household food security issues, as well as ecological function of home gardens within the land use system. It compares gardening in urban, periurban and rural areas of Zambia. One of the main objectives of this study is to determine differences between male and female gardeners. Findings reveal that more male gardeners are found in periurban and rural areas than in urban areas and access to land in these areas more difficult for women than men. In urban areas, women have longer walking distances to water sources due to the fact that people often cannot chose the garden site. Female household labour is most important in urban home gardens, while male labour is key in rural areas and periurban areas have a mix of female-male labour. Strengthening the role of women is noted as a recommendation for policy makers in the future. (AH)

Drescher, Axel W. **(1997). Management strategies in African homegardens and the need for extension approaches Paper presented at the International**

Conference on Sustainable Urban Food Systems. Ryerson Polytechnic University. Toronto,Canada. 22-25 May 1997. Papers
gender horticulture food security
Africa, Zambia, household survey, food security, management strategy, women's role, gender differences, intervention strategy, extension services

The relationship between urban food production, food security and urban environments has been largely neglected. This paper focuses on results from a household garden survey conducted during 1992 and 1993. The main objective of the survey was to clarify the role of household gardens for household food security in Zambia and to identify differences and problems in management strategies and their effects on production in different areas. The results reveal that the main actors in urban agriculture are often women. In all compounds studied in Lusaka, women were to a greater extent involved in cropping and gardening than men. Gender analysis is used to reveal differences between men's and women's urban agriculture techniques with respect to alternative methods of plant production, crop species, and use of fertilizer, manure and compost. The paper argues that gender specific differences in agricultural activities need to be paid more attention by extension services in urban and periurban areas. (AH)

Drescher, Axel W. **(1999). Urban agriculture in Northern Spain: brief observations: La Huerta del Abuelo Rosel. Urban Agriculture Notes http://www.cityfarmer.org/spain.html. 2 p. University of Freiburg Supplier: City Farmer, Canada's Office of Urban Agriculture**
horticulture food security and nutrition
community gardens; Zaragoza; Spain

A brief description of 'La huerta del Abuelo Rosel' in Zaragoza, Spain. (NB)

Driss, Ben Ali, Di Giulio, Antonio, Lasram, Mustapha & Lavernge, Marc **(1996). Urbanisation et agriculture en Méditerranée: Conflits et Complémentarités. Editions L`Hamattan, Paris (Histoire et perspectives Méditerranéennes.**
land use planning rural-urban linkages food security and nutrition
land use; policy; urbanisation; planning; Mediterranean ; environment rural-urban linkages environment

This publication is a collection of articles on urbanization and agriculture in the Mediterranean. Most of the articles are in French, some in English. Maps, pictures, and tables enrich the book a lot. In the first part the book deals with problems of urban planning mainly from experience of Magreb countries. The multifunctional character of urban agriculture is pointed out by one article. This paper propose a systematic mode of representing agriculture through a set of indicators, meant as a tool for choosing appropriate planning strategies. In the second part the book deals with specific problems caused by the conflict between urbanization and agriculture, like e.g. water problems and other environmental problems. In the last part the book mainly deals with rural urban linkages [AD].

DSE **(2001) Food and Nutrition Seminar, Feldafing, 14th - 25th May 2001, German Foundation for International Development (DSE)/ Centre for Food, Rural Development and the Environment (ZEL), German Agency for Technical Cooperation (GTZ), German Agro Action**

food security and nutrition
conferences; food security; nutrition

In May 2001, an international seminar was held in Feldafing, Germany, on the subject of food and nutrition security, and with specific atention paid to programmes addressing acute and chronic malnutrition. Today, still more than 800 million people live in conditions of endemic hunger and poverty in rural and urban areas whereas the wealth of a minority continues to increase. Especially women and children, who belong to the most vulnerable groups, require urgent attention. In a world enjoying record wealth, food security is no longer seen as a mere problem of producing enough food for mankind, but incorporates, besides others, the question of access to sufficient food, health-nutrition relationship, aspects of knowledge and education.The main focus of this seminar is to provide an holistic understanding of the complex nature of food security and nutrition, categories of causes, different levels of actors and the variety of interventions to tackle either acute or chronic food insecurity in urban and rural areas. Participants looked at other disciplines' point of view and in this way, got an improved understanding of the various instruments at hand.

The main focus was the analysis and appraisal of the different instruments and approaches for the preparation, planning and management of food security programmes.

In order to provide basic conceptual knowledge for planning and management of food security programmes the following aspects have been addressed:

- Food and nutrition security: definitions and concepts
- Food and nutrition security: problems and perspectives
- Conceptual framework of food and nutrition security
- Selection of indicators for food and nutrition programmes
- Assessments within the cycle of a food and nutrition security programme
- Methods for analysis and assessment of aggregate food deficits
- Impacts of macro and sector policies on food security
- Instruments on the prevention and management of food crises
- Targeted interventions to improve food security of vulnerable groups
- Interventions to achieve nutrition security

Dubbeling, Marielle **(1999). Urban agriculture and feeding Latin American and Caribbean cities. Urban Agriculture Notes http://www.cityfarmer.org/feedingLatAmer.html. 5 p. Urban Management**

Program Latin America and the Caribbean, Garcia Moreno 1201 and Mejia, Quito, Ecuador
Supplier: City Farmer, Canada's Office of Urban Agriculture
food security and nutrition horticulture R&D methodology
food security; Latin America; best practices; poverty alleviation; waste; resource management; food security; nutrition; income generation; gender; environment

Presents the best practices and city consultation project of the Urban Management Program for Latin America and the Caribbean. The thematic orientation is on urban poverty alleviation, urban environmental management and participatory urban governance. The objective of the project is to assist a group of resource and associate cities with documenting urban agriculture experiences, producing analysis of urban agriculture activities and implement a city consultation process. (NB)

Ellis, Frank; Sumberg, James **(1998). Food production, urban areas and policy responses. In: World Development vol. 26 (1998) no. 2 p. 213-225**
rural-urban linkages food security and nutrition city ecology
Africa; rural-urban linkages; food policy

A literature review focusing especially on food production in and around sub-Saharan cities and towns. The authors emphasise the importance of rural-urban interactions in resource management and output markets. At the same time, they warn against too high expectations about the role of urban agriculture for food security of urban dwellers. (WB)

Enríquez, Laura J **(1999). Cuba's new agricultural revolution: the transformation of food crop production in contemporary Cuba" San Francisco: Food First.**
food security and nutrition
horticulture; sustainable agriculture; food security; policy; Cuba

This report details the structural changes that Cuba has made over the last decade in order to transition between large, conventionally managed farms to smaller scale, low-input cultivation. Enríquez describes the circumstances that lead to the transformation of state farms into worker controlled cooperatives, the emergence of farmer's markets, and the overall shift in agricultural strategy that has grown in response to food security concerns generated by the economic crisis. The Cuban experience shows the increases in quantity and diversity of foodstuffs that can result from effective policies to promote small farms and localized production. (JS adapted)

EURO-URBANUT (EUN) **(1998). urban food and nutrition security: WHO action plan for vulnerable groups. 8 p.**
food security and nutrition health and environment
political aspects; urban food; nutrition

Contains elements of a description of a WHO urban food and nutrition Action Plan aimed at supporting, protecting and promoting the consumption of vegetables and

fruit. (WB)

European Commission (EC). **Network for the Pan-European food data bank based on household budget surveys: DAFNE 2. 32 p. European Commission (EC), Directorate-General XII, Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium; National Nutrition Centre, National School of Public Health, 196, Alexandras Ave., GR-11521 Athens, Greece**

food security and nutrition economic impact
surveys; food security; databases

Describes the Data Food Networking initiative, aiming at the creation of a pan-European food data bank based on household budget surveys. Data referred to households as the statistical unit and covered 5 European countries, namely Belgium, Germany, Greece, Hungary and Poland. (WB)

Fairholm, Jacinda **(1999), Urban agriculture and food security initiatives in Canada : a survey of Canadian non-governmental organizations. Cities feeding people report series no. 25. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

food security and nutrition
Canada ; food security; community-based organisations; food distribution

Gives an overview of community-based activities in Canada on creating sustainable food systems. The report highlights the diverse strategies of people and groups to recreate food production and distribution systems, focusing on diversification and on rendering the system more locally-based. This paper makes a useful contribution to the debate on the role of urban food production in feeding cities. As so often described for other places, limited access to land, by-law restrictions, input requirements, and restrictive urban planning are often cited as challenges to realising the full potential for urban food production. There is much attention for creating alternative food distribution arrangements and alternative marketing methods, such as farmers' markets, food co-operatives, buying clubs and community kitchens. The report comes with an annotated list of addresses of networks and organisations in Canada. In addition, there is a bibliography sorted per subject. (WB)

Fisher, A **et al (1998). Local Food Policy. Community Food Security Coalition**

community development land use planning food security and nutrition R&D methodology
policy; NGOs; community associations; United States

This manual includes: (i) Tips for Organizing Coalitions and Food Policy Councils, (ii) Inventory of Food-related Policies in Local Government, (iii) Action Ideas for Changing Local Policy, (iv) Tips for Operating Food Policy Councils and (v) Case studies of nine Food Policy Councils and Similar Organizations. It provides useful information for assessing how city and county policies affect food production and distribution, and how they can be changed to promote community food security. It is

a valuable resource for activists, academics, policy makers and others working on food and agriculture at the community level. 75 pages, (JS adapted from author)

Fisker, A.M. **(2000) The cutting edge between Agenda 21, food, and design in the new millennium. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000.. (on cd-rom).**

land use planning food security and nutrition

food; Germany; design

Agenda 21 sets out priorities and strategies to stop and reverse environmental degradation and to stimulate sustainable development. The realisation of sustainable development requires new ways of thinking, but it often leaves the question of how the individual moves from the Agenda towards concrete action. The links between the single citizen/consumer, food/meal and the design of the physical room is the central topic subject of this project, described here.

Foeken, Dick Owuor, S.O., Klaver, W. **(2002) Crop cultivation in Nakuru town, Kenya: Practice and potential. African Studies Centre, ASC working paper 50/2002**

food security and nutrition community development extension, marketing and credit services

crop production, urban agriculture, practical experience

Urban poverty is increasing in Kenya, and farming in town is one of the ways people employ to cope with this problem. This is mainly done for self consumption. 40 different types of crops were established. Inputs used are chemicals, organic inputs and irrigation. Crop cultivation potential is much bigger given the low average productivity, but constraints should be removed.

The environmental aspect of urban cultivation is important, since crops are grown at polluted sites and sometimes raw wastewater is used for irrigation.

Foeken, Dick; Mwangi, Alice Mboganie **(1998). Does access to land have a positive impact on the food situation of the urban poor? A case study in Nairobi. In: East African Social Science Research Review vol. 14 no. 1 (1998) p. 1-15. 15 p.**

land use planning food security and nutrition rural-urban linkages

Kenya; urban poor; food security; land rights; access to land

Examines the vital issue of whether and how access to farm land influences the household's food and income situation. There is a general introduction into coping strategies of the urban poor as well as an interesting review of existing access rights to urban land in Nairobi. Interestingly, for this aspect hardly receives any attention at all, the authors also investigate the phenomenon of urban households realising part of their livelihood from rural sources, through access to rural land, in particular. Previous surveys had revealed that this was the case for Kenyan middle income

groups, in particular. The land is not necessarily farmed by the urban dweller himself / herself: often, it is a member of the family. The authors conclude that having access to a rural plot seems to have a positive effect on income and that, in addition, they seemed to be better off than those with access to an urban plot. Mechanisms involved are not entirely clear, however. A paper with a refreshing view. (WB)

Foeken, Dick; Mwangi, Alice Mboganie **(2000). Increasing food security through urban agriculture. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 303-327. DSE, GTZ, CTA, SIDA**

food security and nutrition

food security; nutrition; food policy; land use systems; health; ecology; economic impact; land tenure; gender; urban policies; reuse of waste; poverty; ornamental plants; Kenya

Urban farming can be seen everywhere in Nairobi, especially in informal densely populated residential areas, which do not exist on official maps. Small-scale subsistence crop cultivation and small-scale livestock production are dominant. There is just a little market oriented small-scale crop production as well as some large-scale commercial farms. In crop production, the labour is mainly provided by women. Practices are usually very simple. Livestock is kept in open spaces in the city, with poultry being the most important type. Apparently, lack of employment opportunities forces people into agriculture. Roadside, riverside and sewage line farming are illegal which also means that many of the poor urban farmers do not qualify for extension.

Farming is primarily done to improve households' food situation, in quantity and dietary composition. In some areas food intake and nutritional condition of children in farming households is better than non-farmer households. The most important urban-specific problem is the theft of crops. Some studies indicate that almost all cultivators recycle organic material. There has been little effort in developing urban agriculture in Nairobi, and authorities in general ignore the activity. Perspectives for urban farming would improve, if there would be official recognition and if land tenure would be more secure. Strategies to promote urban agriculture should focus on changing the attitudes of local governments and stressing the environmental benefits of urban agriculture. (NB)

Food and Agriculture Organization (FAO) **(2001) Proceeding of Regional Seminar "Feeding Asian Cities", Bangkok, Thailand, November 2000. On: http:/www.fao.org/waicent/faoinfo/agricult/ags/agsm/sada/asia/index.htm**

food security and nutrition; horticulture; services

Asia; marketing; horticulture

This seminar was organised by the Association of Food Marketing Agencies in Asia and the Pacific (AFMA), and the Regional Network of Local Authorities for the Management of Human Settlements (CITYNET), in collaboration with GTZ, International Union of Local Authorities (IULA), Ministère des Affaires étrangères (France), UNDP/UNCHS/World Bank - Urban Management Programme - Regional Office for Asia and the Pacific, World Union of Wholesale Markets (WUWM) and with

the technical support of FAO.

Food and Agriculture Organization (FAO) **(2001) Proceedings of Sub-Regional Expert Consultation on "Urban and Periurban Horticulture in South-African Countries". Stellenbosch, South Africa. January 2001.**
Food and Nutrition; horticulture
Southern Africa; horticulture; Malawi; Zimbabwe; South Africa; Botswana; Tanzania; Namibia; Mozambique

The papers of this expert consultation on urban agriculture, focusing on horticulture in Malawi, Zimbabwe, South Africa, Botswana, Tanzania, Namibia, and Mozambique. Three discussion groups were organised on Opportunities and Constraints; Assessment of Project Profiles on selected countries; and Training Needs and Methodologies.

Food and Agriculture Organization (FAO) **(1998). Methodological workshop for the compilation of urban food security and nutrition profiles, Maputo, Mozambique, February 10-11, 1998. Field document no. 1b. 37 p. Ministry of Planning and Finance, Department of Population and Social Development, Ministry of Health, Nutrition sector, Food and Agriculture Organization (FAO)**
food security and nutrition R&D Methodology
household food security; information systems; Mozambique; assessment; urban food; nutritional status

The proceedings include presentations and reports prepared by resource people together with a summary of the issues raised during the workshop. The workshop focused on developing methodologies for the compilation of household food security and nutrition profiles in urban areas in Mozambique to feed into the Food security and Nutrition Information Network. (NB)

Food and Agriculture Organization (FAO) **(1998). Feeding the cities. Food into Cities collection no. DT/39-98E. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**
food security and nutrition
food security; access to food; food availability; nutrition; food supply; food distribution; institutional aspects; access to credit; perceptions

"The State of Food and Agriculture 1998" analyses the issue of urban food security starting from trends and factors affecting urban food security. From there, food supply to the city and problems of distribution at various levels is discussed. In conclusion strategies to improve food supply and distribution efficiency in the cities are suggested including developing new partnerships, credit access, raising consciousness and changing perceptions and institutional environment issues. (NB)

Food and Agriculture Organization (FAO) **(1999). AG21 Magazine: spotlight issues in**

urban agriculture.. 3 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy. On: http://faoext02.fao.org/WAICENT/FAOINFO/AGRICULT/magazine/9901sp2.htm
food security and nutrition
periurban agriculture; household farming

The paper summarises the report on urban and periurban agriculture prepared by COAG. The paper assesses the importance of urban agriculture and the benefits and constraints are reviewed. Urban agriculture is estimated to involve 800 million urban residents worldwide. (NB)

Food and Agriculture Organization (FAO) **(1999). Urban food security and food marketing: a challenge to city and local authorities. Food into Cities collection no. DT/40-99E. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**
food security and nutrition services
food security; food marketing; urban planning; distribution systems

The relation between food security and food marketing and ways to overcome inhibitions in food marketing to improve food security in the context of urban growth are analysed. Food security especially of low-income urban consumers depends on the level and stability of the cost of accessing food and the variety and quality of food available to them. Major problems in marketing and what city managers and planners can do to enhance food security are presented. Efficiency improvements of all marketing and distribution systems are most important for this. (NB)

Furedy, Christine; Maclaren, Virginia; Whitney, Joseph **(1997). Food from waste: urban pressures and opportunities for food production in Asian cities. 28 p. Ryerson Polytechnic University, Toronto**
waste recycling food security and nutrition
South Asia; South East Asia; organic wastes; composting; aquaculture; waste reuse; health risks

Waste reuse and recycling has a longer tradition in Asian cities than anywhere else in the world. Waste-based food production is an important source of food as well as employment to farmers, waste workers and traders involved. Within thee region, waste sources or reuse sectors are different from one country to another as a result of differences in religion and culture. Economic factors such as land, transport and cost of fertilisers also determine the type of waste which is going to be used. Other areas of concern are health and environmental regulations, due to the fact that urban waste can be hazardous to the public health. This risk is especially increasing nowadays with the changes in urbanisation and consumption habits. At the same time, changes in life style can create new opportunities for using waste. This report explores these possibilities and gives suggestions for stronger links between waste reuse and urban agriculture. Further research areas are suggested. Reference is made to different projects in South and Southeast Asia. One of the main goals of this

report is to start filling the gap between the practical work done on the subject, with a long-standing tradition, and the written materials which are still lacking. (WB)

Gabel, Stephanie **(2001) Methodoligal reflections on using participatory and action oriented research with women farmers in Harare. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D methodology food security and nutrition gender
Zimbabwe; survival strategies; policy; gender; equity; participatory approaches

This paper presents the methods used for a case study in Harare, Zimbabwe in the role that people play in food provisioning within their household and, second, their use of urban cultivation on open spaces as both a household survival strategy and a food provisioning. Another aspect of the research was focused on policy and governance issues related to urban agriculture, taking special note of local level policies and decision making in regard to: gender sensitivity, equity and public participation. The methodology describes various participatory approaches that were used during the research.

Garden to kitchen newsletter**. Family Food Production and Nutrition Project, Unicef Pacific Operations, c/o UNDP, Private Mail Bag, Suva, Fiji**
food security and nutrition horticulture
Pacific Islands; children; malnutrition

This quarterly targets the Pacific Islands, contains interesting assorted information about homegardening in the pacific setting. The few issues in our possession report about pest control, country profiles, cultivation techniques, news from the field, malnutrition related diseases, and so forth. (WB)

Gardner, Gary; Halweil, Brian **(2000). Underfed & overfed: the global epidemic of malnutrition. WorldWatch Washington DC. 150 p.**
food security and nutrition
food insecurity; malnutrition; children

This paper efficiently defines the growing problem of malnutrition and hunger. It stresses the issue of urbanization and the importance of urban agriculture in resolving the issue of access to micronutrient. (JS)

Garnett, Tara **(1996). Growing food in cities: a report to highlight and promote the benefits of urban agriculture in the UK. 90 p. ISBN 1_900_670_56_9. National Food Alliance / SAFE Alliance, 5-11 Worship street, London EC1A 2BH, UK**
food security and nutrition city ecology
community development; economic development; vegetable production; horticulture; United Kingdom;

In the UK, many poor urban neighbourhoods have become food retailing deserts, where access to good food shops and markets is rare. Parts of the countryside too are becoming desertified economically with farming employing just over 2% of the population. The author pleads for people to reconnect to the land and their culture by growing food, following a long tradition of allotment gardening in the UK, and also with the 'Dig for Victory' campaign during the 2nd World War in mind. This report presents and analyses a wide variety of case studies classified by aspect: community development, economic development, education, environment, health, leisure, and sustainable neighbourhoods. There is a useful resource section with addresses in the UK. A number of recommendations are formulated with regard to policy integration; funding, support and promotion; and land and water. (WB)

Garnett, Tara **(2000). Urban agriculture in London: rethinking our food economy. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 477-500. DSE, GTZ, CTA, SIDA**

services food security and nutrition city ecology

food policy; nutrition; community development; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; food systems; United Kingdom; food deserts; education

Starting with the ecological footprint of London the London foot system is analysed. Increasing alienation of Londoners from agriculture and the emergence of food deserts are raised as issues. Despite a small contribution in quantities produced a wide range of farming activities occur in London (allotment gardens, private gardens, county farms, parks etc). From this perspective the potential and actual contribution of urban agriculture towards health, the environment, household economies, education and training and community development are discussed. Factors affecting urban agriculture and the perspectives for urban agriculture are presented in which it is argued that sustainable food growing is a metaphor for social change, catalysing new ways of thinking about our society, our economic system and our environment. It is argued that there are plenty of opportunities in the multiple and flexible forms of urban agriculture. (NB)

Garrett, James; Ruel, Marie T **(eds) (2000). Achieving urban food and nutrition security in the developing world. Focus ‘3’, 2020 Vision, IFPRI Washington DC.**

food security and nutrition

nutrition; livelihoods; women; health; food security

This publication includes ten papers by renewned authors. It begins with the conclusions that (i) “-- growth in urban poverty, food insecurity and malnutrition and their shift in their concentration from rural to urban will accompany urbanization.” (ii) “Urban food security may -- have a direct link to agriculture -- the poor often (have) a ‘home garden' or raise small livestock --.” (iii) “Urban planners and local government should consider how to incorporate -- urban agriculture in their (development) plans.” The papers include the following topics: (i) urbanization, (ii) rural-urban links, (iii) labor markets, (iv) food distribution, (v) urban agriculture, (vi) nutrition in transition,

(vii) women as producers, (viii) health, (ix) programming urban food security. (JS)

Garrett, Steven; Feenstra, Gail **(1999). Growing a community food system. Western Regional Extension WREP0135, Community Ventures Series.**
community development food security and nutrition R&D methodology
food system; community; policy; evaluation

This short book defines what a community food system is and how to improve it. It provides guidance and example for project design, coalition building, strategic planning, community food system assessment, attracting resources/funding, building an organization, shaping policy and carrying out an evaluation. The authors' conclude that the following are essential ingredients: (i) long-term vision, (ii) incorporating the values of a wide cross section of the community, (iii) through assessment of the existing community food system, (iv) finding supporting leaders, (v) beginning with doable small projects, (vi) evaluating and documenting progress towards goals, (vii) finding resources on time, and (viii) maintaining a viable organizational structure (JS)

Gavrilov, Alexander **(1997). Rooftop gardening in St. Petersburg, Russia. Urban Agriculture Notes on: http://www.cityfarmer.org/russiastp.html#russiastp. 3 p. Center for Citizen Innitiatives, St. Petersburg, Russia**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition
rooftop gardening; home gardening; St. Petersburg; Russia

The Rooftop Gardening Program in St. Petersburg started in 1993. This short article gives facts and figures and describes some of the techniques used in the project. The project achieves much impact with citizens despite a complete lack of interest from city administration. (WB)

Gefu, JO **(1992). Part-time farming as an urban survival strategy: a Nigerian case study. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 295-302**
food security and nutrition rural-urban linkages
Nigeria; survival strategies; surveys; urban poor

Several survival strategies are being adopted in the wake of structural adjustment in Nigeria. One of these is part-time farming. This chapter presents the results of a survey questionnaire on part-time farming that was distributed to 550 academic and non-academic staff members of Ahmadu Bello University, Main Campus, Zaria. A total of 110 questionnaires were returned. All of the respondents indicated that they were involved in a variety of part-time farming activities, ranging from home gardening to commercial production. The involvement of all but 16% predated structural adjustment. Maize and cowpeas were the most commonly cropped grain,

maize for sale and cowpeas for home consumption. A variety of vegetables were grown for home consumption around the house or on small patches of land near residences or office buildings. About 81% of the respondents kept some livestock: goats, poultry and sheep, in that order. Most kept fewer than five units of any one species (except poultry), indicating that livestock raising was geared to home consumption. The profit margin was very narrow. It was concluded that urban agriculture is likely to remain a prominent feature of the informal sector in urban Nigeria. It is recommended that urban farmers form their own producer associations the better to take advantage of government-subsidized production inputs and obtain credit.

German NGO Forum for Environment and Development **(2001) Drawing on Farmers' Experiences in Food Security, local successes and global failures.**
food security and nutrition
agriculture; IFPRI; NGO Forum

This reader presents commissioned papers, giving a critical analysis and views of a variety of experts working with rural and urban communities in developing countries. The reader was especially developed as an input of the NGO Forum at the IFPRI Conference on Food Security held in Bonn, September 2001.

Global Facility for Urban Agriculture **(1997). Urban agriculture for food security, jobs and waste recovery: roundtable of top local government officials. Second International Colloquium of Mayors on Governance for Sustainable Growth and Equity (UNDP). 10 p. Global Facility for Urban Agriculture**
food security and nutrition waste recycling R&D methodology
municipal policies; urban planning; open spaces

This roundtable took place in the framework of the Second Colloquium of Mayors on Governance for Sustainable Growth and Equity, held at UNDP, New York, July 28-30, 1997. A number of city case studies were presented by mayors outlining the status of urban agriculture in their cities. In a plenary discussion, challenges and benefits of urban agriculture were discussed. (WB)

Gonzalez Novo, Mario; Murphy, Catherine **(2000). Urban agriculture in the city of Havana: a popular response to a crisis. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 329-347. DSE, GTZ, CTA, SIDA**
horticulture food security and nutrition
food security; food policy; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; environmental regulation; hydroponics; Havana; vermiculture; biopesticides; biodiversity; reforestation; Cuba

Havana probably offers the most successful example for which the concept of urban agriculture was applied as a response to a food crisis, not only by individuals, but

also as a government-supported strategy. The main idea of urban agriculture in Havana is “Production by the neighbourhood, for the neighbourhood”. In general it is an intensive high input, high output system. There are many different forms of urban farming: (a) popular gardens, (b) basic production co-operative units with about 10 to 15 members, (c) state farms (d) individual farms (e) co-operative supply units. The organopónics and intensive gardens, which work well in the urban setting, are important in the total production. The government made land available for farming providing secure land-use rights and there are a number of regulations concerning urban agriculture e.g. on the use of pesticides. There is a large network of support services for producers and direct marketing by the producers has been facilitated. Urban agriculture increased the diversity of crops and had a dramatic impact on the deteriorating food situation in Havana. Overall 117,000 people work in jobs related to urban agriculture. Waste is recycled though urban agriculture a reforestation programme started and urban agriculture has become an important element in urban development and different departments co-operate in improving the impacts of urban agriculture. (NB)

Gravestein, Xandra; Lubek, Marianne van **(1995). Desk study VPO evaluation: intervention strategies to promote urban food security. 154 p.**
food security and nutrition
development projects; food security; government policies

Analyses the urban food security aspects in a number of Dutch development projects in order to improve intervention strategies of a number of Dutch NGOs, grouped together as intermediary donor organisations (IDOs). A large number of projects are described in an annex. (WB)

Gura, Susanne **(1996). Vegetable production: a challenge for urban and rural development. In: Agriculture + Rural Development, vol. 3 (1996) no. 1, p. 42-44 Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA); Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL); Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ)**
horticulture food security and nutrition
vegetable production; consumption patterns; nutrition; farming systems

Vegetables play an important role in food security. Vegetable production has been mostly concentrated on species with a high market value. However, the poor usually can't afford these types of vegetables. Urban poor mainly consume leafy vegetables which wither quickly. Urban agriculture can play an important role to increase this production. Three systems of production are distinguished: urban shifting cultivators, household gardeners and periurban market producers. It is argued that these systems need development support for land saving technologies, improved recycling of waste, recycling technologies and urban community development approaches and interdisciplinary approaches. (NB)

Guyer, JI **(1987). Feeding African cities: studies in regional social history. Bloomington: Indiana University Press.**
food security and nutrition
Africa; history; food security; food supply

This book explores the historical connections between three aspects of regional food supply systems: the income/price relationship for producers and consumers, organizational forms in production and trade, and the broader social dynamic resulting from the interface between regional social organization and colonial and post-colonial policies. The introduction reviews the literature on the subject and is followed by four case studies addressing particular situations: “Brittle trade: a political economy of food supply in Kano,” by Michael Watts; “Feeding Yaoundé, capital of Cameroon,” by Jane I. Guyer; A century of food supply in Dar es Salaam: from sumptuous suppers for the sultan to maize meal for a million,” by Deborah F. Bryceson; and “The development of food supplies to Salisbury (Harare),” by Paul Mosley. The epilogue seeks to identify similarities and differences in the four experiences in terms of evolution, watersheds and patterns of change. (HC, IDRC)

Haen, H. de **(2002) Enhancing the Contribution of Urban Agriculture to Food Security In: Special Edition Urban Agriculture Magazine: World Food Summit, Five Years Later, RUAF, pp. 1-2, 2002**
food security and nutrition
urban agriculture; food security

At the World Food Summiit 1996, representatives of 185 nations and the European Community pledged to eradicate hunger in all countries, with an immediate view to halving the number of undernourished people in 2015. Five years later it is estimated that hunger still afflicts one in five of the developing world's people and that nearly 30 percent of the world's population suffer from some form of malnutrition. An increasing part of these people live in urban areas. Rates of urbanisation are expected to reach 83% in Latin America and the Caribbean, 53% for Asia and the Pacific and 55% for Africa by 2030. Ensuring food security and appropriate nutrition of the urban population - and in particular of the poorest households - has become a major challenge worldwide.

Hahn, Nathalie **(1991). Backyard gardening: a food security system managed by women. In: Entwicklung + laendlicher Raum vol. 1991 no. 1 p. 24-27. International Fund for Agricultural Development (IFAD), 107, Via del Serafico, 00142 Rome, Italy**
food security and nutrition
home gardening; gender issues; food security

Highlights the importance of home gardening to contribute to food security, and, particularly, the role women play herein. The author suggests various directions for furtherr research and innovation. Interestingly, homestead production of spices receives special attention. (WB)

Hamm, Michael W; Baron, Monique **(1999). Developing an integrated, sustainable urban food system: the case of New Jersey, United States. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 54-59. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition
local food system; food security; United States;

The establishment of more localized food systems that achieve social-justice goals is an important strategy for developing sustainable urban food systems. New jersey, United States, is used as a case study to explore avenues for impacting various components of the food system in ways that (1) incorporate social justice issues into a more localized system; (2) alleviate constraints on access to adequate, nutritious food; (3) develop the economic capacity of residents to purchase food; (4) develop people to grow, process, and distribute this food; (5) maintain adequate land to produce a high percentage of the locale's food needs; (6) educate a population increasingly removed from food production to participate in, and respect, its generation; and (7) integrate environmental stewardship into this process. (Abstract adapted from original)

Hargesheimer, Ken**. Urban agriculture: gardening, market gardening, mini-farming, mini-ranching. Gardens / Mini-farms Network, Lubbock, TX, USA**
horticulture economic impact rural-urban linkages
home gardening; gardening techniques; urban livestock production; youth; United States

Focuses on the potential of various forms of urban agriculture, notably from the perspective of an opportunity for youth employment. Much of this paper is a mapping of production techniques. In addition, a condensed overview is given of important publications and suppliers' addresses, for the American market. (WB)

Harmon, Alison **et al (1999). The food system: building youth awareness through involvement. PennState, University Park PA USA, 142 p. Also on: www.cas.psu.edu/docs/CASPROF/**
food security and nutrition
youth; food system; education; nutrition

This is a guidebook for parents and educators of youth in grades four through to twelve to introduce the concept of ‘food system’ and to provide background information, recommendations for developing curricula, specific project activities, and resources for gathering information. Many of the activities are also appropriate for adults. The authors suggest that “In the face of globalization, food system

educators should emphasize the need to strengthen local food systems." Topics covered include: (i) food system inputs, (ii) food production, (iii) food transportation, (iv) distribution, (v) food access, (vi) food system outputs, (vi) local food system elements, (vii) sustainability. (JS)

Hassell, M. von **(2000) The Impact of Community Gardening Initiatives in New York City on Children In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning community development food security and nutrition
United States, children; anthropology; housing; poverty

This paper describes research of the author on the Lower East Side of Manhattan since 1989. Her current work on community gardens has developed out of research about a community-based initiative to renovate abandoned buildings. Community gardens on the Lower East Side emerged in conjunction with these housing initiatives from the early 1970s on. They must be understood in the context of fluctuations in the urban economy and attendant shifts in labor markets, housing availability, and market-driven struggles over space. There are approximately 950 community gardens in New York City, predominantly on city-owned land in neighbourhoods marked by poverty and deteriorated housing conditions. Many are contested and targeted by the current city administration as sites for development. In this paper the role of and impact on children in community gardens and community-based initiatives on behalf of these gardens in New York City are analysed. The focus was on food production, art, and education projects involving children in community gardens on the Lower East Side of Manhattan and on children's participation in marches and other events on behalf of the gardens.

Hawkins, JN **(1982). Shanghai: an exploratory report on food for the city. Food for the Cities Symposium of the Fourth Intercongress of the Pacific Science Association. Singapore. September 1981. WP-82-7/7. Honolulu: East West Resource Systems Institute.**

food security and nutrition
policy; planning; food security; China

The author draws a profile of the city in terms of geography, demography, industry, agriculture and political planning. He notes that Shanghai is unique in that the surrounding 10 counties have been functionally organized to provide agricultural goods and services to the city. He then examines food policy and planning, setting out the five policy objectives for the 1980s and discussing the four main policy issues: rural-urban linkages (specialization vs self-sufficiency); socialist planning vs market mechanism; labour-intensive vs capital-intensive (mechanized) farming; and food pricing (urban consumers vs rural communes). Other topics covered include production and supply; markets (state and free) and prices; food expenditure; food rationing; human resource development; and research and policy issues. (HC, IDRC)

Hawkins, JN **(1981). Shanghai's food system. Unpublished, 47 p.**
food security and nutrition
policy; planning; food security; China

This short paper provides a start to understanding modern urban agriculture's organization in China, beginning with Premier Zhou en lai's 1963 policy declaration of objectives of city planning: (i) Cities will combine industrial and agricultural production, (ii) urban enterprises (socialistic) primary focus to be promotion of both industrial and agricultural production, (iii) policy and planning must include the city itself and the surrounding countryside, (iv) the goal of city planning is quality of life. The paper goes into detail on the organization of Shanghai's food system. (JS)

Hermann, Hans-Joachim **(1999). Planning for survival spaces in the city: how urban agriculture could be promoted. In: Gate: Technology and Development no. 2 (April-June 1999) p. 10-13**
economic impact services food security and nutrition
urban dwellers; rural-urban migration; urban poor; survival strategies

The majority of poor people live in urban areas. The received wisdom of development theory that the poor migrate to the city is being challenged in this article. Urban agriculture is an important element in survival strategies. However, the isolated promotion of urban agriculture as part of a solution of the problems of the urban poor will be of little help. (NB)

Hobbs, K. **(2000) The role of community gardening and community development. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning community development food security and nutrition
United States, children; anthropology; housing; poverty

The White House Task Force on Liveable Communities coordinates federal agencies with missions and resources that affect the liveability of American communities. The Task Force focuses on policies that promote sustainable growth, preserve open space, reduce congestion, improve schools, and make neighbourhoods safe. In pursuing these policies, the Task Force promotes coordinated Federal financial assistance, technical expertise, and information to assist collaborative efforts by communities at the state, local, and regional levels.

Hoffmann, H. and Mathey, K. **(eds.) (2000) Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000.**
land use planning food security and nutrition
United States; economic impact

All information of the International Symposium on Urban Agriculture and Horticulture on CD-Rom. The CD contains all the abstracts, posters and papers; programme of the event including the excursion and public relations network information.

Holl, Annegret **(1998). Urbane Landwirtschaft in Havanna (Kuba) zwischen staatlicher Planung und 'moviemento popular'. 90 p.**

food security and nutrition community development hydroponics

Havana; Cuba; home gardening; community gardens; food security; agricultural markets; commodity-oriented agriculture

Urban agriculture in Havana is considered by many authors as an essential contribution to Cuban food security, is very much instigated by the state and now covers over 6,000 hectares within the city boundaries. This paper reports on a fact-finding trip examining if urban agriculture in Havana is as successful as is often claimed. Doing a survey to that effect revealed itself difficult in the current political setting. The author highlights existing discrepancies from state regulations, more particularly with regard to the composition of crops produced: many citizens go for staple food production rather than vegetables. The paper concludes that the contribution of urban agriculture to food security is less than what is often reported and certainly not enough to feed Havana. Also, rural production should be much more directed towards the internal Cuban market. A refreshing look at things which are so often just taken for granted and therefore an important

Holm, M **(1992). Survival strategies of migrants to Makambako - an intermediate town in Tanzania. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 284-294**

food security and nutrition rural-urban linkages

Tanzania; rural-urban migration; survival strategies; surveys

This chapter examines the phenomenon of rural-urban migration in Tanzania, in general, and Makambako, in particular. Makambako is a local transit and trade centre with limited infrastructure and opportunities for employment. Nevertheless, it draws large numbers of migrants, mainly from among the “better off” rural inhabitants. Researchers interviewed 283 migrant households using questionnaires and talked with key informants in Makambako and the surrounding villages, in order to shed light on their survival strategies. They noted that after taking up residence as urban dwellers, migrants tended to continue a rural lifestyle. The 280 economically active heads of households had a total of 342 occupations. More than half were farmers, one-third were in business and one-quarter worked as wage laborers. The 249 economically active wives of heads of households held a total of 295 occupations. More than four-fifths were farmers, 14.8% engaged in business and 12.3% were wage laborers. A large proportion of both male and female migrants practiced a combination farming and business, often selling their surplus production. Migrants tended to retain close ties with their area of origin and one-fifth received

food from their home village. The implications of migration for rural-urban equity are discussed. It was concluded that Makambako needed a better infrastructure, facilities to process local resources and a powerful local government with local participation if it were to function effectively as an intermediate centre for the rural hinterland. (HC, IDRC)

Husbands, Winston **(1999). Food banks as antihunger organizations. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 103-109. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition
food bank; access to food; food security; emergency food; community initiatives; Canada; Toronto

The Daily Bread Food Bank (DBFB) was established in Toronto in the early 1980s in an environment of high unemployment. It was established to provide emergency food assistance to people in need. The organization's founders claimed that DBFB would work to put itself out of business. Since that time, however, the demand for emergency food assistance has grown enormously, as a result mainly of lingering unemployment and cuts to social assistance. In other words, the food-security situation of low-income households in Toronto has worsened. In hindsight, DBFB's original focus on more or less traditional food banking undermined its intention to work to put it itself out of business. Traditional food banking, though important, is of limited value in securing reasonable alternatives to the current situation. Consequently, over the past 2 years, DBFB has been transforming itself to operate as an antihunger organization, without abandoning its commitment to providing emergency food assistance. Food banks need to organize their resources to focus considerably more on research, public education, public-policy advocacy and community mobilization. Food banks, but not traditional food banking, have a role to play in the struggle for food security. (Abstract adapted from original)

Institut Masyarakat **(1983). Urban agriculture: food and employment for the urban poor. Penang: Institut Masyarakat**
food security and nutrition
Malaysia; urban poor; food supply; vegetables; surveys; needs assessments; development policies

A concerted drive toward industrialization and urbanization has resulted in the rapid disappearance of market vegetable gardens in the city of Penang and its urban fringe. This document presents a proposal for a project to document the causes and effects of the growing crisis in urban agriculture in Penang, and seek solutions to it. The study will involve a needs assessment of the poor, an examination of the decline of urban agriculture, a thorough appraisal of the state’s development strategy and a

case study of the Thean Teik Estate. The last is expected to provide concrete examples of how market forces and development pressures displace the powerless, i.e. farmers without legal title to their land, and the actual impact of current government policies. (HC, IDRC)

Instituto de Investigaciones Fundamentales en Agricultura Tropical (INIFAT) **(1995). Primer Encuentro Internacional sobre agricultura urbana y su impacto en la alimentación de la comunidad. 92 p. Instituto de Investigaciones Fundamentales en Agricultura Tropical (INIFAT)**

food security and nutrition economic impact

home gardening; economic analysis; IPM; hydroponics; permaculture; crop rotation; biofertilisers

Contains a number of papers on various technical aspects of homegardens and communal gardens on Cuba. (WB)

International Food Policy Research Institute (IFPRI) **(2000). The life cycle of malnutrition: eradicating malnutrition: income growth or nutrition programs? International Food Policy Research Institute. 70 p.**

food security and nutrition health and environment

malnutrition; food policy; urbanisation; food security; gender; livestock; land tenure

This annual report of a CGIAR center is focussed on the role of good nutrition in economic growth and well-being. It finds that community-based nutrition programs bring multiple benefits. It begins with the statement that Malnutrition is not a disease that runs its course. It is a process, with consequences that may extend not only into later life, but also to future generations. Currently about one in thee children under five in the developing world are malnourished, and one in two in eastern Africa. The potential gains of improved nutrition are identified as massive beginning with increased adult productivity, continuing through reduced health care costs, and promoting both social and civic well-being. Significantly, IFPRI finds that poverty and malnutrition are not congruent. More money may not lead to better food, care and health if good food is not available and accessible. Better nutrition is proven to raise incomes but higher income is not a guarantee of better nutrition and health. (JS)

International Food Policy Research Institute (IFPRI) **(1996). Uncommon opportunities for achieving sustainable food and nutrition security: an agenda for science and public policy. A 2020 Vision for Food, Agriculture, and the Environment Brief no. 37. 2 p. International Food Policy Research Institute (IFPRI), 1200 Seventeenth Street, N.W. Washington DC 20036-3006, USA**

food security and nutrition R&D methodology

food security; government policies; political aspects; sustainable development

An invitation to the World Food Summit convened by FAO in Rome in November 1996 'to harness science and technology for the transformation of agriculture into a

primary instrument of a global Evergreen Revolution'. A 10-point agenda is proposed as a basic scientific and public policy framework for achieving sustainable food and nutrition security at both the national and international levels. A very condensed and important policy brief. (WB)

Islam N **(1982). Food consumption, expenditure pattern of urban households in Bangladesh. Food for the Cities Symposium of the Fourth Intercongress of the Pacific Science Association. Singapore. September 1981. WP-82-7/1. Honolulu: East West Resource Systems Institute**
food security and nutrition
food consumption; household economy; Bangladesh

This paper examines population growth and food availability in Bangladesh; the income structure of urban and rural households; the pattern of food consumption by income group (grain vs other food); the pattern of food consumption by income and food item (rice, wheat, pulses, milk, oil, meat, fish, potato, sugar and eggs); and the percentage of income expended on food by area (rural or urban) and by class. Between 1973-74 and 1979-80, the country had a grain deficit approximately equal to the percentage of people living in urban areas, i.e. in the 10-15% range. To overcome the chronic food deficit, not only of grain but also of other foods, the government has piloted a few dairy farms, agricultural estates, fish ponds and backyard poultry farms in and around the large cities. It has also approved a “greenbelt” scheme to encourage food production on the urban periphery. It is recommended that the government go further than this by extending better technology and inputs to traditional small-scale farmers, especially those on the urban fringe. (HC, IDRC)

Jacobi, Petra **(1998). Food production as a survival strategy for urban households: state of knowledge and state of research in Tanzania. 10 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
economic impact food security and nutrition rural-urban linkages
horticulture; Tanzania; urban livelihoods; food security

Provides an overview of urban agriculture in Dar es Salaam with its estimated 3 million inhabitants and its growth rate of 8%. In such a setting, urban food production has revealed itself to be very important as a survival strategy for the urban poor. The paper provides interesting figures and statistics out of which emerges a varied picture as to who is practising urban agriculture, with what purpose, scale of production, and more. Various production systems are presented and typified: crop based systems, periurban crop production, open space production, homegarden production, and livestock based systems. (WB)

Jacobi, Petra ; Amend, Jörg; Kiango, Suzan (1999). Farming in the city: Vegetable production in Tanzania. In: Gate: Technology and Development no. 2 (April-June

1999) p. 14-20
horticulture food security and nutrition
; Tanzania; vegetable production

Dar es Salaam is a good example of the potential of urban farming. Besides cattle raising, vegetable production is the most prominent activity, with a clear focus on leafy vegetables. The reasons are: a huge demand, it can be grown throughout the year, there are pest resistant crops, investments are reasonable, certain crops can be picked continuously and competition from outside the town is minimal. The authors conclude that urban farming creates jobs and income, reduces household spending, maintains green space and contributes to reusing organic waste. More and more stakeholders acknowledge the importance of urban agriculture in Dar es Salaam. An extended version of the article can be found in 'Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda' published by DSE. (NB)

Jacobi, Petra; Amend, Jörg; Kiango, Suzan (2000). Urban agriculture in Dar es Salaam: providing for an indispensable part of the diet. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 257-283. DSE, GTZ, CTA, SIDA
horticulture food security and nutrition
vegetable production; dairy farming; community gardens; food security; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Tanzania

Homegarden production, Livestock production in homesteads, community gardens, open space production, and periurban production in Dar es Salaam are discsussed. Perishables (milk, leafy vegetables) are produced in intraurban areas the periurban area supplies a mix of perishables and staples (maize, rice a.o.). More than 90% of leafy vegetables come form opens spaces and home gardens while 60% of the milk is produce in urban and periurban areas. Urban farming contributes to the maintenance of green open spaces, improving the micro climate and preventing illegal dumpsites. The different production systems contribute considerably to family income. There is a strong link between the socio-economic status of a family, the objective of the production and the involvement of women. “Female agriculture” contributes more to the household. Urban agriculture is affected by, access to resources (water), insecure land-use titles, the unsatisfied demand for fresh food especially green leafy vegetables. Level of organisation is low and urban retail poses problems. Urban agriculture has received attention on various policy levels. Its recognition is reflected in several laws and regulations. It is expected to keep its importance especially for the urban poor. (NB)

Jacobi, Petra., Drescher, Axel W. and Amend, Jörg (2000) Urban Food Security; urban agriculture response to crisis. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.
food security and nutrition economic impact
crisis; poverty alleviation

Why people get involved in urban agriculture is the basic question of this article,

which is based on information extracted from 20 city case studies on urban agriculture world-wide and additionally draws from experiences of the Urban Vegetable Promotion Project in Dar Es Salaam (Tanzania). It is argued that local authorities have to take their responsibilities in securing urban food security and to create an impact on urban poverty alleviation.

Jaenicke, Hannah, Jonathan Muriuki and Caleb Basweti. **(2000) Seed and Seedling Supply for Urban and Periurban Agroforestry. ICRAF (International Centre for Research in Agroforestry) Paper presented at SIUPA stakeholder meeting and strategic workshop, Sub-Saharan region, 1-4 november 2000**

food security and nutrition urban forestry
food production; agroforestry

In the context of a projectyed high increase in the urban and periurban population in the next decades, agroforestry technologies can help to increase food and fodder production, and minimize risks associated with small-scale agriculture. Fruit, medicine, fodder and timber are the primary tree products from agroforestry that can be produced on small plots with relatively extensive management. However, to date, a satisfactory seed and seedling distribution system for the urban and peri-urban sector does not exist. In the past year, we have carried out several surveys amongst urban and peri-urban nursery operators, and seed suppliers in Kenya. Although germplasm is moving between the rural (seed) and urban areas (seedlings), there is no system that allows tracing the origin and destination of this material. ICRAF and its collaborators are trying to develop a sustainable system for agroforestry seed and seedling production in the urban and peri-urban areas.

Johnson, Vicky and Jacqui Webster **(2000) Reaching the Parts... Community Mapping: Working Together to Tackle Social Exclusion and Food Poverty. London: Sustain: The alliance for better food and farming / Oxfam's UK Poverty Programme**

food security and nutrition R&D methodology
community development; participatory methods; United Kingdom; food; poverty; nutrition

Community mapping uses participatory appraisal methods to enable local people to analyse their food economies and work with others to develop sustainable solutions to the problems they face in eating a healthy diet. This full colour report illustrates the process and findings of the pilot project in Brighton, Coventry and Leicester. It concludes with a range of recommendations to help tackle food poverty and increase people’s control over their communities.

Jolly, Desmond **(1999). Urban agriculture as food-access policy. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 195-199. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications

Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition R&D methodology
access to food; rural-urban linkages

Hunger malnutrition, and suboptimal access to food have resulted from a number of political, economic and demographic forces. Among these are urbanization, un(der)employment, food-marketing systems and welfare politics. Urban agriculture can enhance access to food and thus enhance the welfare of low-income urban residents. However, the net outcome may be negative if urban agriculture is seen as a substitute for, rather than an addition to food and agricultural policies designed to improve rural conditions and provide affordable access to food for the all urban residents. Hence, the benefits of urban agriculture may depend integrally on an overall context of food and agricultural policies designed to meet the food needs of the entire population. (Abstract adapted from original)

Kaldjian, Paul **(1997). Istanbul: opportunities in urban agriculture. In: Arid Lands Newsletter no. 42 (fall/winter 1997). 10 p.**
city ecology food security and nutrition
food systems; Istanbul; Turkey; food production; resource management; food security

Provides an overview of the Istanbul food system resource use and agricultural production. The paper makes an attempt to identify the potential role of urban agriculture within the urban food system with regard to resource use, land tenure, social relations and political ecology. (NB)

Kerry, Sylvester; Fidalgo, Lourdes **et al (1998). Workshop for the compilation of urban food security and nutrition profiles. FAO, Rome & Ministry of Planning, Maputo. 39 p.**
food security and nutrition
nutrition; food security; Africa; gender; youth; food system; Mozambique

This workshop report presents inputs from several Southern African cities. It emphasizes the need to understand the food system before intervening. It defines the role of women and youth in food security. Its prime concern is how to collect data. (JS)

Khouri-Dagher, Nadia **(1985). Food and energy in Cairo: provisioning the poor. 64 p. The Food Nexus Programme, The United Nations University, Toho Seimei Building, 15-1, Shibuya 2-chome, Shibuya- Ku, Tokyo 150, Japan**
food security and nutrition
Egypt; food distribution; food availability; food consumption; energy consumption

Analyses Cairo citizens' access to food and energy. The former was very much on people's minds, the latter much less so, at the time when this report was written, in the midst of an economic crisis. Data used in the study were collected during a

survey in one of the lower-income areas of Cairo. Food distribution and buying behaviour of people is examined in detail and this yields interesting information. (WB)

Khouri-Dagher, Nadia **(1986). Food and energy in Cairo: provisioning the poor. UNU, Paris , 62 p**

food security and nutrition

food system; household farming; urbanisation; energy; livestock; urban poor; poverty

This report begins with the observation that access to food is one of the major problems of daily life in Cairo. Urban livestock rearing is presented as a method of concrete access to food. (JS)

Kleer, Jerzy **(1987). Small-scale agricultural production in urban areas in Poland. In: Food and Nutrition Bulletin vol. 9 no. 2 (1987) p. 24-28. University of Warsaw**

food security and nutrition horticulture

home gardening; allotment gardens; agricultural production; Poland

Contains a historic overview of small-scale food production in Polish towns and cities. One interesting figure: in the mid-1980s, total output from allotment gardens accounted for over 6% of total agricultural production in Poland. (WB)

Kleer, Jerzy; Wos, Agustyn **(eds) (1988). Small-scale food production in Polish urban agglomerations. UNU Paris, 63 p.**

food security and nutrition

urbanisation; markets; leisure; malnutrition; livestock; horticulture; allotment gardens; ecology

This small volume tells a wide and deep history of small-scale urban farming in Poland based on research by a team of twelve professionals. The study includes the methods of production, the producers, the nutritional and health benefits, the ecological consequences and more. The tables spread out a complete national picture. This study provides a foundation for future national surveys in Europe and the rest of the world. (JS)

Klein, Petra; Steen, Anniek **(1999). Urban agriculture: a review of the literature on the sociological and nutritional dimensions of urban agriculture in East Africa. 55 p. ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**

food security and nutrition community development health and environment

Kenya; Uganda; Tanzania; food security; nutrition; social aspects; urban livelihoods; health hazards; home gardening

In the framework of a literature study, this paper reviews a number of publications looking at sociological and nutritional aspects of urban agriculture, mainly in Nairobi, Kampala and Dar es Salaam. (WB)

Knight, Jonathan **(1999). The nutrition garden project. In: Urban Agriculture Notes http://www.cityfarmer.org/albie.html. 6 p.**
Supplier: City Farmer, Canada's Office of Urban Agriculture
food security and nutrition
home gardening; research methodology; vegetable production; nutrition; economic aspects; United States;

Describes a research project in which a student started to grow all his own food in a garden of 4,500 square feet. The project describes production maximisation, labour requirements, variety trials, establishing compost needs and the diet obtained from the garden. (NB)

Koc, Mustafa; MacRae, Rod; Mougeot, Luc JA; Welsh, Jennifer (eds) **(1999). For hunger-proof cities: sustainable urban food systems. 240 p. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition services
food supply; nutrition policy; sustainable agriculture; urban health

Most contributions to the book were presented at the International Conference on Sustainable Urban Food Systems in May 1998. The book examines food security from an urban perspective. The concept of urban food security, local food systems and how to improve the availability and accessibility of food for city dwellers are discussed. The book explores the role urban and community agriculture play, how this can be improved and its linkages with rural populations. Furthermore ecological and health concerns and a gender perspective on urban food production are examined. The politics of food and food policy and urban agriculture as food access policy are discussed. Finally strategies toward food democracy and the emergence of innovative food systems are analysed. The discussions are based on case studies form around the world including Canada, United Kingdom, Poland, Turkey, Cuba, Zambia and Zimbabwe. The book includes contributions from farmers, professors, activists, business leaders, policymakers and community organizers. (NB)

Koc, Mustafa; Koc, Hulya **(1999). From staple store to supermarket: the case of TANSAS in Izmir, Turkey. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 115-121. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications

Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
services food security and nutrition
access to food; food distribution; consumption patterns; Turkey

This paper examines a successful staple-store project operated by the municipal government of Izmir, Turkey. Whereas its immediate success offered relatively affordable food to urban poor and middle class consumers and helped to curb inflationary tendencies to a certain extent, the project later extended beyond its original goals and turned into one of the two biggest supermarket chains in Turkey. The paper suggests that staple stores can he effective tools for food access if they can be kept as small operations, and the paper offers some insights on the impacts of supermarketing on food access, pricing, and consumption. Yet, there are no easy solutions that improve access to food. Although TANSAS protected consumers from high inflation and speculation in the 1970s, it inadvertently played a role in introducing and spreading supermarket chains in Turkey, altering the food-consumption and food-distribution patterns irreversibly. The paper also warns of the impacts of global economic pressures and neo-liberal restructuring schemes on the future of public enterprise and public policy at the local level. (NB - abstract adapted from original)

Kreinecker, Petra **(2000). La Paz: urban agriculture in harsh ecological conditions. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 391-411. DSE, GTZ, CTA, SIDA**
gender food security
food security; food policy; land use systems; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; migration; nutrition; microclimate; Bolivia; appropriate technology

The climate in La Paz enhances the development of adapted techniques for urban agriculture. Officials tend to not seen urban agriculture though in fact it is everywhere. Urban agriculture is a survival strategy for socially marginalized people as urban agriculture fits well in their economy based on social relations. Several urban farming systems can be found of which private home gardens and communal gardens are more important. Land titles are unclear and little capital is used. Farmers are organised in informal and formal organisations and networks. Women play a central role in farming and urban farming contributes to women’s independence. Urban agriculture contributes little to food energy supply but increase the diversity of food consumption. Many factors hamper the development of urban agriculture among others the ecological conditions, cultural heterogeneity and land tenure situation. A future strategy needs to emphasise existing structures and socially accepted Andean varieties to improve the situation of marginalized people. (NB)

Lam, TT **(1982). Food for the city: the role of the informal sector. Food for the Cities Symposium of the Fourth Intercongress of the Pacific Science Association. Singapore. September 1981. WP-82-7/4. Honolulu: East West**

Resource Systems Institute
food security and nutrition
Malaysia; street food; food supply; informal sector

In Third World cities, an important part of the food distribution network is dominated by the informal sector. This study looks at the food consumption pattern in Peninsular Malaysia by income and ethnic group; food consumption in and away from home; changes in diet; the various food retailing outlets; the role of hawkers and vendors; and the future of informal retailing. It is noted that hawkers and vendors usually sell cooked food or food that can be prepared very quickly for the waiting consumer, such as soup noodles, noodles fried with cockles, salad, satay and curried rice. They can do so cheaply because of their low overhead. Moreover, both the poor and the wealthy traditionally go to hawkers for vegetables, fruit, fish, meat and poultry. It is concluded that the informal sector will probably continue to thrive in Malaysia: it will continue to be patronized by the poor out of necessity and the rich by choice, as a complement to other options in the urban food retailing system. (HC, IDRC)

Lang, Tim **(1997). Food policy for the 21st century: can it both be radical and reasonable? In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 216-224. 31 p. ISBN 0_88936_882_1. CAD 35.00. Thames Valley University (TVU), 32-38 Uxbridge Road, Ealing, London W5 2BS, United Kingdom**
Supplier: Ottawa: International Development Research Centre
food security and nutrition
food policy; environment; health; consumption patterns; globalisation

Argues that the food system can only be understood as a dynamic system. The paper outlines a number of key features, including drivers, of the food system. After decades of dominance of production interests in food policy, a period of reaction is now under way by arguments and groups committed to protecting the environment, public health, consumers, and the socially disadvantaged. Changes in production and distribution, even changes in cooking, have altered the nature of food. This has both alarmed and activated consumer and public interest groups. The paper characterises this struggle as one of forces seeking to control and bend nature and the labour process versus those seeking to democratise food. The outcome is uncertain. Even powerful corporate interests face uncertain times. Issues such as climate change, population pressure, consumerism, internal conflicts of market forces and inequalities driven by globalisation, and the restructuring of welfare all threaten the controlling tendencies. The paper concludes with a call to rethink the role of the state. Given the relative lack of power individual consumers have only the state to exert power on their behalf. The challenges ahead are practical, intellectual, political, and cultural. (Abstract adapted from original)

Lebre La Rovere, Emilio **(1985). Food and energy in Rio de Janeiro: provisioning the poor. UNU Paris. 59 p.**

city ecology food security and nutrition
market gardens; marketing; farmers' associations; smallholder food production

This report looks at experiments in a large city in the face of energy and food shortages. It detail the cooperation of an electrical utility and small-scale periurban farmers and the formation of a marketing cooperative by small-scale urban farmers. (JS)

Leckie, Stephen **(1999) How meat-centred eating patterns affect food security and the environment. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 145-149. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition
food security; consumption patterns; land use systems; ecology; meat production

Scaling back on resource-intensive meat production may be the best way to ensure food security for a growing population into the next century. Essentially, the world is experiencing an over-population of farm animals. Since 1950 global meat production has jumped from 18 kg/person to more than 35 kg/person. Grain yields have also increased, but much of the gain has gone to fattening animals that are very inefficient at converting grain to meat. Per capita land use in countries with plant-based agricultural economies stands at only a fraction of the levels seen in countries with high meat production rates. North America still uses seven times more land per capita than many countries in Asia. Less animals to feed might lead to a rebuilding of the world grain reserves. Furthermore, a reduction in land use by cutting meat production would be an effective way to ensure that wilderness areas are maintained and even expanded. (Abstract adapted from original)

Lee-Smith, Diana **et al (1987). Urban food production and the cooking fuel situation in urban Kenya. National Report: Results of a 1985 National Survey. Nairobi: Mazingira Institute. 304 p.**
food security and nutrition
Kenya; fuelwood; poverty; livestock

This is a true pioneering study. It is one of the first surveys of urban food production (conducted in 1984-1985), and the first in a wave to come from Eastern Africa in the past decade and a half. It also marks the beginning of the involvement of Canada's IDRC in funding research on urban agriculture. The study analyses the patterns of food and fuel production and subsistence consumption by urban households in Kenya, based on a random sample of urban households in six representative towns in Kenya (Isiolo, Kakamega, Kisumu, Kitui, Mombasa, and Nairobi). The high proportion it found of households engaged in subsistence food production (crops and livestock) as well as fuel production and gathering is consistent with the proportions

of urban families with incomes below the level of affording to buy food to meet domestic needs. Detailed reports on each of the six towns surveyed can be found under separate cover, as annexes to the main report. (JN, partly adapting from authors)

Lee-Smith, Diana; Memon, Pyar Ali **(1993). Urban agriculture in Kenya. Canadian Journal of African Studies 27:1 (1993) pp. 25-42. Papers, 18 pp.**
genderfood security and nutrition R&D methodology
Africa, Kenya, urban theory, urban policies, urban development, women's role, subsistence production, urban poor, food security

This article analyzes the characteristics of urban agriculture in Kenya within a wider conceptual and socioeconomic context and is based on a survey by the Mazingira Institute (Lee-Smith et al., 1987). This article emphasizes the significance of incorporating a food component, namely crops and livestock, into urban theory, and raises questions of policy for sustainable urban development. The authors claim that the situation in urban areas with respect to urban farming must be understood as part of a wider food crisis, exacerbated by the fact that women's work and subsistence production are largely ignored, and the situation therefore remains misunderstood. The article notes women's roles and participation in urban agriculture. Extension services need to be made more available in urban areas, and specifically, they need to be directed to poor urban women. The article concludes by stating that the fact that urban farmers are mainly, but not exclusively, women producing for their own families' consumption, is no reason to discount the conceptual significance of these activities or the value of their primary economic production. (AH)

Lee-Smith, Diana; Lamba, Davinder **(1998). Urban food, fuel and shelter. Workshop on Cities feeding people: lessons learned from projects in African cities. IDRC. Nairobi. 21-25 June 1998.**
food security and nutrition
woodfuel; urban housing; food security

During 1984-1987, the Mazingira Institute carried out the first national survey of urban agriculture as part of an International Development Research Centre (IDRC)-funded project entitled Urban Food, Fuel and Shelter (82-0114). The study revealed that 29% of the households surveyed grew part of their food on urban land. The value of food crops produced in one season in Kenyan towns was estimated at US $4 million and the total value of livestock at US $17 million. Most of the crops and livestock were produced for subsistence and not sale, although milk and eggs were both consumed and sold. The majority of urban farmers were women. Local authorities were generally hostile to urban farming, except on private land. The researchers identified the following key issues in urban agriculture: land for crops, crop extension, space for livestock, veterinary services, woodfuel, organization, women farmers, marketing and indigenous vegetables.

Although the project established urban agriculture as a significant economic activity,

it was not until the early 1990s that policy and refereed scholarly articles on the research were accepted for publication. And, despite persistent effort on the part of the authors, the impact on urban agriculture policy and practice in Kenya has yet to be felt. This paper discusses the project in terms of institutional capacity building, the generation of gender insights and, especially, the utilization of results by non-researchers. Some of the difficulty related to the last was attributed to the fact that there were no urban farmers' associations to work with. Some 56 references are contained in the bibliography. (HC, IDRC)

Levenston, Michael **(1999). Chickens in the soup. Urban Agriculture Notes. In: http://www.cityfarmer.org/chicken84.html. 3 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture

food security and nutrition land use planning
livestock; chickens; urban policies; United States

This article from the very first issue of the City farmer Newspaper describes the battle of urban farmers, especially chicken raisers, with city by-laws in North America. Interesting from a historical point of view. (NB)

Leybourne, Shona L; Grant, Miriam **(1999). Bottlenecks in the Informal Food-transportation Network of Harare, Zimbabwe. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 110-114. ISBN 0_88936_882_1. CAD 35.00. Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
services food security and nutrition
food distribution; food security; urban policies; Zimbabwe;

In the context of the bottlenecks that pervade the internal informal food distribution flows of Harare, urban dwellers who work in the informal food-distribution network and/or live in the poorer areas of the city are facing food insecurity. Gender, class, and race are axes of perceptual difference between policy writers, policy enforcers and the recipients of these policies, and these axes affect how individual transporters, food retailers, and consumers choose to manoeuvre in the grid of authority's domination. It is suggested that the state should recognize the contribution that the informal food distribution network is making to the food security of the city. A strategically oriented dialogue that seeks to ensure the security of these people's basic food requirements would protect the local structures that have been created by the people for the people. Such discussion might include the formalization, hence protection, of the actors within the informal food-distribution system thus cushioning a large proportion of the urban poor from immediate food insecurity. (Abstract adapted from original)

Losada, Hermenegildo **(et al.) (1998). Urban agriculture in the metropolitan zone of Mexico city: changes over time in urban, suburban and periurban areas. In: Environment and Urbanization vol. 10 (1998) no.2 p. 37-54**

horticulture food security and nutrition

urban livestock; ornamental plants; urban farming systems; environment; environmental pollution; urban planning; land tenure; cultural aspects

The paper describes the scale and nature of agricultural production in Mexico City, according to the different zones defined and how these have adapted to the changing demands from urban populations for food, wood and recreation. Evidence is provided that agriculture has successfully adapted its products and production methods to the changes, which include a deteriorating environment and lack of government support. The producers developed ways to use degraded land and use large volumes of waste in the production process. Its is argued that appropriate support for the diverse urban agricultural production comes with many ecological advantages and creates new jobs. However this also requires important changes in the ways city authorities manage urban expansion. (NB - Abstract adapted form from summary)

Lourenco-Lindell, Ilda **(1995). The informal food economy in a peripheral urban district: the case of Bandim District, Bissau. In: Habitat International vol. 19 (1995) no. 2 p. 195-208. Stockholm University, Sweden**

food security and nutrition

food supply; Guinea Bissau; urban survival strategies

This paper addresses the role of urban food supply for urban food security and attempts to uncover the diversity and complexity of the urban food system, through an integrated study of food production, distribution and consumption of two different foodstuffs. It focuses on informal food supply in a peripheral district of Bissau, Guinea-Bissau. The study reveals that different foodstuffs contribute in different ways and have distinct production, marketing and consumption structures. The highly diversified nature of urban food supply is illustrated by the variety of scales of food production and marketing activities. Poor households integrate cash and subsistence elements in their food consumption, as well as the formal and informal sector in order to improve their access to food. But within the informal food sector, small-scale retailers and low status markets seem to play a crucial role in making food available to the poor at prices they can afford. The investigation takes the form of a case-study through a qualitative approach that has potential for revealing the experience of food insecurity and the coping strategies of the urban poor in an unplanned peripheral settlement. (Original abstract)

MacRae, Rod **(1999). Policy failure in the Canadian food system. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 182-194. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition
food policy; nutrition policy; health; environment; globalisation; food security

Canada has failed to create a national food policy. Instead Canada has an agricultural policy with significant contradictions and a very weak nutrition policy. A coherent food policy should have the optimal nourishment of the population as its highest purpose, make agricultural reduction and distribution servants of that purpose, and ensure the long-term financial and environmental sustainability of the food system. The absence of a comprehensive food policy has resulted in health and environmental sustainability problems that the current policy apparatus is inadequately equipped to address. A national food policy should be designed with an emphasis on integrated responsibilities and activities, transdisciplinary development and implementation, food-systems thinking and a focus on macropolicy. New policies and policy-making structures are proposed, based on the emerging theory of ecological organizational design. An outline for a new Department of Food and Food Security, with health and sustainability as its central thrust, is presented. (Abstract adapted from original)

Madaleno, Isabel Maria. **(2001) Urban Agriculture Supportive Policies: two distant cities. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning community development food security and nutrition
Portugal; Brazil

Agriculture is an old urban function. Doomed and cursed as it was after the first Industrial Revolution, it never ceased to exist in developing countries and is now once again welcome in most developed countries as well. Poor Brazilian communities see urban agriculture as an alternative survival strategy, because it produces food and improves household's nutrition, but also generates income and jobs, while additionally providing self-respect and hope for a better future. In Portugal, city gardening is small-scale, aimed at giving opportunities for child and adult education, providing ways to produce and consume healthy food, and to enhance contact with land and living things.

Madaleno, Isabel Maria **(2001) Cities of the Future: Urban Agriculture in the Third Millenium. Instituto de Investigacao Cientifica Tropical, Lisbon. In: *Food, Nutrition and Agriculture, no. 29*, 2001, pp. 14-21. Supplier: Food and Nutrition Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy**
food security and nutrition
urban areas; periurban areas; urban agriculture; food production; nutrition; food security; green spaces; Europe (Eastern); Europe (Western) ; America (Northern); health; environmental aspects; Africa (Eastern); Africa (Western); Africa (Southern); America (Southern)

Urban agriculture, defined as food and non-food production dispersed throughout urban and peri-urban areas, can play an important role in the cities of the future. A

main benefit of these activities could be an improvement in the nutritional status and food security of urban people. Urban agriculture may contribute to food self-reliance, jobs and effective survival strategies. It provides an opportunity for purposeful recreation and educates young people about health and environmental issues. Producing food in a city environment helps to develop community bonds because it encourages cooperation and a sense of sharing. Children, young people and adults have opportunities to increase their understanding of, and respect for, the tasks and challenges faced by farmers and to be directly involved with the production of healthy food. Urban agriculture constitutes a positive way to improve the urban environment, adding a further dimension to the wide-ranging benefits urban people derive from public open spaces. In this article, the evolution of cities and use of green space in Europe and North America are explained. Recent experiences in urban agriculture in a number of countries in Africa, Europe and Latin America are described. It is argued that urban agriculture

can foster local solutions to social, environmental, political and economic problems in a diversity of settings.

Madaleno, Isabel Maria **(2001) Urban Agriculture Supportives Policies in Latin America. Tropical Institute, Lisbon, In: Urban Agriculture Notes, also available from http://cityfarmer.org/LatAmerPromotes.html#Lapromotes**

food security and nutrition land use planning

urban agriculture; nutrition; land use, America (Central), America (Southern)

Agriculture is an old urban function, doomed after the first Industrial Revolution. However, in developing countries it never ceased to exist and nowadays it is welcomed in most developed countries too, for urbanites feel more and more compelled to regain the lost bond with nature. Regarding poor Latin American communities, urban agriculture is widely seen as an alternative survival strategy, because while it produces food and improves household's nutrition, the activity can also generate income, jobs, additionally providing self-respect and hope for a better future. The table presents several practical and current experiences of urban and peri-urban agriculture integration into city development and urban land use in Latin America, due to friendly public policies, systematizing and resuming what is available in recent literature, together with the author's own research results.

Madaleno, Isabel Maria **(2001) Cities of the Future: Urban Agriculture in the Third Millenium, Instituto de Investigacao Cientifica Tropical, Lisbon. In: Food, Nutrition and Agriculture, no. 29, 2001, pp. 14-21. Supplier: Food and Nutrition Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition

urban areas; periurban area; urban agriculture; food production; nutrition; food security; green spaces; Europe (Western); health; environmental aspects, Africa (Central), Africa (Eastern), Africa (Northern), Africa (Southern), Africa (Western), America (Northern)

Urban agriculture, defined as food and non-food production dispersed throughout urban and peri-urban areas, can play an important role in the cities of the future. A main benefit of these activities could be an improvement in the nutritional status and food security of urban people. Urban agriculture may contribute to food self-reliance, jobs and

effective survival strategies. It provides an opportunity for purposeful recreation and educates young people about health and environmental issues. Producing food in a city environment helps to develop community bonds because it encourages cooperation and a sense of sharing. Children, young people and adults have opportunities to increase their understanding of, and respect for, the tasks and challenges faced by farmers and to be directly involved with the production of healthy food. Urban agriculture constitutes a positive way to improve the urban environment, adding a

further dimension to the wide-ranging benefits urban people derive from public open spaces. In this article, the evolution of cities and use of green space in Europe and North America are explained. Recent experiences in urban agriculture in a number of countries in Africa, Europe and Latin America are described. It is argued that urban agriculture

can foster local solutions to social, environmental, political and economic problems in a diversity of settings.

Maidar, T **(1999). Combating hunger in Mongolia using urban agriculture. Urban Agriculture Notes. On: http://www.cityfarmer.org/mongolia.html. 3 p. Poverty Alleviation Study Centre (PASC), Central POB 275, Ulaanbaatar 13, Mongolia**
Supplier: City Farmer, Canada's Office of Urban Agriculture
food security and nutrition
Mongolia; food security

Project description of the activities of a Mongolian NGO in the field of urban agriculture promotion aimed at increasing food security of poor families. (NB)

Mapetla, M; Phororo H; Prasad G **(1994). Urbanization, gender and environment: the role of wild vegetables. Paper presented at the International Seminar on Gender, Urbanization and Environment. Nairobi, Kenya. 13-16 June 1994. Proceedings. Nairobi, Kenya: Mazingira Institute**
Supplier: Mazingira Institute, PO Box 14550, Nairobi, Kenya
genderfood security and nutrition
Africa, Lesotho, resource use, wild vegetables, nutrition, income generation, gender issues, cultural aspects, urbanisation, women's role, social networks, rural-urban linkages

Although many people in Lesotho move to towns in search of better job opportunities, they miss out on access to natural wild food resources. It is argued in this paper that such resources can be adapted to the urban environment and wild vegetables could contribute to nutrition and cash income of urban dwellers. Gathering, preparing and eating are related to gender and culture. Earlier studies

have shown that collecting and preparing wild vegetables is a strategy for rural women to provide a balanced diet for their families. Urbanization in Lesotho has affected women's access to natural resources like edible wild plants. Settlements now occupy former agricultural land and wild foods become scarce in peri urban areas due to over harvesting. Urban women have to spend much more time to find enough wild plants for a meal. The study reveals that only a few people collect wild plants, and children are no longer taught about edible plants due, in part, to schools highlighting westernized curriculums which do not foster the value of indigenous plants. For many people in towns, wild foods have low status and they would rather buy cultivated vegetables from the market. Towns have created markets but only rarely are wild vegetables sold. Women from the countryside sell the wild vegetables through informal networks in town. A promotion strategy for wild vegetable focusing on knowledge, attitude, value and nutrition is suggested. Outward rather than inward growth of urban areas is also recommended by the authors. It is argued that gardens within urban housing sites in Lesotho are agriculturally more productive than fields in rural areas, and agricultural production does not decrease when fields are converted into housing sites with gardens in the present urban expansion pattern. (AH)

Marsh, R **(1994). Nutritional benefits from home gardening. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 14-15. Asian Vegetable Research and Development Center (AVRDC), PO Box 205, Taipei 10099, Taiwan; IICA, PO Box 55-2200, San Jose, Costa Rica**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
horticulture food security and nutrition
Bangladesh; community health; home gardening; nutrition; nutritive value; urban communities; urban development; urban environment; urban population; vegetables

Seasonal hunger and malnutrition are ever-present conditions for the landless or near landless rural poor and urban slum dwellers. These groups are particularly vulnerable because of low and irregular cash incomes. In Bangladesh, as in other tropical countries, many such households use the small area around their house to grow food to supplement field crops, purchased food and generate income for households with access to markets. The pilot homegarden project of Helen Keller International (HKI) reported here has looked specifically at the impact of improved home gardening on the nutritional status and health of poor households. (ILEIA)

Martin, A. and Oudwater, N. **(2000) Urban Agriculture and the livelihoods of the poor in Southern Africa. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning food security and nutrition
South Africa; poverty; livelihoods

The paper focuses on three dimensions of the social, institutional and planning context of urban agriculture. Firstly an analysis of the contribution of urban

agriculture to the livelihoods of different social groups; secondly, factors affecting the outcomes of urban agriculture projects, and thirdly, the linkages between households, communities and the planning authorities. The policy implications of these are discussed. The paper is based on research carried out in informal settlements in South Africa (Cape Town and Pretoria) and Zimbabwe (three sites in Harare, one periurban setting with strong market linkage to the central food market, a resettlement area and a high density township). Appropriate policy responses to support urban agriculture as part of sustainable urban livelihoods are needed. In Southern Africa there is increasing awareness and interest among policy makers concerning the potential of urban agriculture, but present policies provide limited support.

Mawoneke, Sthembile **(1998). Impact of the urban agriculture research study in Zimbabwe. ENDA Zimbabwe, Box 3492, Harare, Zimbabwe**

economic impact food security and nutrition health and environment

Zimbabwe; economic impact assessment; food security; off-plot cultivation; health hazards; heavy metals

Reports on the results of a household monitoring study aiming at determining the economic impact of urban agriculture on urban households in Harare, Zimbabwe, assessing the nutritional impact of agricultural produce on urban households; and identifying crop types and off-plot cultivation. Simultaneously, environmental research was conducted focusing on assessing the impact of urban agriculture on the urban environment. (WB)

Maxwell, Daniel G. **(1996). Highest and best use? Access to urban land for semi-subsistence food production. In: Land Use Policy vol.13 (1996) no. 3 p. 181-195**

land use planning food security and nutrition

Africa; access to land; land tenure; semi-subsistence farming

Pressures on urban policy-makers in Africa to formalise land tenure and land delivery systems are increasing. Parallel, there is an increased demand for informal access to land in urban areas. From analysing what brings the highest and best use, the land access and land tenure issues in Kampala, Uganda are discussed. Semi-subsistence agriculture is an important component of the urban system, yet it is a technically illegal form of land use. From the situation analysis, possible policy responses to competing demands over urban resources are presented. (NB - abstract adapted from original)

Maxwell, Daniel G.; Armar-Klemesu, Margaret **(1998). The impact of urban agriculture on livelihood, food and nutrition security in Greater Accra. 30 p. Nutrition Unit, Noguchi Memorila Institute for Medical Research, University of Ghana, PO Box 25, Legon, Ghana**

food security and nutrition economic impact health and environment

food security; Ghana; Accra; nutrition; livelihoods; health; environment; land use

systems; food contamination; gender; multi-disciplinary approach; institutional aspects; human resource development; farming systems

Part one of the paper summarises the major findings of the urban agriculture component of the overall study. The geographic, demographic, and socio-economic distribution of urban agriculture in Accra is presented. The impact of urban agriculture on food and livelihood security and nutritional status at household level and individual level are discussed as well as the environmental impacts and the impacts on health. An analysis is made of how city growth affects land use, property rights and livelihoods on the urban fringe. Finally, various other areas like human resource development, institutional strengthening, local partnerships gender are discussed. (NB)

Maxwell, Daniel G. **(1999). Urban Food Security in Sub-Saharan Africa. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 26-29. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition
sub-Saharan Africa; urban poor; access to food; political aspects

Cities in Africa face numerous problems, including alarming increases in the levels of urban poverty. The urban poor devote large proportions of their total incomes to procurement of food, meaning that, to a large extent, the poverty problem manifests itself as a food-security problem. Problems faced in the area of urban food security, particularly giving the urban poor access to sufficient food, are scarcely recognised in policy arenas or contemporary political debates. This paper traces the reasons for the "disappearance" of urban food security from the political agenda, noting that urban food security classically meant ensuring the food supply for a city. More recently, the problem has become one of access to sufficient food, as a result of rapidly growing urban poverty, and the urban poor have relatively little political voice. The paper goes on to suggest a series of questions to guide policy research and action to alleviate urban food insecurity insub-Saharan Africa. (NB - abstract adapted from original)

Maxwell, Daniel G. [et al.] **(2000) Urban livelihoods and food and nutrition security in Greater Accra, Ghana. International Food Policy Research Institute (IFPRI), 2033 K Street, N.W., Washington, DC 20006-1002, USA. IFPRI Research Report no. 112**
food security and nutrition
Ghana ; food security ; periurban agriculture ; surveys ; street vendors

This report is the outcome of the Accra Urban Food and Nutrition Study, a collaborative effort of the International Food Policy Research Institute (IFPRI), the Noguchi Memorial Institute of Medical Research in Accra, and the World Health Organization. It examines the nature of urban poverty and how it relates to food insecurity and malnutrition in Accra, Ghana, especially among children. By exploring

the major determinants of food security and nutritional status, it develops indicators that are appropriate in an urban context, identifies vulnerable groups within the city, and suggests policies and programmes to improve the lives of the urban poor. With regard to the importance of urban agriculture in food security strategies of the poor in Accra, the authors found it to be less important than in some other African cities, but it is of critical importance in the periurban areas around the city. Agriculture as a source of livelihood is increasingly vulnerable as the city physically expands, destroying farmland. Street vendors in Accra play an important role in food distribution: their role should be acknowledged by city authorities. This major study has important consequences for policy making: governments have to accept the fact that urban poverty is real and must be addressed, especially when vulnerable groups, such as female-headed households, are concerned. (WB - adapted from the original summary)

Mbiba, Beacon M **(1999). Urban agriculture in Zimbabwe. Urban Agriculture Notes http://www.cityfarmer.org/zimbabwe.html. 2 p. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe Supplier: City Farmer, Canada's Office of Urban Agriculture**

horticulture food security and nutrition

Zimbabwe; poverty; income generation; food production

A summary of the book "Urban agriculture in Zimbabwe" by Beacon Mbiba. A table of contents is provided. The book adresses the phenomenon of urban agriculture in Zimbabwe. (NB)

Mbiba, Beacon M **(1995). Urban Agriculture in Zimbabwe: Implications for Urban Management and Policy. Chapters. 1856288579: USD 59.95 (hardcover). Aldershot, England: Avebury**

genderfood security and nutrition

Africa, Zimbabwe, women's employment, adolescents, gender roles, socioeconomic differentiation, gender relations, access to land, decision making, power relations, men's roles, women's role, men's strategies, women's strategies

This book addresses the phenomenon of urban agriculture in Zimbabwe. While it acknowledges that the activity is a significant source of food and income for the urban poor, the book draws attention to the development conflicts raised by the activity. It attempts to place urban agriculture within the context of urban economy, the environment, institutional concerns, gender and urban poverty. Evidence presented confirms the role of urban agriculture for employment of women and children. A review of gender dimensions of informal urban cultivation highlights the needs, problems and experiences of women's double burdens of production and reproduction. Men's social and economic motivation for urban cultivation activities are also noted. Issues of ‘gate-keeping', women landlordism, and decision-making are discussed in terms of gender dynamics. It is noted that women are not a homogenous group, thus there is a need to revise generalizations of poor women, and extend research issues to high income groups. The author contends that urban cultivation should only form one part of a strategy designed to improve the position

of urban women for it does not tackle the problems of women's access to education, skills, wage and self-employment. Based on ongoing research the book demonstrates that there is a potential for urban agriculture as part of the urban economy, but that the urban poor, including women- headed households, are not major beneficiaries of the activity. (AH)

Mbaye, Alain **(et al.) (1999). Some more urban agriculture case studies: Dakar, Cairo, Zambia and Cagayan de Oro. In: Gate: Technology and Development no. 2 (April-June 1999) p. 40-47**

food security and nutrition economic impact city ecology

food security; ecology; economic impact; nutrition; land use planning; political aspects

Discusses case studies on urban agriculture in Dakar, Cairo, Lusaka, and Cagayan de Oro (Philippines). An overview is presented including what are the main agricultural activities, who is involved, what are the environmental and economic impacts and policy implications. Extended versions of the case studies can be found in 'Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda' published by DSE-ZEL. (NB)

Mbiba, Beacon M **(1993). Urban agriculture in Zimbabwe: implications for urban poverty and management. The Making of Modern Africa Series. ISBN 1 85628 857 9. NLG 225.00. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe**

horticulture food security and nutrition

Zimbabwe; urban environment; urban development; development policies

The book is based on research conducted in Zimbabwe in 1991 and rejuvenated local interest on urban agriculture. In southern and eastern Africa, urbanisation is a major process transforming the economies. Most urban centres were lanned for much smaller populations and they lack adequate formal sector employment for the growing workforce. As a result most urban environments are characterised by informal sector activities, of which urban agriculture is increasingly an important feature. While it acknowledges that the activity is a significant source of food and income for the urban poor, the book draws attention to development conflicts raised by the activity. The book places urban agriculture within the context of urban economy, urban management, and urban development also discussed are the gender dimension, environment institutional aspects. Lastly ways to develop urban agriculture to its full potential in Harare are explored. (NB)

Mbiba, Beacon M **(2000). Urban agriculture in Harare: between suspicion and repression. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 285-301. DSE, GTZ, CTA, SIDA**

horticulture food security and nutrition

farming systems; food security; food policy; land use systems; ecology; economic impact; gender; urban policies; poverty; land tenure; legislation; Zimbabwe

Harare has several conditions favourable to urban agriculture including a relatively wet climate, large residential plot size and large open spaces in the city. Urban agriculture can be classified into on-plot agriculture, off-plot agriculture, and periurban agriculture. The collapse of the formal economy gives rise to urban agriculture. Most of the production is for subsistence. Whereby women provide the bulk of the labour and management inputs. This can be related to their traditional roles of food procurers. The official view is that urban agriculture poses a threat to the environment, but potential contributions to the environment remain unexplored. Existing policies swing between repression and tolerance, while urban agriculture is not perceived as a viable solution for food security or job creation. The general opinion is that there is ample rural land available for production, rather the problem is the inequitable distribution of land. Research and lobbying helped to create a basis for dialogue around the potential of urban agriculture. For this the target should be to increase food production and make it available, affordable and adequate through out the year. The challenge is to discover how the ambiguity of the legal framework can be used to extent urban agriculture. (NB)

McKenzie, John; Wright, Sarah; Phillips, Toni **(1999). Revolutionary food. On: http://www.peg.apc.org/~adamt/cuba/hab9606/hab9606.htm. 5 p. Australian Conservation Foundation, Urban Permaculture Project, Havana, Cuba Supplier: Australian Conservation Foundation**

food security and nutrition

Cuba; urban gardens; food security

Using the example of Havana, Cuba, the paper demonstrates the importance and potential contribution of urban food gardens to solving the food crisis, cutting costs and environmental improvement in cities. (NB)

Memon, Pyar Ali; Lee-Smith, Diana **(1993). Urban agriculture in Kenya. In: CJAS/RCEA (January 1993) p. 25-42. Mazingira Institute, Nairobi, Kenya**

horticulture food security and nutrition

food security; surveys; Kenya

Presents the results of a survey among urban farmers in Kenyan cities by the Mazingira Institute. The study concludes, once more, that subsistence production in towns and cities has been neglected in economic and spatial planning to the point of being outlawed Still, the economic value of urban subsistence farming is both significant at the national level and crucial to the poor themselves. (WB)

Meyer-Renschhausen, Elisabeth; Holl, Annegret **(eds) 2000. Die Wiederkehr der Gaerten: Kleinlandwirtschaft im Zeitalter der Globalisierung. 229 p. ISBN 3-7065-1534-2. Innsbruck: Studien-Verlag**

horticulture food security and nutrition community development
horticulture; gardening; allotment gardens; vegetables; conferences; Germany; United States; Cuba; Mexico; Burkina Faso

More and more city dwellers become involved in producing vegetables and fruit, rather than consume commercially produced food. The reasons strongly vary, however, from sheer necessity in many Eastern European and developing countries to a reaction to the unhealthy commercial products and the benefits of a relaxed pastime for overstressed urban citizens.

A number of chapters in this book were originally presented at the 'International Symposium on Urban Agriculture and Horticulture: the Linkage with Urban Planning' held in Berlin in July 2000. Cases described are from Western Europe -Germany, in particular-, Eastern Europe, the USA and from developing countries. Many different aspects are described, ranging from the land use issues, that never fail to come up in these cases, to community development and to descriptions of gardening systems, like the chinampas near Mexico City. Interestingly, a number of projects are analysed that were unsuccessful in involving the beneficiaries. Invariably, these projects did not take traditional production and consumption patterns enough into account. This is an important warning not to automatically paint a rosy picture of urban gardening. (WB)

Mies, Maria; Bennholdt-Thomsen, Veronika **(1999). The subsistence perspective: beyond the globalised economy. 246 p. ISBN 1_85649_776_3 (pbk). GBP 15.95 Supplier: Zed Books, 7 Cynthia Street, London N1 9JF, UK**
food security and nutrition
subsistence farming; urban planning

This book is not just a translation of a former paper (in German: Eine Kuh für Hillary: Die Subsistenzperspektive – A cow for Hillary, The Subsistence Perspective), but an updated and upgraded book. In this book, Bennholdt-Thomsen and Mies put the subsistence perspective not only as still being very alive and valuable for sustainable development, but as an alternative to the current globalised free market system. After a historic overview, the subsistence perspective is subsequently analysed and applied on globalisation, agriculture, markets, cities, the commons, wage labour, women’s liberation and politics. Of course there are overlapping issues between these sectors. An interesting section regarding urban agriculture is chapter 5. A picture of self- provision co-op stores is given. And an interesting perspective is given on urban gardening, which is explained as an answer to the neo-liberal policy of de-industrialisation in the cities of UK, USA and Japan (in the latter called Yabo Farmers). Subsistence in the cities, it is argued, is not an utopian pipe dream, but being practised in many diverse ways. They however, leave the question unanswered whether we should view urban agriculture as a sign towards the design of sustainable cities or as “just” instrumental for the maintenance of the world capitalist system. While it is worthwhile thinking about this, it will not keep the thousands of urban “peasants” from producing. (RvV)

Ministry of Planning and Finance **(1998). Consolidation of the household food security and nutrition information network for policy formulation and development planning in Mozambique. FAO Field Document no. 1. 54 p. Ministry of Planning and Finance, Department of Population and Social Development, Maputo, Mozambique**

R&D methodology food security and nutrition

food security; nutrition; methodologies; urban policies; Mozambique; Zambia; urban planning

A workshop report documenting the process of developing and implementing a methodology for the compilation of urban food security and nutrition profiles in Mozambique. Draft methodology, presentations and issues raised during the workshop are presented. A supplementary report in English presents the workshop objectives, key issues and a presentation of the Zambian experience. (NB - abstract adapted from original)

Mlozi, MRS; Lupanga, IJ; Mvena, ZSK **(1992). Urban agriculture as a survival strategy in Tanzania. In: Baker J. & Pedersen P.O. (eds). The rural-urban interface in Africa: expansion and adaptation; seminar proceedings no. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 284-294**

food security and nutrition rural-urban linkages

Tanzania; survival strategies; urban poor

The urban agriculture research project was carried out by Sokoine University of Agriculture, with support from the International Development Research Centre (IDRC). Researchers interviewed 1 800 respondents in six towns: Dar es Salaam (700); Dodoma, Morogoro and Mbeya (300 each); and Makambako and Kilosa (100 each). The sample covered both high density and low density settlement patterns: it included political and non-political leaders, farmers and non-farmers, and men and women. It was noted that urban agriculture was practiced not only by the urban poor, but also by members of the middle class. About 90% of home gardens and out-of-town fields were used to grow field and vegetable crops for home consumption, as a cash-saving strategy. The middle class in medium-density areas and the well-off in low-density areas were the main livestock producers: they sold milk and eggs as a means of maintaining their standard of living in an inflationary context. Constraints to farming included access to inputs such as land, finances, labour, water, etc., especially by the poor; theft of crops; pests and diseases; destruction of crops by people, stray animals, vehicles, municipal employees, etc.; and contamination of crops by refuse. This chapter describes the factors that have contributed to the growth of urban agriculture in Tanzania; discusses the implications of coexistence between agricultural activities and normal urban life and activities; and draws conclusions and makes recommendations as to how the government can handle the growth of urban agriculture as an income earner. (HC, IDRC)

Morris, Saul S **(2000). Targeting urban malnutrition: a multicity analysis of the**

spatial distribution of childhood nutritional status. IFPRI FCN(DP No. 94. 29 p.
food security and nutrition
malnutrition; food security; health; children; youth; geography; surveys

This paper examines the degree to which urban childhood malnutrition, disease, poverty substandard housing and lack of access to sanitation tend to concentrate in certain disadvantaged neighborhoods in developing country cities. Findings are presented for seven cites in Africa, Asia, and Latin America. The results suggest that the conventional view that childhood malnutrition is primarily concentrated in squatter settlements and slum areas greatly oversimplifies a complex reality. There was consistently little evidence of spatial clustering of malnutrition as indicated by weight-based nutrition indicators. The findings challenge the appropriateness of geographically targeting nutrition interventions in cities. The reviewer concludes that urban agriculture, applied citywide, is an appropriate nutrition intervention whereas many spatially targeted commodity interventions are likely to miss their target. (JS)

Morrow, K **(1997). Feeding the poor: improving household production of Guinea pigs in Peru. IDRC Reports. October 31, 1997. On: http://www.idrc.ca/books/reports/1997/33-01e.html.**
food security and nutrition
Peru; guinea pigs; quality of diet

Guinea pigs are an important staple of the Andean diet. They are traditionally raised by women and children in the kitchen, where they are fed vegetable scraps and fresh greens such as alfalfa. For the past 25 years, researchers at the Agricultural Research Station of the Agrarian University of La Molina research station on the outskirts of Lima have worked to improve the Guinea pig's productivity by breeding animals that produce many offspring and reach reproductive age early. By 1986, the team had identified the first promising breeds that combined the two desired qualities. They had also developed simple, low-cost husbandry methods to protect the animals from disease and prevent inbreeding. With funding from the International Development Research Centre (IDRC), they began introducing the improved breeds and methods in the Cajamarca region, one of the poorest areas of the country. More recently, the team has shifted its attention to helping recent migrants raise Guinea pigs in the city. This article is also available in French and Spanish. (HC, IDRC)

Mosha, A.C. and Cavric, B.I. **(2000) The Practice of Urban Agriculture in Gaborone City. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning food security and nutrition
Botswana; strategies; policy

The aim of this paper is to presents on the development and spatial extent of urban agricultural practice in the city of Gaborone, one of the fastest growing urbanities in Africa. From this case study, lessons can be drawn for future urban agriculture

practices in semi-arid climatic conditions in Africa and abroad. The main interest in the study was to see to what extent, the people in the city of Gaborone carried out urban agriculture activity. The results from the study show that, urban agriculture in Gaborone is dominantly spontaneous and creative response and to some extent is found to be one of the survival strategies of the urban poor. As this case study has just scratched the surface of this very important urban subject in Botswana capital, there are many more questions, which need further researching into before the city can capture the full potential of this activity.

Moskow, Angela Lynne **(1996). The contributions of urban agriculture in Havana, Cuba to individual control and community enhancement. Masters thesis. University of California, Davis, 121 p.**
food security and nutrition
food security; urbanisation; gender; community security; micro enterprise; community gardens; household gardening; geography; organic agriculture; policy; organisation; agricultural extension; environment; Cuba

This thesis is based on an extensive field survey and supplements several other recent studies of urban agriculture in Havana. It has a particular focus on the psycho-social benefits of the urban gardens. It has excellent data and tables. (JS)

Moskow, Angela Lynne **(1999). The contribution of urban agriculture to gardeners, their households, and surrounding communities: the case of Havana, Cuba. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 77-83. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development economic impact food security and nutrition
food security; community development; economic impact; food quality; Cuba

Urban agriculture is promoted in Havana, Cuba, as a means of addressing the acute food-scarcity problems that developed when Soviet aid and trade were drastically curtailed in 1989. Today more than 26 000 gardens in Havana provide for the gardeners' own food needs. Research was conducted in 1995 to determine the ways these gardens contributed to the gardeners' sense of control over their lives and the role of the gardens in enhancing the surrounding communities. Results indicate that the gardens significantly incremented the quantity and quality of the food available to the gardeners' households and neighbourhoods; improved financial welfare through reduced gardeners' households weekly food bills and through money earned from sales of garden products; and made aesthetic, environmental, and other contributions to the community. (Abstract adapted from original)

Mougeot, Luc JA; Egziabher, AG; Lee-Smith, Diana; Maxwell, Daniel G.; Memon, Pyar Ali **(1994). Cities feeding people: an examination of urban agriculture in East**

Africa xiv, 146 p. ISBN 0_88936_706_X. GBP 9.95. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK

food security and nutrition rural-urban linkages economic impact

case studies; Africa (Eastern); farming systems; food production; urban communities

Urban agriculture is gaining importance in order to reduce developing countries' dependency on food imports in order to feed rapidly growing urban populations. The underlying book studies urban agriculture in four East African countries: Tanzania, Uganda, Kenya and Ethiopia. In these countries, IDRC began examining impact and feasibility of urban agriculture a number of years ago. Urban agriculture has long been neglected by researchers as a marginal, unproductive activity undertaken by the urban poor. However, under the pressure of falling per-capita food production in Africa south of the Sahara, and subsequent migration to urban areas resulting in high unemployment, urban agriculture can no longer be ignored as an important part of the urban informal sector, providing income or income-substituting food. An important aspect of the study of urban agriculture is that the approach that looks at rural and urban economies as completely separate entities is seriously questioned. In reality, these economies have many links, although they do not necessarily appear in official statistics. Better land use agreements are needed for urban food production to flourish. More government involvement and interest in urban agriculture will be necessary to achieve this. (WB)

Mougeot, Luc JA**.(1993) Urban food self-reliance: significance and prospects. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

food security and nutrition

selfreliance; food security; survival strategies

This early article on urban farming provides an overview of the importance of the contribution to urban food self-reliance and the scale of urban farming. Furthermore the article touches on prospects for urban agriculture research and its priorities by referring to the major issues of urban agriculture: technologies, the urban ecosystem, the urban economy, access to land and credit, waste and health risks and equity aspects. (NB)

Mougeot, Luc JA **(1994). The rise of city farming: research must catch up with reality. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 4-5. Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands**

horticulture food security and nutrition

home gardening; urban communities; urban development; urban environment; urban population; urban wastes

Farming has probably been carried out in cities ever since they came into being. Luc

Mougeot from the International Development Research Centre (IDRC) in Canada traces the history of farming from ancient cities to the challenges facing urban planning and research in the North and South at the dawn of the 21st century. (ILEIA)

Mougeot, Luc JA **(1994). Urban food production: a survey of evolution, official support and significance: with special reference to Africa. 42 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

food security and nutrition

food production; urban environment; urban population

The article presents an overview on urban agriculture arguing that the largest advances in production and marketing systems in urban agriculture are found in and around major Asian cities. Cases from China are cited as well from Philippines and other countries. Developments outside Asia are also presented with reference to Dar es Salaam, Nairobi, Harare, Ivory Coast and North America. It is argued that city governments are now paying much greater attention to the role of urban agriculture in urban development. (NB)

Mougeot, Luc JA **(1998). Farming inside and around cities. In: Urban Age (winter 1998) p. 18-21**

economic impact food security and nutrition

Africa; development projects; agricultural production; urban planning; urban development

General overview on urban agriculture, with, mostly, African examples. The author expects increased opportunities for urban agriculture in the twenty-first century, e.g. as a result of lower-density urban expansion and because urban planning will more systematically include an UA component. (WB)

Mougeot, Luc JA **(1999). For self-reliant cities: urban food production in a globalizing south. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 11-25. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

food security and nutrition

globalisation; food security; coping mechanisms; food markets; social systems; land use; ecology; municipal policies; waste reuse; gender; food supply; food production; selfreliance; development policies

In this chapter food security is examined in the context of globalization and the forces of interdependence and self-reliance. While disparities continue, people have

learned to cope using ingenious ways to feed themselves, urban farming being one. As poverty rises in urban centres access to food has become an important issue. The author outlines the characteristics of urban food systems in the South and the factors that determine the ability of normal food markets to provide for city dwellers. As a response to food insecurity, today millions of people are producing and distributing food via intricate social systems. The paper discusses the major issues surrounding urban agriculture and the need to study its land use, environmental impact, and the municipal policy. Joint initiatives among international and bilateral development agencies have emerged during the 1990s, resulting in the formation of the Support Group for Urban Agriculture that sets priorities for research, training, and information. Options for the future must include strategies for self-reliance and an acknowledgment of the contribution urban agriculture can make to intensive and efficient local production, waste reuse, and the involvement of women. (Adapted form original abstract)

Mougeot, Luc J.A. **(2002) Urban Agriculture: Main Concepts. International Development Research Centre (IDRC), Cities Feeding People Programme, Ottawa, Canada. In: *Urban Agriculture Magazine - World Summit Special Edition*, 2002, p. 7-8. Supplier: ETC NL**

food security and nutrition

urbanisation, urban food production, concept development, concepts of urban agriculture

Key features of current definitions of "urban agriculture" generally have downplayed a critical trait that makes urban agriculture, urban. Urban agriculture (UA) is different from and complementary to, rural agriculture in local food systems: UA is integrated into the urban economic and logical system. Unless this dimension is enhaced and made operational, the concept will remain of little use to the scientific, technological and policy fronts.

Moustier, Paule **(1999) Définitions et contours de l'agriculture périurbaine en Afrique subsaharienne. In : Agriculture périurbaine en Afrique subsaharienne, p.29 - 42**

rural-urban linkages food security and nutrition

periurban agriculture; sub-Saharan Africa; land use

In this paper an attempt is made to outline the boundaries of periurban agriculture in Africa. The term "Periurban agriculture" refers to the influence the town has in terms of demand but also in terms of resources for which alternatives between agricultural and non-agricultural uses generate competition and complementarities. Its importance is parallel to the dynamics of urbanisation in sub-Saharan Africa. The involvement of urbanites inside and around cities is related to their employment and food situation. This involvement is neither marginal nor transitory but rather in constant change. The interface of the urban area and agricultural activities creates changes in resource uses, choice of marketed products and marketing strategies. The economic and agronomic sustainability of the industries is in question. There have been different foci in the available research: spaces influenced by cities;

natural resource management; strategies of urban residents; production systems; commodity and food systems. The analysis of vegetable commodity systems in different towns suggests ways to improve the comparative advantages of periurban agricultural commodities versus rural sources and imports, by supporting marketers in securing their supply in quantitative and qualitative terms. To ensure the sustainability of periurban industries it is necessary to cross-cut approaches on management of space and commodity system approaches which aims at favouring actors' consultation on the same commodity characteristics. (NB - Adapted form original abstract)

Murphy, Catherine **(1999). Cultivating Havana: urban agriculture and food security in the years of crisis. Oakland: Food First Development Report No. 12.**
food security and nutrition
policy; organic agriculture; Cuba

This report describes the structural, technological, and policy changes in urban agriculture that are reducing food insecurity in Cuba's cities. (JS)

Musa, Tansa**. Yaounde, Cameroon: capital becomes garden city. Urban agriculture notes; on: http://www.cityfarmer.org/cameroon.html Supplier: City Farmer, Canada's Office of Urban Agriculture**
food security and nutrition
Cameroon; crisis response; food security; income generation

A tale on how residents of Yaounde, Cameroon, are turning to urban agriculture in order to reduce their food bills. Among these urban farmers there is a fair proportion of government employees. (NB)

Mwangi, Alice Mboganie **(1995). The role of urban agriculture for food security in low income areas in Nairobi. Food and Nutrition Programme no. 54. 82 p. ISBN 90_5448_028_9. Ministry of Planning and National Development, Nairobi, Kenya; African Studies Centre, Leiden, The Netherlands**
food security and nutrition services
Kenya; food security; micro enterprise; nutrition; livestock; horticulture; rural-urban linkages; surveys; stakeholders; agricultural extension

Reports on findings of a survey of 1994 among 210 low-income households in Nairobi about the role of urban agriculture. One group has urban farmers organized by the UNDUGU Society and the other does not have any organisation amongst its farmers. It finds that urban farming leads to more food security and better nutritional status and access to extension services has very substantial benefits. Household income for the farmers was about 50 percent higher than average for the community. Findings reveal that the Kenyan government takes urban agriculture insufficiently into account in its planning. Policies regarding land distribution and tenure rights are not suitable for the urban farmers. The report states the need for agricultural

extension among low income households, with a special emphasis on women farmers, who constitute the majority of urban farmers. The constitution of an organisation representing urban farmers' rights is vital to protect their interests. Given health hazards connected with urban food production, the government should impose more control on waste, water and other environmental issues. The report suggests that poverty alleviation hinges on sustainable economic development stemming from close collaboration between governments, NGOs, donors, research institutions, and farmers. (WB)

Mwangi, Alice Mboganie; Foeken, Dick **(1996). Urban agriculture food security and nutrition in low income areas in Nairobi. In: African Urban Quarterly vol. 11 no. 2-3 p. 170-179. Unit of Applied Nutrition, University of Nairobi, PO Box 30197, Nairobi, Kenya ; African Studies Centre, PO Box 9555, 2300 RB Leiden, Netherlands**

food security and nutrition health and environment

food security; Kenya; children's health

Addresses the issue to what extent farming activities by low income urban dwellers within the city boundaries of Nairobi play a role in the food security and nutritional condition of the households involved. A comparison is made between three low income groups, i.e. those who practise urban farming, those who do not, and finally a group involved in an urban farming project. The results show that as far as food security is concerned, urban farming does play a role, but also that this is not translated into a better nutritional condition of the children. (WB - from the original abstracts)

Nichol, Lucy **(2001), How can Planning help the local food economy? A Guide for Planners Oxford Brookes University, School of Planning, Oxford, OX3 0BP**

food security and nutrition

local food system, planning, United Kingdom,

This document describes the characteristics of local food production and producers and explains what planners can do to help the local food economy. It advocates local food production by summing up all its benefits. A number of practical policy recommendations are made.(WiH)

Niñez, Vera K **(1985). Introduction: household gardens and small-scale food production. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 1-5.**

horticulture food security and nutrition

home gardening; food production; gardening practices

Discusses household gardens as a household-level food production strategy and provides a useful list of functions and benefits, apart from the obvious food supply. Definitions are given of home gardens as against field production and market gardening and a systematic comparison is made between these three production modes. Interestingly, the author remarks on the fact that those who were involved in traditional gardening systems are rarely the ones who participate in the design and

implementation of garden projects. This seems a strange state of affairs. (WB)

Niñez, Vera K **(1986). The household garden as a lifeboat. In: Ceres no. 112 (July/Aug 1986) p. 31-36. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

horticulture food security and nutrition

home gardening; food security; Peru; traditional gardens

Describes household gardens as an additional source of food for the urban poor. A typology for these gardens is given, both from a biophysical and a socio-economic viewpoint. Initial gardening programmes were unsuccessful, the author argues, as they were mostly a replica of temperate, 'budget' gardens and took local conditions and customs insufficiently into account. A Peruvian urban gardening project is analysed in detail. Community gardens evolved from European-style gardens to traditional Peruvian gardens as external financial support came to an end. This resulted in a shift of species planted, with a stronger staple food component, in more intercropping, and in a multi-layered set-up, including banana, papaya and climbing species. The author draws a number of conclusions based on such project experiences all hinting at the importance to link up with existing practices. Extension and advertising campaigns are important to interest as wide a range of people as possible. (WB)

Nitsch, Egbert; Aue, Christina **(199?). Bedeutung staedtischer Land- und Gartenwirtschaft in Einer Welt: Gaerten als Beitrag zur Welternaehrung und zur Oekologisierung der Staedte. 33 p.**

horticulture food security and nutrition city ecology

food security; urban poor; urban policies

Examines the role and position of urban agriculture in the light of food security for the urban poor. A number of policy measures are presented that are necessary to reach a wider impact. The authors argue that this role is not restricted to cities in developing countries but plays an important role in greening cities in industrialised countries as well. (WB)

Nugent, Rachel A **(2000). The impact of urban agriculture on the household and local economies. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 76-97. DSE, GTZ, CTA, SIDA**

economic impact food security and nutrition health and environment

household economy; local economy; employment; income generation; labour markets; gender; economic diversification; urban policies; macro-economic impacts

On basis of the case studies presented in the reader the article analyses the economic impact or urban agriculture on individual, household, city and macro-economic level. The paper explores the economic conditions and policies in urban areas that create the impetus for urban agriculture to exist and which affect its

viability. The capacity of urban agriculture to provide jobs and income and value of production are analysed, which all are badly needed in fast growing cities. Conclusions are drawn on the economic relevance of urban agriculture based on both quantitative and qualitative knowledge. (NB)

Ofei-Aboagye, E **(1996). Gender critique on urban agriculture: food security and nutritional status in greater Accra (Ghana). Report for IDRC Project No. 96-0013 003149. Reports. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9. Ottawa: IDRC**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
gender food security and nutrition
Africa, Ghana, gender issues, research agenda, development projects, gender analysis, methodologies, food security, nutrition

This proposal review is based on an IDRC study on food security and nutritional status in Greater Accra, Ghana, and highlights key issues in gender considerations for research on urban agriculture. It focuses on the reviewer's expectations regarding objectives of the study and suggestions for improvement along gender lines. The reviewer notes that resources of land, water, credit, information and other inputs need to be considered from a gender perspective. Gender proportions of poverty and its influencing factors should inform the design of conceptual framework and proposed methodology (with qualitative methods facilitating particularly rich gender enquiry). The reviewer contends that the participation of a female leader researcher does not necessarily guarantee incorporation of a gender perspective. Use and involvement of policy makers, the National Council on Women and Development, women's organizations and the media are critical at various stages of the research. (AJH)

Okpala, Don C.I. **(2002) Urbanisation, Poverty and Urban Food Security. Urban economy and Finance Branch, UNCHS (HABITAT) In: Urban Agriculture Magazine - World Summit Special Edition, 2002, p. 1-2. Supplier: ETC NL**
food security and nutrition rural-urban linkages
urbanisation, urban food production, poverty, food security

In this new millenium two of the most significant development challenges are rapid urbanisation and growing poverty. The combination of these two trends within cities and towns in Africa, Asia and Latin America has resulted in a special problem now recognised by a new name - "urbanisation of poverty".

Oni, S. I. **(2001) Urban agricultural Enterprises in West Africa: Case of Metropolitan Lagos, Nigeria. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning food security and nutrition
Nigeria; poverty

This paper discusses the historical antecedent of urban agricultural enterprises in West African countries and particularly shows how urban agriculture is practiced as a means of addressing the consequences of unguided urbanisation such as acute unemployment of low/medium class level, food shortages, poor nutrition and urban poverty. It examines the socio-economic characteristics, factor costs, returns and profitability levels of the enterprise. The research findings show that while commercial vegetable entrepreneurs in metropolitan Lagos are dominated mainly by poorly educated migrant farmers, higher proportion of commercial floriculturists are well-educated, and are engaged in this enterprise on part-time basis. It is also revealed that the revenue derived from a unit of floriculture is higher than from commercial vegetables, while seedlings raised for fruits earn highest. The author advocates for urban agricultural networking involving information, exchange on expertise and projects, and exchange.

Onumah, GE; Hubbard, M **(1999). Urban food supply and distribution: policies addressing urban poverty. FAO Rome; 45 p.**
food security and nutrition
policy; food distribution; poverty

This well documented paper suggests that all concerned city authorities need to agree on a set of goals, objectives and plans that guide them in the use of resources to improve the performance of their food supply and distribution systems (FSDSs) including: (i) urban and periurban food production, (ii) distribution networks (markets, shops, and informal), (iii) food waste disposal, recycling and (iv) reducing traffic. The objectives, broadly, are (a) food security, (b) efficient distribution, (c) safe food, (d) green city. The paper concludes with “formulating, implementing and monitoring urban food supply and distribution policy”. The cases present best practice and the references point to more information. (JS)

Ouedraogo, S; Zoundi, SJ **(1999). Approvisonnement de la ville de Ougadougou en poulets de chair. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 67-82. Natural Resources Management and Production System Department**
services food security and nutrition Rural-Urban Linkages
poultry production; meat supply; economic aspects; employment

The contribution of modern producers to the urban meat supply system is low. Traditional producers are the main suppliers to the city. Most production comes form a range of 10 to 200 km from Ougadougou. (NB)

Pariser, ER **et al (1988). Postharvest food losses in developing countries. National Academy of Sciences, Washington D.C. 206 p.**
food security and nutrition

post-harvest operations; fish; food distribution

This study is devoted to assessing both the potential of food loss reduction efforts and their limitations. It summarizes existing work information about losses of major food crops and fish. It suggests policy and program options for developing countries and technical assistance agencies. Modern technology enables conservation of most food commodities almost indefinitely without loss. Cost is the prime limit. Each country is advised to establish a national postharvest policy body to carry out research (in country) and advise decision-makers. Fish is given special attention, including fish farming close to market. (JS)

Pederson, R.M.. and Robertson, A.**. (2001). Food Policies are essential for Healthy Cities. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment food security and nutrition

Europe; policy

Food production and its retail are increasingly perceived as presenting risks to society in Europe. Consumers are more and more concerned, no longer trust and have lost confidence in the food supply. In contrast food is essential for health. Policies are therefore needed to limit its risks and promote food's assets and re-store consumer confidence. Local food policies can demonstrate the assets, and not the liabilities, of urban and periurban food production and its retail. The benefits include improved physical and mental well-being. Social benefits could accrue from increased leisure opportunities, improved cohesion within the community and decreased social exclusion. Economic benefits arise from job creation, income generation and the development of enterprises for local food production and processing and its retail. More opportunities for education, recreation, tourism, and attracting new business could be created. Environmental benefits from improvements to water conservation and supply, air quality, carbon dioxide levels, bio-diversity, waste-management and energy-saving could result from local food policies.

Pederson, R.M. **(2001) Urban Food and Nutrition Security: Participatory Approaches for Community Nutrition. WHO Regional Office for Europe Programme for Nutrition and Food Security. ETC, The Netherlands. Suhr's Seminarium, Copenhagen. European Health21, Target 11. Supplier: WHO Regional Office for Europe, Scherfigsvej 8, DK-2100 Copenhagen, Denmark**

food security and nutrition community development health / pollution

food security; urban areas; nutrition; participatory approaches; community participation; Europe (Western); food contamination; consumers

Urban Food and Nutrition Security is a growing concern in Europe. Rapid urbanisation creates new demands for food and nutrition, especially in low- and middle-income countries. This poses new challenges ro food and nutrition intervention programmes. The rapid process of urbanisation has led to the so-called double burden of nutrition, a situation where nutritional deficiencies exist side by side with the emergence of over nutrition among vulnerable groups in urban areas. This

paper examines the applicability of participatory approaches as a tool for planning intervention programmes, and suggests guidelines for a participatory approach to address urban food and nutrition insecurity. Traditionally, nutrition programmes are designed using "top down" approaches. In contrast, community approaches argue that large-scale behavioural change can only be achieved by mobilisation of the community. During the 1980's and 1990's a large number of participatory approaches have been developed with the intent of mobilising rural communities to analyse their situation and take action to make improvements. Participatory approaches provide a valuable framework for enabling people to identify, analuse and mobilise resources within the community to overcome their problems. However, certain rpoblems exist inlcuding the type and quantity of data collected and if it can be utilised by decision makers. In addition, experience of practitioners suggest that participatory approaches are applicable in urban areas, but special attention is needed to address the differences between urban and rural communities.

Pérez Rivero, Roberto **(19??). La permacultura dentro del sistema de agricultura urbana de ciudad de la Habana, Cuba: su impactos en la seguridad alimentaria. Foundation for the Nature and Humankind, Cuba**
food security and nutrition
permaculture; Havana; Cuba

The paper introduces a permaculture project in Havana City. Questions like 'is permaculture a proper technology for urban agriculture?'; 'how would this work in the urban agriculture system of Havana?'; 'what are is potentials and constraints?'; and 'what modifications would be needed?' are discussed. (NB)

Perkins, Ellie **(1999). Public policy and the transition to locally based food networks. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 60-63. ISBN 0_88936_882_1. CAD 35.00**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition R&D methodology
food systems; ecology; public policy; local economy

Food networks play an important role in local economies because of their many linkages, their employment requirements, and the ties among food, culture, health, and well. This paper explains the social, economic, and ecological importance of locally based food production and distribution systems, giving examples of policies and institutions that communities and governments can use to help develop them. It provides examples of such measures in action from Toronto and other places. The paper also discusses the relationship between public policy and grass-roots community initiatives as part of the local institutional structures surrounding food. Finally, the paper sets out several criteria for assessing the ecological implications of public-policy measures and discusses the political and cultural conditions that favour development of locally based economies and food systems. (NB - abstract adapted from original)

Pinstrup-Andersen, Per **et al (1998). World food prospects: critical issues for the early 21st century. IFPRI Washington D.C. 32 p.**
food security and nutrition
urbanisation; food security; malnutrition; WTO; livestock; roots & tubers

This report provides a summary of the projections of the future world food situation. It identifies and discusses current and emerging issues that will influence global food security are explored: (i) deteriorating nutrition status, (ii) grain prices, (iii) WTO trade policies, (iv) small farm productivity, (v) agroecology, (vi) precision farming (vii) biotechnology, (viii) information technology. The solution offered is political will. (JS)

Pinzás, Teobaldo **(1994). Can city farming survive? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 10. Instituto de Estudios Peruanos, Horacio Urteaga 694, Lima 11, Peru**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
economic impact food security and nutrition horticulture
home gardening; horticulture; Peru; urban communities; urban development; urban environment; urban population; urban wastes; vegetables; waste recycling; women

Early 1994 ETC Foundation asked Theobaldo Pinzás to make an exploratory study on urban agriculture in Peru. This is an excerpt from his report, focusing on his findings about urban vegetable growing. In his full report, he suggests that more attention be given to recycling of waste and sewage water. (ILEIA)

Pothukuchi, Kameshwari; Kaufman, Jerome L **(1999). Placing the food system on the urban agenda: the role of municipal institutions in food systems planning. In: Agriculture and Human Values No. 16 (1999) p. 213-224.**
land use planning food security and nutrition
food systems; food policy; urban planning

This article is a perceptive look at the relationship of city planning and the urban food system in America at the turn of the century. The urban food system is less visible than such other urban systems. The reasons for its low visibility include the historic process by which issues and policies came to be defined as urban; the spread of processing, refrigeration and transportation technology; together with cheap, abundant energy; that rendered invisible the loss of farmland around older cities; as well as the continuing institutional separation or urban and rural policy. Despite its low visibility, the urban food system contributes significantly to community health and welfare; to metropolitan economies; connects to other urban systems such as housing, transportation, land use, and economic development and impacts on the urban environment. Existing and potential city institutions that could offer a more comprehensive management of the urban food system are examined. These include the city department of food, the policy council, and the city-planning department.

(adapted from original by JS)

Pothukuchi, Kameshwari; Kaufman, Jerome L **(2000). The food system: a stranger to the planning field. In: APA journal vol. 66 (Spring 2000) no 2. 12 p.**
land use planning food security and nutrition
planning; food systems

The article argues that a conceptual gap exists in the planning field. The gap the food system, an area which planners continually impact both directly and indirectly, but which is rarely being considered in the palnning process. The article helps to fill the gap by exploring why the food system has a low priority among planners, identifying specific ways the food system affects the economy, environment and health of communities and lastly by suggesting ways to strengthen community and regional food systems and food system planning. (NB)

Potutan, Gerald E; Schnitzler, Wilfried H; Arnado, JM; Janubas, LG; Holmer, Robert J **(2000). Urban agriculture in Cagayan de Oro: a favourable response of city government and NGOs. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 413-428. DSE, GTZ, CTA, SIDA**
city ecology horticulture food security and nutrition
vegetable production; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; land tenure; nutrition; NGOs; school gardens; home gardening; Philippines

Cagayan de Oro is a boomtown in Mindanao. A considerable number of farmers work in the periurban area mainly in vegetable production. Within town about 40% of the households engages in backyard farming and the majority of schools maintain nurseries. Vegetables are considered ‘poor man’s food’. Farmers consume more vegetables than wealthier people and farming contributes considerably to in-kind family income. There are initiatives to produce and improve composting of urban organic material. As powers became more decentralised, a City Agriculture Office was established. Awareness on urban agriculture is increasing. This all helps to promote urban agricultural initiatives. Legislation has been passed to secure agricultural land. Activities at local level are backed by a sustained flow of information through the media and by successful co-operation of NGOs and local government. (NB)

Powell, D; Wint, E; Brodber, E; Campbell, V **(1990). Street foods of Kingston. Mona: Institute of Social and Economic Research, University of the West Indies**
services food security and nutrition
Kingston; Jamaica; surveys; street food; street vendors; bylaws

This book presents the results of a project (85-0309) carried out with support from the International Development Research Centre (IDRC). The study included both men and women vendors. Researchers identified and mapped the location of

vendors across Kingston and St. Andrew, noting the type of food sold, predominant clientele, and peak selling time. They interviewed 300 vendors regarding procurement and preparation of food, vending practices, access to credit, and demographic characteristics. And, they conducted field observations of, and in-depth interviews with, 30 vendors. Seven samples of foods - two from the pre-prepared traditional solids group, four from the home-made liquids group and one from the non-traditional liquids group - were examined for extraneous matter and microbial content, as well as nutritive value and cost-nutrient benefit. The total plate count of microbes was high in all but two foods: jerk chicken and “sky juice.” The high microbial count of most other products indicated poor sanitation and hygiene, e.g. improperly washed bottles for drinks. Other study findings were as follows: vending was the sole source of livelihood for most vendors; men regarded vending as a business whereas women tended to see it as temporary employment; and the best cost-nutrient benefit was found in prepared nontraditional solid foods. Three broad areas were identified in which policy interventions could facilitate the street food trade: the location of street food vendors; the access of food vendors to funding; and the training of food vendors in business management, hygiene and nutrition. (HC, IDRC)

Power, Elaine M **(1999). Combining social justice and sustainability for food security. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 30-37. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition
community development; food security; food systems; poverty reduction

One can distinguish two distinct approaches to the promotion of domestic food security in contemporary Canada: one to establish a sustainable food system and the other to eliminate poverty. These approaches correspond to the two main dimensions of food security, both of which are currently under threat in Canada. The paper attempts to bring them together in the community-development approach. Community-food projects emphasize making the food system local to minimize environmental impacts and fostering the development of community to make links among people who are isolated from each other. Some of the issues neglected to date include the hidden aspects of the rhetoric of community, reinforcement of individualistic ideology, limitations of coverage, and increased burdens on women. The paper calls for clarity in framing food-security problems because this determines what solutions are proposed. Reflection on the part of academics and activists is needed because the positions in the social and economic structure affect how we understand the problems. (Abstract adapted form original)

Pretty, Jules; Altieri Miguel **(1999). Best practices in land resources management to achieve sustainable food cycles. CGIAR CSD 8 Dialogue Paper No. 3.**

land use planning rural-urban linkages food security and nutrition
sustainable agriculture; environment; policy

This paper, prepared for the UN Commission on Sustainable Development, presents an approach to accelerating the trend to sustainable agriculture. It notes that although there has been increasing informal activity in the field only three countries have given explicit national support (Austria, Cuba and Switzerland). Sustainable agriculture is presented a multi-functional within urban and rural landscapes and economies (food and other goods, clean water, carbon sequestering, flood protection, environment for living, biodiversity). Four options for change are presented to the CSD: (i) better use of renewable resources, (ii) intensification of production, (iii) diversification of the agroecosystem, (iv) better use of non-renewable inputs. Institutions are urged to concentrate on process over product and to aim for win, win, win outcomes. (JS)

Programme for Nutrition Policy, Infant Feeding and Food Security, World Health Organisation (WHO) **(1998). Draft urban food and nutrition action plan: elements for local action or local production for local consumption. 26 p. Programme for Nutrition Policy, Infant Feeding and Food Security, World Health Organisation (WHO), Regional Office for Europe, Scherfigsvej 8, 2100 Copenhagen, Denmark**
food security and nutrition
Europe; action plan; policy development; food consumption; public health

Proposes an action plan for increasing production, access and consumption of vegetables and fruit in the EU and CEE. A number of project interventions to reach this goal is discussed. (WB)

Prudencio, Julio **et al. (1993). Aspectos sobre la inseguridad alimentaria en Bolivia. La Paz, Bolivia: UNITAS.**
food security and nutrition
bibliographies; food security; trade; health; Bolivia; poverty

This is a very high quality survey of nutritional status in rural and urban Bolivia. It examines the reasons behind the vastly different food security status of the well-to-do in the Capital La Paz and the poor in smaller cities and rural areas. It is one of the few such studies that include data and analysis of foreign trade, and over and under production is diverse product lines. It is exceptional in the vast amount of data presented in extended tables. (JS)

Rakodi, Carole **(1988). Urban agriculture: research questions and Zambian evidence. The Journal of Modern African Studies 26:3 (1988) pp.495-515. Papers, 21 pp.**
genderfood security and nutrition
Africa, Zambia, gender roles, labour, food production, decision making, income

generation, subsistence production, research issues, urban policies

This article explores the forgotten or ignored area of food crop cultivation in urban areas in the 1980s. The author contends that the first stage in studying any neglected area is to review existing evidence and policy, in this case from Zambia, to reveal gaps and suggest avenues for further enquiry, policy formulation, and experimentation. The author situates urban agriculture within a wider framework of the gender division of labour, specifically the economic activities of women. Food production in Zambian cities is predominantly a women's activity, determined by the size of household, income per capita, stability of urban residence, and the availability of land for cultivation around the house and/or within reasonable walking distance. A strategy to increase the household production of fruit and vegetables for consumption and sale must be examined in the context of household decision-making, and especially the labour time available to women. Women's response to opportunities to grow more food will depend on the extent to which they make decisions about cultivation, the use or sale of produce, and the distribution of benefits within the household. More detailed evidence from urban agriculture projects and wider implications of such a policy must be assessed before more widespread cultivation is advocated. This includes assessing the benefits to households, and especially to women, compared to alternative economic opportunities which might be made available by other initiatives. (AH)

Rauber, Paul **(1999). Food for thought: cultivating our cities. On: http://www.sierraclub.org/sierra/199705/fdforthought.html. 2 p.**
city ecology food security and nutrition
home gardening; food security; urban livelihoods

Argues that cities are returning to producing their own food and gives examples of what is already being achieved by urban agriculture inside as well as outside of the USA. (NB)

Remenyi, J. **(2000) The contribution that urban agriculture makes to the livelihoods of poor people. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning food security and nutrition
Bangladesh; livelihoods; poverty; micro-finance; participatory techniques

This paper looks into the contribution that urban agriculture makes to the livelihoods of poor people, especially recent in-migrants from rural areas. The research is based on slum dwellers in Dhaka Bangladesh. The paper reports on work in progress, including the use of participatory techniques for assessing the contribution that urban agriculture makes to employment, income generation and cash flow into poor households in the slum areas of Dhaka. The results are relevant for how poverty programs are designed, and for how urban planning needs to coordinate with micro-finance providers to ensure that the potential contribution of urban planning to poverty reduction is realised.

Research, Development and Consultancy Division (REDEC) **(1996). Urban agriculture in Gweru: proceedings of a one-day workshop organized by ENDA - Zimbabwe, Midlands Hotel, Gweru, 16 October 1996. 24 p. Research, Development and Consultancy Division (REDEC), Environment and Development Activities (ENDA) - Zimbabwe, PO Box 3492, Harare, Zimbabwe**

food security and nutrition economic impact horticulture

Gweru; Zimbabwe; workshops; home gardening; off-plot cultivation

At this workshop, results of a household survey conducted by ENDA in Gweru in 1996 were presented, looking both at on-plot and off-plot cultivation. A fair number of parameters was discussed and quantified. (WB)

Research, Development and Consultancy Division (REDEC) **(1996). Urban agriculture in Zimbabwe: realities and prospects: proceedings of a workshop organised by ETC International and ENDA-Zimbabwe. 36 p. Research, Development and Consultancy Division (REDEC) of Environment and Development Activities (ENDA), Zimbabwe; PO Box 3492, Harare, Zimbabwe; ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**

horticulture food security and nutrition

Zimbabwe; urban policies; organisation of producers; socio-economic aspects; environment; health

The four-day workshop of practitioners, researchers and policy makers included stakeholders' perspectives, field visits, and the policy context of urban agriculture and research experiences. From different towns (Harare, Gweru, Mutare) perspectives on urban agriculture were presented. Issues discussed were: organisation of farmers, land tenure, technical support, risks of urban agriculture. Conclusions and recommendations regarding urban agriculture in Zimbabwe are given. (NB)

Riches, Graham **(ed.) (1997). First world hunger: food security and welfare politics. London: Macmillan Press Ltd. and New York: St. Martin's Press.**

food security and nutrition health and environment

malnutrition; hunger; health; policy

Chapters by resident authors on Australia, Canada, New Zealand, the UK, and the USA, plus introductory and concluding chapters by Graham Riches. A well documented overview of the anomaly of hunger in wealthy countries.(JS)

Riches, Graham **(1999). Reaffirming the right to food in Canada: the role of community-based food security. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 203-207. ISBN 0_88936_882_1. CAD 35.00.**

Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development food security and nutrition
food security; food policy; food systems

How is it possible to move from the declarations and rhetoric of world summits, international conventions and governments and their assertions of a right to food when evidence suggests that governments and to some extent civil society have in recent years sought to depoliticize the issue of domestic hunger and make it no longer a responsibility of the state? How is it possible to ensure that the complex and interrelated issues of hunger and food security become the subject of informed democratic debate and thereby publicly understood as being critical not only to the poor and vulnerable but also to long-term ecological and social well-being? The paper examines these questions by asking whether the right to food in Canada exists, addressing the causes of First World hunger, and analysing the responses of federal and provincial governments, businesses, and charities to food poverty in terms of the depoliticization of hunger. It argues that collaborative and adversarial actions at the community level are essential if the right to food is to be established and food security for all is to be achieved. (Abstract adapted from original)

Richter, Juergen; Basler, Alois; Franzen, Hubertus **(eds) (1996). Small-scale food processing, contributing to food security: proceedings of the international workshop held from 4 to 8 September 1995 in Bonn-Roettgen, Germany. DOK 1744 A/a. 242 p. ISBN 3_931227_01_4. Deutsche Stiftung fuer Internationale Entwicklung (DSE); Council for Tropical and Subtropical Agricultural Research**
food security and nutrition services
food processing; small scale industries; food security

Increased food production alone is not enough to bring about food security. Access and entitlement to food by food-insecure people is crucial. Food security can often only be secured by the urban poor through an increase in income and, hence, purchasing power. Small-scale, decentralised, food processing can be an important income-earner for poor people. The underlying proceedings stress the development of this sector. Gender is an important notion in this, as small-scale food processing is often the domain of women in developing countries. In many cases, access to improved technologies, extension and credit keep them from further developing their business and increase their productivity. This volume underpins a number of project activities to address these issues. (WB)

Robinson, M. **(2002) The Right to Food: Achievements and Challenges. United Nations Commission for Human Rights. Paper presented at the International Workshop "Policies Against Hunger", Berlin, May 22-23 2002**
food security and nutrition
poverty alleviation; food policy; food security; workshops; access to food

On 17 November 1996 the World Food Summit adopted by consensus the Rome Declaration on World Food Security and the World Food Summit Plan of Action, which outlined ways to achieve universal food security. In the Plan of Action, the

States attending the Rome Summit made a number of commitments.

Significant progress has been made in the implementation of that request, as illustrated in section I of this report. The right to food has been much better defined, and ways to implement and realise it has been proposed. Unfortunately, however, insufficient steps towards implementation have been taken at the national and international levels, and the right to food is therefore far from being realised for all. Section II of the report identifies the main challenges ahead. Section III contains some concluding remarks.

Rosegrant, M.W., M.S. Paisner, S. Meijer and J. Witcover **(2001) 2020 Global Food Outlook: Trends, Alternatives and Choices. International Food Policy Research Institute (IFPRI) Food Policy Report, A 2020 Vision for Food, Agriculture anf the Environment Initiative Supplier: IFPRI, 2033 K Street, NW Washington, DC 20006-1002 USA**

food security and nutrition health / pollution

food security; poverty alleviation; health and environment; malnutrition

Government officials and representatives of aid agencies are continually making decisions on how to spend their resources. It is easy to lose sight of the fact that each decision to be made represents a fork in the road, and each investment is a step in the direction of a future that will bring a healthuy, sustainably produced diet to more people - or to fewer.

This report shows just how and how much certain policy decisions and social changes will affect the world's future food security. It projects the likely food situation in 2020 if the world continues on more or less its present course, and it then shows how alternative choices could produce a different future. Even rather small changes in agriculture and development policies and investments, it turns out, can have wide-reaching effects on the number of poor and undernourished people around the world. A world of less poverty, greater food security and a healthier environment is possible, but it will not come about without explicit policy steps in that direction.

Rosset, Peter; Medea, Benjamin **(eds) (1994). The greening of the revolution: Cuba's experiment with organic agriculture. Ocean Press, Melbourne, Australia: 85 p.**

food security and nutrition horticulture

organic agriculture; bio-intensive horticulture; community-based agriculture; policy; planning; emergency agriculture; Cuba

This is the story of Cuba responding to an economic and health crises with an organic and urban agriculture strategy. It is particularly strong in the area of knowledge systems. It stretches from history, to policy to narrow focus specifics of how it was done. (JS)

Ruel, Marie T **et al (1998). Urban challenges to food nutrition security: a review of**

food security and health in the cities. IFPRI Washington DC, FCND Discussion Paper No. 51, 101 p.
food security and nutrition
food security; health; nutrition; urbanisation

This is a review of recent literature explores the face of urban food insecurity in an integrated and comprehensive manner. It asserts that no developing country can afford to ignore the shift in the locus of poverty from the village to the city. It presents the problems of malnutrition from nine points of view: (i) urban agriculture, (ii) source of food, (iii) cost of food, (iv) income, (v) urban diet, (vi)child care, (vii) health, (viii) environment, and (ix) safety nets. It concludes with a definition of issues and knowledge gaps for future research. (JS from authors)

Ruel, Marie T; Levin, Carol **(2000). Assessing the potential for food-based strategies to reduce vitamin A & iron deficiencies. IFPRI, FCND Discussion Paper # 94 PP 53, 11 pp. references, 2 tables, Washington**
health and environment food security and nutrition
nutrition; micronutrients; malnutrition; health

This paper reviews ten recent projects and library sources regarding food-based strategies to improve vitamin A and iron intake in the diet. It discusses some of the lessons learned and the knowledge gaps. It sets research priorities. Food-based strategies are often described as sustainable because they empower individuals, households, and communities to take responsibility over the quality of their diet through production of nutrient rich foods and informed eating choice. It concludes that the area of food-based interventions has been increasingly active and successful over the past decade. The design and implementation of these strategies have significantly improved. This work is largely driven by NGOs and local institutions. The study concentrates on home gardens (six of ten cases cited). These strategies are particularly well fit to urban agriculture and agriculture fore refugees and displaced persons. (JS)

Sawio, Camillus J **(1993). Feeding the urban masses: towards an understanding of the dynamics of urban agriculture and landuse change in Dar es Salaam, Tanzania. 71 p. International Development Research Center (IDRC), PO Box 62084, Nairobi, Kenya; Clark University, Worcester, MA, USA.**
food security and nutrition R&D methodology
Tanzania; food security; food supply; income generation; land use; open spaces; land tenure

This is one of the first – and most important – among the wave of doctoral and Masters thesis focussed explicitly on urban agriculture, which emerged over the past decade in universities scattered across the globe. The firs three chapters introduce the food shortage situation in Dar es Salaam, the importance of studying urban agriculture (a fairly new concept at the time), and the conceptual framework for evaluating urban agriculture's role. The fourth chapter paints a picture of the changes in agricultural land use in the Dar area since the mid-1960s. The next four

chapters – the dissertation's core provide the results of a survey undertaken, focussing in turn on urban farmers, urban farms and urban farming practices. The final chapter offers a typology of impediments to urban agriculture in Dar. (JN)

Scharf, Kathryn **(1999). A nonprofit system for fresh-produce distribution: the case of Toronto, Canada. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 122-127. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
services community development food security and nutrition
food distribution; access to food; Canada; Toronto

The Good Food Box (GFB) project of FoodShare Toronto is a nonprofit fresh-food-distribution system that operates like a large buying cooperative: 4 000 boxes of fresh fruit and vegetables are delivered through 200 volunteer-run neighbourhood drop-offs each month. The GFB is a successful continuity-based and market-driven food-distribution alternative. The similarities and divergences from traditional community-development or nonprofit-sector projects are explored, as "business principles" needed to be incorporated to ensure its success in the marketplace. Stimulating community self-organization, improving food access for low-income people, promoting healthy food choices, and avoiding the stigmatisation involved in charity-based models of food distribution are all goals of the GFB. As a free-based service, the GFB must compete effectively, meaning that it must maintain a high level of customer service, a high level of sales, a fairly low level of mandatory time investment from participants, and attractive advertising - charactristics which it are not often seen in non-profit community-development projects. (Abstract adapted from original)

Schnitzler, Wilfried H **(et al.) (1999). City harvests: the case of Cagayan de Oro City (Philippines). Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems: a project of the European Commission (no. IC18-CT97-0184). 44 p.**
R&D methodology food security and nutrition
Philippines; interviews; surveys

Describes results of a study on agriculture activities in Cagayan de Oro; Philippines. Elements were: (1) the analysis of baseline survey data on periurban vegetable consumption, farming and marketing conducted by the Periurban Vegetable Project; (2) the exploration of existing data pertaining to urban agriculture from various sources; and (3) in-depth interviews with key informants. provides a wealth of information. Also published as a chapter in the 'reader' 'Growing Cities, Growing Food'. (WB)

Scott, GJ **et al (2000). Roots and tubers for the 21st Century: trends, and policy**

options, IFPRI Washington 64 pages, 26 tables, 6 diagrams, 3 cases, references
food security and nutrition
policy; roots & tubers

Continued high rates of population growth and urbanization are projected to increase demand for roots and tubers above the overall trend for food, particularly cereals. Per capita consumption rises as per capita income rises. And urban populations are increasing their consumption of roots and tubers, other than cassava. Research is rapidly increasing yields per unit of space and inputs. Many of the world's most undernourished households depend on roots and tubers as a contributing, if not principle, source of food and nutrition. The leaves of roots and tubers are consumed during the growth cycle. Small farmers, particularly periurban, produce most of the potatoes in Asia and Africa. (JS)

Seck, PA**. L'agriculture périurbaine dakaroise: les enjeux de son suivi. Agriculture périurbaine en Afrique subsaharienne, p. 141-147**
food security and nutrition
Senegal; food supply; periurban agriculture; stakeholders' organisation

The food situation in Dakar has deteriorated over the past ten years. The areas supplying Dakar are more and more remote and transport cost make up more than half of the marketing costs of horticultural and animal products. Moreover imports of agricultural produce is increasing. It is therefor crucial to enhance the role of periurban agriculture in supplying Dakar. To enable producers to target the Dakar market more effectively and provide them with a long term perspective it is important their activities fit in the framework of private stakeholder organisations with the capacity to negotiate with political authorities. There is a clear will to set up such organisations, however there is none specifically concentrating on periurban activities. However easily accessible and reliable information which would facilitate the proper functioning of such body is currently lacking. (NB - abstract adapted from original)

Selvester, Kerry; Fidalgo, Lourdes **(1996). Situacao alimentar e nutricional nas zonas urbanas de Mocambique: pesquiza de literature. 38 p.**
food security and nutrition
food security; methodologies; nutrition; Mozambique

Contains three parts: (1) an annotated bibliography with three main sections: demography and physical planning, socio-economic aspects, health and nutrition and lastly poverty; (2) a summary report on the food and nutritional situation in the urban zones of Mozambique which presents among others the basic economic and labour data, sources of food, survival strategies and food habits; and (3) a methodology for the development of urban profiles for food and nutrition security. The methodology is elaborated from urban food security concepts and then discusses available information and gaps, key questions, adaptation of district

profiles to the urban situation and future steps. (NB)

Silva, M.L. **(2002) The Contribution of the Expert Consultations on the Right to Adequate Food to the Implementation of the Right. UNHCHR. Paper presented at the International Workshop "Policies Against Hunger", Berlin, May 22-23 2002**

food security and nutrition

action plan; food policy; food security; access to food; workshops

The paper starts by summarising the objectives, conclusions and recommendations of the three expert consultations held to the right to food, emphasising those which are particularly relevant to progress in the implementation of the right to adequate food. There are also some remarks made, which are based on the conclusions of the expert consultations, which could guide the elaboration of a Code of Conduct on the right to adequate food.

Skinner, G. William **(1981). Vegetable supply and marketing in Chinese cities. In: Vegetable Farming Systems in China / D.L. Plucknett and H.L. Beemer, Jr. (eds). Boulder, Colo.: Westview Press, 86 p.**

food security and nutrition horticulture

food security; city planning; China; metropolitan area; periurban agriculture; waste management; livestock

This is a breakthrough study of the potential of large cities to be significantly nutritionally self-reliant in the areas of micronutrients and protein. The survey included the 15 largest cities in China, and found them to be 85 percent self-sufficient in vegetables. All aspects of the urban food security issue are examined including: (I) production methods, (ii) marketing, (iii) policy, (iv) locus (inner, suburb and peri), (v) organization (government and civic, (vi) health, (vii) waste management, (viii) land use management and more. Comparisons amongst cities are well presented. (JS)

Smil, Vaclav **(2000). Feeding the world: a challenge for the twenty-first century. IT Press Cambridge Massachusetts; 230 p.**

food security and nutrition

food scarcity; nutrition; resources; agroecosystems; biodiversity; pollution; climate change; fertiliser; water; precision farming; aquaculture; livestock; China

This book addresses the question of how best we can feed the ten billion or so people who will likely inhabit the Earth by 2050. It focuses on the complete food cycle from agriculture to eating and discarding. The outlook is constructively optimistic. A good general source. (JS)

Smit, Jac **(1993). Grow food cheaply by the roadside. Developing Countries Farm Radio Network package no. 29 script 8. 5 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada**

M5G 2C2
food security and nutrition horticulture
roadside cultivation; home gardening; vacant lands

A radio script for dissemination in a large number of developing countries, explaining how even the landless can farm using vacant land along road sides for food production or as a grazing area for their animals. Interestingly, there are some unexpected advantages to be found in roadside farming: it is easier for bringing inputs to the garden or for delivering products, even selling them along the roadside. Obviously, much of the farmers' worry concerns the many thefts, which farmers often avoid by harvesting their crops before they are completely ripe. Protecting oneself against theft eminently lends itself to group initiatives, where all farmers take turns in guarding the area. The author also gives hints at how to get the water necessary for gardening. There is a special paragraph on the hazards of lead poisoning, as a result of exhaust fumes settling on the crops. Fruiting plants or root crops are, in this context, generally safer to grow than leafy vegetables. Full of practical information, and presented clearly. (WB)

Smit, Jac **(1995). Food for the poor: urban and rural vegetable production. In: Development & Cooperation no. 5 (1995) p. 22-23**
food security and nutrition horticulture
vegetable production; deficiency diseases; horticulture; periurban agriculture; small- and medium-sized enterprises; food security; nutrition

Describes small-scale vegetable production in Africa and Latin America, both in urban and in rural settings, and its contribution to food security and in fighting deficiency-related diseases. (WB)

Smith, Frank **(1977). Food in the city. Conference Report. Washington, D.C.: Public Resource Center. 68 p.**
food security and nutrition
food systems; nutrition; community-based organisations; cooperatives; pollution

Ten papers in this five-part report cover: (i) alternative food systems, (ii) food quality; food cooperatives; (iv) soil and air pollution and (v) urban gardening. Its strength lies in its combining, the point of view of low-income African-Americans, and an ambitious “Program for the Cities”. Public policy and best practice are well presented. A good benchmark report edited by an elected politician. (JS)

Smith, Olanrewaju B **(1999). Agriculture urbaine en Afrique de l’Ouest: une contribution à la sécurité alimentaire et à l’assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation. 240 p. ISBN 0_88936_890_2. CAD 30.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9; Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ**

Wageningen, The Netherlands
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition health and environment
food security; ecological aspects; economic aspects; rural-urban interaction; research methodology

Seven case studies and research papers plus reports of working groups and plenary sessions of the workshop are presented covering the following themes: policy environment, rural urban interaction, food security, urban waste management and networking in urban agriculture. Case studies on Mali, Burkina Faso, Senegal, Togo, and Benin were presented. Opportunities and constraints of the UA sector contributions to urban food security and sanitation are analysed. (NB)

SODEM **(1990). Curso de huertos familiares. La Paz, Bolivia: SODEM. 20 p.**
horticulture food security and nutrition services
training; home gardening; Bolivia

This binder contains a collection of Spanish-language training material on home gardening. It is intended for trainers rather than gardeners themselves. (JN)

Tadros, HR; Feteeha, M; Hibbard, A **(1987). Squatter produce market vendors in Egypt. Cairo: Social Research Centre, American University in Cairo**
services food security and nutrition R&D methodology
Egypt; street vendors; marketing; food supply; food distribution

This document presents the results of a study (83-0056) carried out with support from the International Development Research Centre (IDRC) in 18 squatter markets in different districts in Cairo. The methodology involved direct observation, surveys, and interviews with government officials and 192 vendors. Commodities available through these vendors included vegetables and fruit; meats; prepared and processed foods and beverages; nonfood products; and services. The researchers noted business hours, environmental problems, characteristics of vendors, reasons for entering the vending business, and the role of the market "Sheik" or informal leader. Data was also collected on vendors' Suppliers and customers; the effect of vending on other marketing systems; vendors' relationship to the government; and attitudes of government officials and authorities toward vendors. The findings indicated that markets were relatively stable operations, generated jobs, and were well integrated into the city's social structure. The recommendations called for up-to-date statistics on squatter markets, better cooperation between vendors and authorities, and improvements to the market organization. (HC, IDRC)

Talukder A., Pee, S. de, Taher, A., Hall, A., Moench-Pfanner, R., Bloem, M.W. **(2001) Improving food and nutrition security through homestead gardening in rural, urban and periurban areas in Bangladesh. Paper for the workshop**

"Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.

R&D Methodology food security and nutrition

Bangladesh; home gardening; gender; children

Malnutrition is a serious public health problem in Bangladesh, and can have serious impacts on the population as malnutrition retards child growth, increases the risk and duration of illness, reduces work output, and slows social and mental development. Improving nutritional status, including micronutrient status, can lead to increased productivity, increased child survival and growth, and reduced maternal morbidity and mortality. Interventions for improving nutrition can address deficiencies of specific nutrients. However, when the goal is to address deficiencies of more nutrients simultaneously and to target the population throughout the lifecycle interventions such as dietary diversification are more appropriate. Homestead gardening activities are centered on women because they are usually the ones who take care of the homestead garden. These activities empower the women and can increase their income. This combination of empowerment and increased income can result in better use of household resources and improved caring practices. Therefore, homestead food production also addresses a priority area of poverty alleviation and overall development of communities. This article describes the important characteristics of HKI's Homestead Gardening Program in Bangladesh (1990-2001) as well as how it is being monitored and evaluated.

Technical Centre for Agricultural and Rural Cooperation (CTA) **(1999). Urban agriculture and food security: take your farm to town! In: Spore no. 81 (1999) p. 1-2. Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands**

food security and nutrition

Africa-Caribbean-Pacific countries

Overview article of possibilities and constraints for urban agriculture in Africa - Caribbean - Pacific (ACP) countries. The background article to the conference on urban agriculture in Havana, October 1999. (WB)

Te Lintelo, D., F. Marshall and D.S. Buphal **Peri-Urban Agriculture Imperial College of Science, Technology and Medicine, London / Agricultural Economics Research Centre, Delhi University In: Food, Nutrition and Agriculture, no. 29, 2001, pp. 4-13. Supplier: Food and Nutrition Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition

urban food security; urbanisation; urban agriculture; periurban agriculture; India;

Rapid urbanization and a progressive shift from rural to urban poverty have important consequences for urban food security. Worldwide studies have shown that urban and peri-urban agriculture (UPA) may be able to make positive contributions as a local supplier of food to cities and can provide poor households with fresh food,

income and employment. However, while generally the interest of international development research and funding agencies in urban and peri-urban agriculture is increasing, very little work has been carried out in India. Accordingly, this article provides a preliminary assessment of the nature, extent and importance of UPA in Delhi. It is shown that UPA is not only a significant and dynamic land use for poor people (particularly landless and farmers with small landholdings) living in urban and peri-urban areas in India, it is also a very important livelihood strategy, providing families with employment, income and food. And although geographical locations may shift over time, the phenomenon of UPA will remain. Nevertheless, UPA is rarely recognized by

research and policy communities in India and hence raising awareness about its significance is a major challenge.

Considering the agroclimatic, socio-economic and cultural heterogeneity of India, more case-study research will need to be carried out in various cities of different sizes. Further research should aim at integrating an assessment of the nature, significance of and constraints to UPU agriculture with an analysis of actual research and policy-support mechanisms.

Teubner, W. and Zeeuw, Henk de **(2002) Green and Productive Cities: A Policy Brief on Urban Agriculture. ICLEI, Germany / ETC, Netherlands 39 p. plus cd-rom.**

food security and nutrition

poverty alleviation; nutrition; urban agriculture; food security; policy; policy development; urban policies; urban planning; urban development; Europe (Eastern); Europe (Western)

This paper deals with the potentials of agriculture in and around cities for urban food security and nutrition, alleviation of urban poverty and improvement of the urban ecology, as well the associated risks for public health and environment. Basic information on presence and impacts of urban and peri-urban agriculture is provided and guidelines for the integration of urban agriculture in urban policies and development planning are presented. The focus is on cities of countries of Central and Eastern Europe and we expect that the paper is of special use for city authorities, urban planners and senior staff of sectoral departments, especially within the health sector, organisations, and NGOs contributing to sustainable and equitable urban development. It is expected that this policy brief will en

hance the awareness among policymakers and senior technical staff of the contributions urban agriculture can make to the urban policy agenda and to facilitate the integration of urban agriculture in urban policies, development and action programmes.

Thrupp, Lori A **(ed.) (1998). Cultivating diversity: agrobiodiversity and food security. World Resources Institute. 64 p.**

city ecology food security and nutrition

biodiversity; policy; integrated pest management; organic agriculture; stakeholders

The argument is made that biodiversity is a fundamental factor for agricultural

production, food security and ecological stability on planet Earth. Further the case is made that agricultural growth and biodiversity are not always conflicting goals. Evidence is presented to show the multiple benefits of integrating biodiversity into agriculture for both small and large-scale farming. Agricultural biodiversity is presented as lying within the general framework of sustainable human development and settlements. Recommendations include: (i) support sustainable ecological agriculture, (ii) develop and ecosystems approach, (iii) empower farmers and communities to protect their right to resources, (iv) adapt agricultural practices and land use to local agroecological conditions, (v) conserve and regenerate plant and animal genetic resources, (vi) adopt policies and establish institutional changes that support agro-biodiversity and (vii) uphold both the convention on biological diversity and the mandates of the World Food Summit. (JS)

Tinker, Irene **(1997). Street foods: urban food and employment in developing countries. Oxford University Press, New York. 243 p.**

food security and nutrition R&D methodology gender

poverty; gender;safe food; informal sector; street food

This book presents the first empirical study of sellers of foods on urban streets. It recounts the efforts of an action-research project to improve the income of street food vendors and the safety of the food they sell in the Philippines, Thailand, Indonesia, Bangladesh, Egypt, Nigeria and Senegal. Details of the street food trade provide robust comparative data on the vendors and the informal sector. The study includes and analysis of income and gender. The Book is thorough in its analysis of what is urban and how street food functions as a system interfaced with other urban systems, in a variety of economies and cultures. Street food is found to be an essential link in the informal economic sector, nutrition and urban agriculture. (JS)

Tricaud, Pierre-Marie **(1987). Urban agriculture in Ibadan and Freetown. 45 p. The Food Nexus Programme, The United Nations University, Toho Seimei Building, 15-1, Shibuya 2-chome, Shibuya-ku, Tokyo 150, Japan**

horticulture food security and nutrition

case studies; Nigeria; Ibadan; Sierra Leone; Freetown; land tenure; urban management; forestry; livestock

This report presents urban agriculture in Nigeria and Sierra Leone. It identifies the extent of the practice, the urban farmers, the role of agriculture in the urban ambiance and the methods of cultivation. There are many similarities between two case study cities, Freetown and Ibadan, both being capitals of anglophone countries, with a similar climate and historical background. However, there are also a number of differences, Freetown being a coastal city while Ibadan is located inland. The two cities have developed in a different manner: while Ibadan grew from 600,000 to 2,500,000, Freetown simply doubled its population to 400,000. This report describes the situation with regard to land and land tenure systems in both cities. Information is given about origin and composition of city gardeners. There is a difference in the type of crops cultivated in the two cities. In Ibadan, urban farmers mostly cultivate

staple food, whereas in Freetown the interest for vegetable cash crops is prevalent, due to differences in consumer habits. Actions are suggested for developing urban agriculture including land policies, composting programmes and organising the gardeners. (WB)

UNICEF **(1984). Urban examples for basic services development in cities. UNICEF Newsletter no. UE-9. UNICEF**

services food security and nutrition

community gardens; home gardening; multi-sector approach; food production; market gardening

An early UN document on examples of programmes to improve or expand city food production. Seven examples from Latin America, Asia and Africa are presented. Topics range from community gardens, to comprehensive city wide food and fuel self-reliance to centrally planned systems of suburban food production and market gardening. The examples are organised around a basic facts sheet and a project summary. (NB)

Wade, Isabel Mary **(1986). City food: crop selection in Third World cities. San Francisco: Urban Resources Systems, 1986. 54 p.**

food security and nutrition

crop selection; intensive production techniques; nutrition; climate

This report has been designed for project organizers in developing countries to implement or assist urban agriculture projects. It categorizes the suitability and characteristics of different crops to cities of developing countries according to nutritional content, and space and climatic requirements. (JN)

Wade, Isabel Mary **(1986). Food, transport and zoning. In: Development: seeds of change vol. 1986 no. 4 p. 30-34**

services food security and nutrition land use planning

food security; selfreliance; urban planning

A systems approach to food self-reliance. This early publication on urban agriculture examines the question to what extent self-reliance efforts in city farming can be incorporated in long-term food policy. As is shown, the role played by land use planning, or zoning, is pivotal in developing an effective food policy strategy. The article compares various not only zoning strategies within the city bounds, but also different periurban zoning options, in recognition of the traditional important of periurban agriculture in supplying food to cities. (WB)

Wade, Isabel Mary **(1986). Planning for basic food needs in Third World cities. Ph.D. dissertation, University of California, Berkeley. 252 p.**

food security and nutrition

ecosystems; urban planning; food systems; selfreliance; system theory

This dissertation examines a specific problem in environmental planning: how can cities in developing countries plan to meet the basic food and nutritional needs of their residents? The author examines the question within the conceptual framework of urban ecosystem theory, to construct a planning process that can be used by community planners in designing and implementing urban agriculture strategies. The first part of the dissertation examines the sociopolitical and economic questions that affect the planning of comprehensive urban food strategies. The second half of the dissertation reviews the principal technical considerations likely to be required in the design of effective urban food production programs. This is one of the first substantial studies to examine urban agriculture, and to define it as an issue for planners. (adapted from original by JN)

Webster, Jacqui; Lang, Tim **(1998). Food poverty: what are the policy options? 43 p. ISBN 1_900_670_13_5. National Food Alliance / Food Poverty Network, 94 White Lion Street, London, N1 9PF, UK**

food security and nutrition

food security; political aspects

This discussion paper outlines the policy recommendations on food poverty offered by a loose coalition of voluntary groups, researchers and academics through the National Food Alliance (NFA). The paper develops a framework for the debate about the policy options from individual and local approaches to national and global policies. The framework on policy options lists the main problems relating to food poverty alongside various options available for addressing the problems: (1) Poverty and Inequality; (2) Shopping; (3) Eating In; (4) Eating Out; (5) Education and Training; (6) Farming; (7) Community Support; and (8) Policy Framework. The framework includes problem definitions, options, relevant organisations and responsible authorities. (NB)

Whyte, A; Mackenzie, F **(1999). Cities Feeding People: a review of the CFP program initiative of IDRC. Ottawa: IDRC**

R&D methodology food security and nutrition economic impact

development programmes; project impact; impact assessment

The reviewers examined the implementation of the objectives set in the International Development Research Centre (IDRC)'s Cities Feeding People program initiative: prospectus 1997-2000, as evidenced in the following five projects: Urban agriculture in Dar es Salaam (93-0037); Socioeconomic and ecological impacts of urban agriculture in Harare (95-0007); Urban horticultural technologies in Port-au-Prince (96-0035); International research awards in urban agriculture (97-0026); and wastewater treatment using water lettuce in Dakar (98-0214). The reviewers agree that CFP has been effective in raising awareness of urban agriculture among international organizations, donors, and national and urban governments; knowledge creation; publication and dissemination; and training. They note that it needs to better integrate gender and social relations into is conceptual framework and to

make the political economy of conflict more integral and explicit in that framework.

The reviewers also looked at the question of whether adequate recognition of urban agriculture has been achieved and whether CFP should move on to more strategic issues. They conclude that it would be premature to move on, as the battle has yet to be won on three fronts: in the cities, which may have the will but not the tools to move from attitude change to policy change; within the research community, which has difficulty attracting practitioners in urban agriculture due to its inherently multidisciplinary nature; and within the international donor community, where urban agriculture is not central to any agency's mandate and therefore vulnerable in all. (HC, IDRC)

Williams, Meryl **(1999). The transition in the contribution of living aquatic resources to food security. IFPRI Washington D.C. 41 p.**
food security and nutrition
aquaculture; fish; biodiversity

A profound and dramatic change is occurring in the living aquatic resource systems of the planet Earth. This volume focuses on the research needs to steer the transition, including urban-based fish and aquatic crop production. The data and charts are particularly useful. (JS)

Wilson, Geoff **(ed.) Urban agriculture and microfarming: growing food in small places. The Urban Agriculture Network Western Pacific (TUAN), PO Box 2223, Mansfield, Queensland 4122, Australia**
food security and nutrition horticulture hydroponics
urban food; Singapore

The first issue of the magazine published by The Urban Agriculture Network Western Pacific (TUAN). This issue is a free insert in 'Practical Hydroponics and Greenhouses' with a global circulation of 12,500 six times a year. It remains unclear whether the magazine by TUAN will be published with the same frequency. From its look, the magazine primarily addresses those who practice, or are interested to start, agriculture in a confined urban space, with a clear business orientation. The first issue features Singapore for having a well advanced urban agriculture within its city limits.

World Bank **(1998). Feeding the city. Urban age: the global city magazine / Bergen, Margaret (ed.) Vol. 5 no. 3 (winter 1998)**
Supplier: The International Bank for Reconstruction and Development, the World Bank, 1818 H Street, NW Washington DC 20433, USA
food security and nutrition
food security; urban poor; case studies

One entire issue of Urban Age dedicated to food security and which contribution urban agriculture can make. A number of articles examine underlying causes to food

scarcity, in the light of rapid urban growth. Rather than to continue relying on -once cheap- food imports, governments are increasingly looking at ways in which to increase domestic production and distribution. Cities are now acknowledged to play an important role in this. A number of case studies are presented to highlight this. (WB)

World Bank**? (199?). Urban agriculture: the big, unknown, polluting, and mobile compliment to rural agriculture, so very important for the urban poor. Agriculture technology notes. 4 p. World Bank?**
food security and nutrition health and environment
urban agriculture typology

A general overview of types of urban agriculture. Figures given and descriptions in the typology of urban agriculture are useful. (WB)

FAO / World food summit: draft Rome declaration on world food security / draft plan of action (1996). 6 p.
food security and nutrition R&D methodology
food security; policy making; international conferences

The draft version of the Rome Declaration on World Food Security and the draft Plan of Action, the outcome of the World Food Security Conference held at Rome, November 1996. (WB)

World Commission on Environment and Development (WCED) **(1985). Official minutes of the Commission's fourth meeting held in Sao Paulo, 25 October - 4 November 1985. Geneva: WCED. Volume 41**
economic impact food security and nutrition
policy development; economic development; sustainable development

The Brazilian meeting took place half-way through the Commission's life. Priority issues to be dealt with were the outline of the official final report, two alternative versions of which were put before the Commission for its consideration, and the preliminary outline of the popular final report. Additional discussions focused on international economic relations, environment and development; food security, agriculture, forestry, environment and development - tropical forests; human settlements, environment and development; and international cooperation - legal principles for environmental protection and sustainable development and resolving environmental disputes. Some 15 annexes include the background documents used in the discussions. Annexes include the following: list of participants, press seminar, opening address, list of submissions, agenda, progress report, preliminary and alternative outlines of the official report, revised alternative version of official final report, outline of final popular report, and background documents pertaining to the discussions. (HC, IDRC)

World Health Organization (WHO) **(1998). A sustainable food supply chain: the possibilities and limitations of implementing the factor 4 strategy on the production and consumption of food. 55 p. World Health Organisation (WHO), Regional Office for Europe, Scherfigsvej 8, 2100 Copenhagen, Denmark**
food security and nutrition
food supply; food systems; eco-efficiency; energy consumption; nitrogen; phosphorus; consumer behaviour

The paper explores the strategy to use material and energy 4 times more efficiently. The 'factor 4' concept is regarded as an important strategy for achieving sustainable development in the food supply chain. Twenty percent of energy consumption in Sweden goes towards supplying food. The paper analyses energy use in the food supply chain per sector: agriculture, food industry, trade and transport sector and households. Examples are given on: foodstuffs produced locally vs. imported, changes in phosphorus and nitrogen cycles. From there, visions for the future food supply chain and strategies how to get there are discussed. The paper concludes that radical eco-efficiency is possible. The approach should, however, also be linked to strategies for emission reduction as well as to environmental, health and sustainability (WB)

World Health Organization (WHO) **(1995). Highlights of recent activities in the context of the world declaration and plan of action for nutrition. WHO/NUT/95.2. Nutrition Programme, World Health Organization, Geneva**
food security and nutrition health and environment
food security; political aspects

Contains a short description of the World Declaration and Plan of Action for Nutrition, the outcome of the International Conference on Nutrition (ICN) organised by FAO and WHO in 1992. The nine decade goals and nine action-oriented strategies of the World Declaration and Plan of Action for Nutrition are summarised in this document. (WB)

World Health Organization (WHO) **(1998). Draft urban food and nutrition action plan: elements for local action or local production for local consumption. 26 p. Programme for Nutrition Policy, Infant Feeding and Food Security, World Health Organisation (WHO), Regional Office for Europe, Scherfigsvej 8, 2100 Copenhagen, Denmark**
food security and nutrition
Europe; action plan; policy development; food consumption; public health

Proposes an action plan for increasing production, access and consumption of vegetables and fruit in the EU and CEE. A number of project interventions to reach this goal is discussed. (WB)

Yasmeen, G. **(2000) Feeding Asian Cities - Proceedings of the FAO-CityNet-AFMA**

regional seminar, Bangkok, Thailand, November 27-30, 2000. FAO / CityNet / AFMA

food security and nutrition rural-urban linkages

Asia (Western incl. Middle East); Asia (South-Eastern); Asia (South-Eastern); Asia (Eastern) urban agriculture; food security; food production; urban areas; periurban areas; rural areas;

Asian cities have been growing rapidly with urban poverty creating increased food insecurity. These proceedings of the FAO-CityNet-AFMA regional seminar "Feeding Asian Cities" held in Bangkok in November 2000, review issues related to food production in urban, periurban and rural areas, rural-urban linkages, processing as well as wholesale and retail activities and suggest possible directions for remedial action. The role of City and local authorities and the importance of North-South and South-South cooperation are given particular attention. These proceedings are meant for decision-makers, planners as well as researchers concerned with urban development, urban poverty and the enhancement of urban food security.

Yasmeen, G. **(2001) Workers in the Urban 'Informal' Food Sector: Innovative Organizing Strategies. University of British Columbia, Vancouver. In: Food, Nutrition and Agriculture, no. 29, 2001, pp. 32-43. Food and Nutrition Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition

Thailand; Philippines; India; informal sector; food production; street vendors

Creating strong membership-based organizations for informal food sector (IFS) workers is key to improving their ability to lobby municipal authorities in order to promote the interests of this sector. Strategies that organize the IFS result in enhanced social capital, which facilitates access to financing, training resources and (most important in the case of rapidly growing cities) secure tenure of good selling spaces. In this article, the IFS is defined and its importance outlined, and examples of innovative organizing strategies

developed by IFS workers and microentrepreneurs are described: these include widely known and welldocumented cases in India and elsewhere as well as other, lesser known, cases in the Philippines and

Thailand for which the author draws on her own empirical research.

In the Philippines, members of the umbrella organization Cebu City United Vendors' Association have registered their associations with the Securities and Exchange Commission and have engaged in proactive dialogue with the city's mayor and municipal administration. In Bangkok, a progressive urban policy towards street food vending has been in place since 1994, granting a number of vendors more secure access to urban space. Despite these progressive municipal policies, IFS microentrepreneurs in many parts of Bangkok remain in need of the types of organization found in CEBU and

the examples profiled in India and other countries. More cooperation among nascent IFS organizations is needed to facilitate networking and, in turn, local institutional strengthening. Strong membership-based organizations can lead to IFS workers being valued by society, recognized by the state at various levels, supported through

financing and training, and involved in making the decisions that affect their lives.

Yeung, Yue-man **(1986). Urban agriculture in Asia. In: Development: seeds of change vol. (1986) no. 4 p. 27-28. Centre for Contemporary Asian Studies, Chinese University of Hong Kong**
food security and nutrition
food security; selfreliance; urban communities; Asia

An overview article about the disappearance of urban fringe land around cities in Southeast Asia and its consequences for the food situation in these cities. Figures are given about production patterns. (WB)

Zalle, Dieudonné **(1999). Les stratégies politiques pour l'agriculture urbaine: rôle et responsabilité des autorités communales: le cas du Mali. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 1-18. 18 p. Institut Supérieur de Formation et de Recherche Appliquée du Mali**
food security and nutrition economic impact
policy environment; economic aspects; Mali

The increase of fruit and vegetable consumption might be linked to the process of urban development, and the evolution of nutritional habits. Vegetables produced for sale play an important role in the economy of the urban family. Land tenure problems pose a big threat for the development of the sector, other constraints relate to human resources and lack of communication between stakeholders. (NB)

Zeeuw, Henk de **(2002) Policy Measures to Facilitate Urban Agriculture and Enhance Urban Food Security. ETC-RUAF In: Special Edition *Urban Agriculture Magazine: World Food Summit, Five Years Later*, RUAF,pp. 10-12, 2002.**
food security and nutrition
food systems; urban areas; food security; food production; periurban areas

Analyses of current trends regarding urban food systems reveal that, in order to achieve food security for the urban poor, a sole reliance on food produced in rural areas and imported food is insufficient. It is necessary for cities to develop plans to enhance urban and peri-urban food production, and to diversify away from the present reliance on the highly capitalised and energy-consuming "supermarket" model, based on the external supply of food-stuffs.

Zurick, David N **(1983). Food production in the urban environment of Katmandu, Nepal. Unpublished. Honolulu: University of Hawaii; 28 p.**
horticulture food security and nutrition
Nepal; land use; household economy; planning; organisation; history; land tenure; water; livestock; consumption; ecology

This study is quite comprehensive and based on grassroots observation as well as

library research. It is found that urban agriculture is an important economic activity in the Katmandu metropolitan area, and in need of policy and programmatic support. (JS)

1.2 Economics Impact of Urban Agriculture

Retailer selling local produce.

(Picture: Henk de Zeeuw)

Economic Impact of Urban and Periurban Agriculture

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Introduction

The economic impact of urban and periurban agriculture (hereafter UPA) provides information that can ensure the survival of the activity when it is threatened by economic or political opposition – but it is also one of the most elusive. UPA has long faced an audience sceptical of its contributions and sustainability, and is only recently being analysed in ways that can demonstrate its value to households and communities. A uniform method of accounting for and tracking the economic output of UPA would provide information to policy-makers, as well as prospective urban farmers, that would improve efficiency and possibly increase support for the sector.

Unfortunately, such a method has so far not been devised and attempts to produce credible and useful economic impact information have been partial and inconsistent. A survey of the existing literature related to economic impact of UPA shows that there is general agreement on which elements should be measured, and on the relative importance of those measures in assessing the impact of UPA. However, there is also agreement that UPA varies widely from city to city and cannot be easily characterised from general experiences. Therefore, the field remains dominated by partial evidence and unsubstantiated claims, and policy-makers respond with little enthusiasm to the resource needs of UPA adherents.

This chapter describes what is known and not known about the economics of UPA based on existing literature. It begins with a definition of the economic impacts of UPA and summarises the state-of-the-art in the field of measuring and analysing those impacts. It then provides a brief summary of the results of economic studies of UPA, highlighting where there are clear and credible results, and where – much more often – there are vague and qualitative statements about the impacts. Finally, the chapter identifies the major gaps in the literature on economic impacts of UPA and suggests steps for filling those gaps in the coming years. The annotated bibliography follows this short summary of the literature.

Overview of literature on economic impacts of UPA

There are two primary strains of literature addressing economic impacts of UPA: city case studies with some quantitative information and descriptive accounts of the theoretical economic impacts of UPA. Neither strain has a long history. The earliest article that appeared discussing the economics of UPA was published by the OECD in 1972, but there was little to follow until the mid- and late-1990s when a series of international conferences spawned a serious look at the subject (Toronto, Havana, Berlin, Quito, Bangkok, Nairobi).

The state-of-the-art in identifying economic impacts of UPA can be characterised as low -- in terms of the techniques used and in the information obtained. Most economic impacts are produced by casual observation or by limited survey methods (case studies in Growing Cities Growing Food, 1999). A few studies exist that have used statistical methods to derive figures

(UNDP, 1996) or gathered information from primary data sources (Nugent in Furuseth, 1999). Nugent (2001, Nairobi workshop) explains the standard economic methodology for obtaining market and non-market values as cost-benefit analysis and contingent valuation, respectively. The former method was used in a limited way in Nugent, 1999 but use of the latter method – most appropriate for quantitative measurement of non-market impacts, such as the informal labour and output markets in which UPA exits, as well as health and environmental impacts – has not yet appeared in the literature. Carrying out such work would serve as excellent research projects for Agropolis to support.

Descriptive accounts of UPA economic impacts

The early literature in this field focused on identifying the types of economic impacts arising from UPA activity. These articles included Ministry of Foreign Affairs (1994), FAO (1996), Nugent (1998), and Mougeot (1998). The articles focused on the employment creation and poverty alleviation potential of UPA, while also naming other impacts with less clear economic connections, such as food security, health and environmental effects.

These articles attempted to lay out an economic framework for thinking about urban agriculture, beginning with definitions. Mougeot (1999) reports that there have been many different published definitions of urban agriculture, but economic aspects are common elements of almost all accepted definitions. He summarises the economic elements as follows:

> Types of economic activities: most definitions refer to the production phase of agriculture; recent definitions include processing and trade to stress system interactions between them. Besides being analytically sound, the integrated approach is particularly relevant to UA as, differently from rural agriculture (RA), production and marketing (and also processing) can and tend to be more integrated, thanks to greater geographic proximity and quicker cash-flow. This is achieved by small and dispersed units which make up an extensive and decentralised supply system within immediate reach of a massive consumption market. Economies of agglomeration seem to prevail over those of scale, the latter being more important in RA production. In UA, economies of scale through cooperative efforts may further enhance the benefits of unit-based vertical integration (CFP Report 31, 1999).

Clearly stated was the idea that UPA could be a potent and important economic activity under certain conditions, and that agricultural policy-makers should take it seriously. As the literature expanded, so did the different definitions of UPA (see Quon, IDRC, 1999). Some of the definitions focused on economic aspects by emphasising the use of resources in a competitive market setting (FAO, 1998, COAG), while others focused on the types of outputs of UPA (Mougeot, 1998) or the different locations in which it could be practiced (UNDP, 1996). The net result has been a healthy discussion about the diverse benefits of UPA, but an unhealthy confusion about what UPA actually is, and who benefits from it.

For instance, Nugent (1999, Furuseth) emphasises the commercial market value of community farming in a North American city in finding that the benefits of UPA outweigh the costs. UNDP (1996), IFPRI (1998) and others emphasise the potential food security benefits, job creation, and overall sustainability that might occur through UPA. In “A framework for measuring the sustainability of urban agriculture,” Nugent (1999) identifies the following types of economic costs and benefits deriving from UPA:

BENEFITS	COSTS
Agricultural Output	Land

Economic Diversity	Water
Indirect Economic Activity	Labour Time
Recreational Activity	Seeds and Plants
Food Security Benefits	Tools and Equipment
Dietary Diversity	Energy Input (fuel, electricity)
Community Cohesion and Security	Environmental Degradation
Environmental Improvements	Health Risks
Health Benefits	Chemical Inputs

The full range of costs and benefits may not be apparent or significant in every urban agricultural enterprise. Specifically, UPA conducted by poor urban dwellers in developing countries is likely to use less chemical fertilizer and pesticides and less purchased energy than UPA conducted by commercial market gardeners near wealthy cities. Similarly, weekend community gardeners in North America or Europe are more apt to derive recreational benefits from their UPA activity than female home gardeners in poor cities who produce subsistence food for their household.

Nonetheless, the description of multiple types of costs and benefits, and the author's insistence that each of them can be considered to have economic value, presents a systematic approach to assessing economic impacts of UPA. A more qualitative discussion of the broad array of potential costs and benefits is found in IFPRI, 1998. The focus of this report is on food security, but the paper discusses the importance of UPA for income, employment, health, and other aspects. The paper presents a literature review and recommends areas needing research.

City Case Studies

The problems of multiple definitions, lack of uniform conditions, and differing foci have resulted in the literature on UPA consisting largely of case studies. City case studies focus on one or several aspects of UPA – generally those that are particularly important to the writer and to the particular circumstances of the city being studied. Very few studies attempt a complete review of all the negative and positive impacts that UPA creates in the urban context. The net effect of the case studies is to create confusion about the economic impact of UPA because UPA itself varies widely by city, and because the methods used in the case studies vary and are often not explicitly stated.

The most extensive collection of case studies was produced for the 1999 Havana Workshop: "Growing cities, growing food: urban agriculture on the policy agenda." A selection of nine case studies was reviewed for the thematic chapter on urban agriculture and the household economy, included as part of the full volume of papers produced for the workshop. The thematic chapter summarised the economic impacts identified in the case studies with the caveat that the cases are variable in their sampling methods, scope, and presentation of data. The summary shows that the primary impacts of urban agriculture are related to food security. UPA practitioners are motivated by the need to produce food for home consumption, to earn income, and as a way to ameliorate the effect of food crisis or high prices on their households. Each of these reasons can be seen as a way to relieve the risk of food insecurity.

The thematic paper also discusses the effect of UPA on labour markets, especially informal markets that exist in many cities of the developing world. Urban farmers are often not formally employed in these circumstances and farming provides the means to earn some income or relieve poverty. In a developed country context, one case study (Nugent, 1999) showed that the use of wage labour was relatively small and concentrated in the commercial sector, while part-time and elderly pensioners provided the bulk of the labour input in the non-commercial UPA sector. However, even among the latter groups, UPA was engaged in for recreational and health reasons rather than food security reasons.

The monetary income from UPA varies significantly from city to city, according to the case studies, and also varies seasonally and by the assets and effort of each farmer. Some case studies carried out surveys to determine income from UPA. Where average earnings were calculated, urban farming produced a range from 2 percent of an average industrial wage (Zimbabwe) to 10 percent of income (Russia). The monetary returns from UPA depended heavily on access to land and the effort and time invested in farming.

The overall economic impacts of UPA are still very much disputed. Case studies show a range from $4 million (Mazingira, Nairobi in 1985) to $25 million (Howarth, Dar es Salaam in 1996). The city of Havana, Cuba and other Cuban cities are widely cited as examples where UPA output provides a large proportion of city food needs (Murphy, 1999) and the results in improved food security and diversity are well documented. In Dar es Salaam, the contribution of UPA to food security and total production is also shown to be significant (Jacobi, 1998). However, with all these studies using different methods, applied in different years, and including different commodity groups, there is no feasible means of making these results comparable across cities or across time.

The disputes arise because of the lack of comparability in available statistics. The case study of Mexico City prepared for the Havana workshop (1999) concludes that UPA has little economic impact in the area, whereas some sources conclude that well over half of households across the world are involved in urban farming (UNDP, 1996). Once again, until common definitions and data collection methods are used in case studies, these differences will not be reconciled.

Major Gaps in the Literature and How to Address Them

Few communities are prepared to conduct a full economic analysis of UPA. Not only do such studies demand specialised skills and require a significant amount of researcher time, but they require data and information that is difficult to acquire. Most importantly, such methods are utilised most often when there is a problem that requires policy-makers to make choices among powerful competing interests. In such situations, policy-makers demand objective, verifiable information that comes only from thorough investigation of a situation. With rare exceptions, issues surrounding UPA have not risen to the level of concern among local or national policy-makers that would warrant such an information-gathering and analysis effort.

Ultimately, credible economic analysis of UPA will clarify choices among activities and needs within a community. Preliminary work can be performed that will improve communities' capacity to undertake economic analysis of UPA for purposes of better decision-making down the road. Some of these steps and their usefulness are described in this section.

Use trend analysis to understand UPA impacts

The most important impact of UPA is the agricultural produce. Lack of information about production trends in UPA presents a severe limitation to any assessment of the value UPA contributes to a community. UPA output depends on many factors (see Nugent, 1999) and can fluctuate widely with changing conditions. This can lead to serious misunderstandings of UPA and its impact.

One step toward eliminating misunderstandings about UPA is to collect available information about major quantifiable impacts of UPA and correlate it with underlying conditions. For instance, UPA production would be expected to correlate positively with unemployment rates in a community: greater unemployment encouraging UPA production from informally or unemployed workers. These kinds of relationships should be examined over a minimum of several years to assist in understanding the major influences on and contributions of UPA.

Quantifiable trends available from official or unofficial statistics often include localised employment in agriculture, wage rates, food availability and prices in markets, and sometimes local agricultural output. If these statistics are not readily available, simple surveys can be carried out to begin establishing a reliable database.

Carry out limited economic analysis of UPA using only market-based, quantifiable measures

A partial cost-benefit analysis can be done when market-based aspects of UPA can be quantified. Results of such analysis can be surprising to policy-makers and others who were unaware of the economic contribution made by UPA. If reliable data are available, the product of agricultural output and prices paid in the market for the output reveal the contribution to a city's GDP of UPA. If data can be produced that show labour hours invested in UPA and wage rates paid to UPA workers (or proxy for wages), the beneficial impact on incomes and employment can be demonstrated. These figures must be offset by the value of the opportunity cost of resources invested in UPA, such as costs of land, water, and seeds.

Develop indicators to approximate non-measurable impacts of UPA

UPA indicators can measure the conditions and trends affecting UPA : are certain things improving or worsening, where are problems occurring, etc. The main reasons to use indicators, rather than simply raw data or qualitative information, is that they can be selected to be simple, comparable, and "indicative" of important objectives. Thus, they can demonstrate the health of UPA itself, and the sustainability of UPA in a city.

The indicators should be selected to provide information, to show trends, to guide policy and give feedback to policy decisions. Primarily, they should show people whether the situation in question is worsening or improving. For UPA, this again suggests different motives for different groups. Some are concerned about the immediate food security impacts of UPA production, others are interested in the environmental effects of soil and water use for agriculture, and others about the social effects of women's involvement in farming, among other issues. These diverse interests complicate the task of selecting a small set of relevant indicators for UPA.

Conduct a case study economic analysis to demonstrate the unrecognised impacts of UPA to policy-makers

The first step to establish a common methodology to assess the sustainability of UPA across communities is to perform a competent case study. The selected city should be one that has the full range of impacts that can occur from UPA, and the full range of issues and conflicts that face policy-makers and communities in deciding how to manage UPA.

The case study will need to draw on methods described elsewhere (Nugent paper for Nairobi workshop on methodology, 2001) and should at a minimum assess both market and non-market impacts of UPA. The study should identify important stakeholders affected by UPA and sectors affected by it both directly and indirectly. The issues and hurdles raised in conducting the case study will inform researchers about the demands and uses of economic analysis for agricultural research and planning.

In summary, the most glaring gap from the current literature on the economic impact of UPA is quantification of important economic variables: income, employment, annual output. Correction of this gap will require further progress toward an agreed definition of UPA, continued progress on methods of analysis appropriate to UPA, and researchers who can devote serious time and effort to produce rigorous case studies that can serve as models. The pay-off will be substantial if this research can be delivered to policy-makers in cities where UPA is an important economic sector and an important livelihood activity for many people.

References

Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda (2000), see multiple case studies.

United Nations Development Program, 1996, Urban Agriculture: Food, Jobs, and Sustainable Cities, New York

U.N. Food and Agriculture, 1996, “Urban Agriculture: An Oxymoron?”, The State of Food and Agriculture, Rome.

Murphy, C., 1999, “Cultivating Havana: Urban Agriculture and Food Security in the Years of Crisis,” Institute for Food and Development Policy, Oakland, CA.

Nugent, R.A., 1999a, “A framework for measuring the sustainability of urban agriculture,” in Koc and Mougeot, (eds.), For Hunger-Proof Cities: Sustainable Urban Food Systems, IDRC Books, Ottawa.

Nugent, R. A., 1999b, “Is urban agriculture sustainable in Hartford, CT.?” in Furuseth, O. and M. Lapping, (eds.) Contested Countryside: The Rural-Urban Fringe in North America, Ashgate, London.

Ruel, M., L. Haddad and J. Garrett, 1998, “Are urban poverty and undernutrition growing? Some newly assembled evidence,” IFPRI Discussion Paper 63 (and others in the series) Washington, D.C.

IFPRI, 1998, “Urban challenges: A review of food security, health and caregiving in the cities,” Discussion Paper 51, Washington, DC.

Mazingira Institute, 1985, cited in Tevera, D., 1996, “Urban agriculture in Africa: A comparative analysis of findings from Zimbabwe, Kenya and Zambia,” *African Urban Quarterly*, pp. 181-187.

Abdelwahed, Said I **(ed.) (1998). Future of urban agriculture in Gaza: proceedings of regional workshop 13-15 September 1998. 168 p. Palestinian Agricultural Relief Committees (PARC)**

economic impact

Gaza Strip; workshops

The papers draws a picture of the situation of urban agriculture in the particular setting of the Gaza Strip and examines perspectives for its more widespread introduction in Gaza, Palestine and Lebanon. (WB)

Agyemang, K; Smith, JW **(1999). Counting the costs and benefits of implementing multi-country collaborative research projects: the case of the periurban Inland Valley Dairy Project in West Africa. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.). International Livestock Research Institute (ILRI), Ibadan, Nigeria**

economic impact R&D methodology

multi-disciplinary projects; agricultural research

Costs mainly associated with consultations, communication problems and bureaucracy are far less than the benefits including capacity building, institutional linkages information sharing and methodology development. (NB)

Aktie Strohalm **(1996). Balancing Europe for sustainability: using financial micro initiatives to build a better environment. 252 p. ISBN 90_70_33413.5. Aktie Strohalm, Oudegracht 42, 3512 AR Utrecht, The Netherlands**

economic impact

economic aspects; alternative marketing; community supported agriculture; microfinance

This 'reader' analyses the potential of various financial micro initiatives as tools for sustainable development. The general concepts provide insight in why urban agriculture is important to achieve sustainability, but especially the chapters on community supported agriculture and local exchange systems are relevant for urban agriculture. (NB)

Allen, Patricia **(1999). Contemporary food and farm policy in the United States. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 177-181. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

food security and nutrition economic impact

food policy; United States; agricultural policies; food programmes; food security

Two movements affecting the food security of Americans have emerged in recent years. One is the community food-security movement, dedicated to ensuring that everyone has the ability to obtain a nutritionally adequate diet. The other is the movement to dismantle social-welfare programs to "end welfare as we know it." While interest in domestic food security is increasing in some areas the food-security safety net is unravelling in others. These notions are distinctly at odds with expectations for commercial agriculture. This paper explores the character of the

disjuncture between governmental farm and food programs. It examines the demographic characteristics of those who benefit from food programs and of those who benefit from farm programs. The privileging of agricultural producers over poor consumers is framed in its political and ideological context. Ensuring food security for the poor will require innovative food policies capable of operating effectively in this political and ideological environment. (Abstract adapted from original)

Armar-Klemesu, Margaret; Maxwell, Daniel G. **(2000). Accra: urban agriculture as an asset strategy, supplementing income and diets. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 203-208. DSE, GTZ, CTA, SIDA**

economic impact food security and nutrition

farming systems; livestock; vegetable production; asset strategy; land use systems; food security; health; ecology; economic impact; gender; urban policies; livelihoods; reuse of waste; Accra; Ghana

Urban agriculture was identified as an important element for a study on livelihoods, food and nutrition in Greater Accra. Different farming types were distinguished and analysed with regard to food security, household economics, health ecology and gender.Farming is done for three main reasons dependent on the farming type: cash income, food subsistence and assets strategy for emergencies. Men and women do have different roles in urban agriculture whereby women's activities tend to contribute more to household food security than men's and women dominate the marketing of crops. Urban agriculture improves food security in terms of availability and access. Crops were analysed to assess health risks and it was found that for rural and urban crops the main source of bacterial contamination is in the transport of the crops. Main issues for urban farmers are land, theft and marketing. Urban agriculture is still missing from municipal planning. The loss of agricultural land is a major reason for concern. (NB)

Anon.**, (1999) Scheme for Urban Micro Enterprises: An Impact Assessment, 1999. National Institute of Urban Affairs (NIUA) New Delhi, Research Study 76**
Supplier: National Institute of Urban Affairs, 1 Floor, Core 4 B, India Habitat Centre, Lodhi Road, New Delhi 110 003, India

economic impact

poverty alleviation; urban poverty; India

This study critically analyses the different dimensions of efforts made under the Scheme for Urban Micro Enterprises (SUME), including a review of the procedures and processes underway and assessment of the overall impact of the programme on urban poverty alleviation. It makes recommendations to the Government of India for improving the effectiveness of the scheme. The study is a part of four other studies commissioned by the Ministry of Urban Development and confined to selected cities from the states of Punjab, Haryana, Himachal Pradesh and Delhi.

Atukunda G **(1998). An analysis of the impact of IDRC funded research projects on urban agriculture in Uganda. Workshop on Cities Feeding People: lessons**

learned from projects in African cities. IDRC. Nairobi. 21-25 June 1998
R&D methodology economic impact
impact analysis; research; Uganda; workshops

This paper reports on the results and impact of an International Development Research Centre (IDRC)-supported study of urban agriculture in Kampala Uganda (88-0325) and fieldwork for a PhD thesis by David Maxwell, one of the original researchers. The study and fieldwork found that over one-third of the respondents practiced urban agriculture, mainly for subsistence, and that urban agriculture made a significant contribution to child nutrition status, especially in low and very-low income groups. Access to land and security of tenure were the major problem facing urban farmers. The research results were disseminated at a workshop held in Kampala in June 1990 attended by 50 participants, including government officials, academics, and representatives of nongovernmental organizations (NGOs); to the residents of the areas in which the survey was carried out; and at a 1-day seminar on Farming in the City, attended by about 100 researchers, policymakers, Kampala City Council authorities, NGOs and international organizations.

The impact of the project on human resource development, institutional capacity strengthening, partnerships with other institutions, gender sensitive analysis, scientific and methodological advances, and research utilization by non-researchers is discussed. It was noted that the studies were relevant and timely in that they were carried out just before the new structure plan for the city was drawn up, and that the seminars were instrumental in changing the attitudes of a number of city council officials toward urban agriculture. Urban agriculture was officially recognized as an informal activity and land use in the Kampala Structure Plan of 1994. (HC, IDRC)

Allen, Patricia **(1999). Contemporary food and farm policy in the United States. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 177-181. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition economic impact
food policy; United States; agricultural policies; food programmes; food security

Two movements affecting the food security of Americans have emerged in recent years. One is the community food-security movement, dedicated to ensuring that everyone has the ability to obtain a nutritionally adequate diet. The other is the movement to dismantle social-welfare programs to "end welfare as we know it." While interest in domestic food security is increasing in some areas the food-security safety net is unraveling in others. These notions are distinctly at odds with expectations for commercial agriculture. This paper explores the character of the disjuncture between governmental farm and food programs. It examines the demographic characteristics of those who benefit from food programs and of those who benefit from farm programs. The privileging of agricultural producers over poor consumers is framed in its political and ideological context. Ensuring food security for the poor will require innovative food policies capable of operating effectively in

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economic impact food security and nutrition

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Benge, Mike **(1996). The economic and ecological value of trees in urban environments. 10 p. Agency for International Development (USAID), Washington DC, 20523-1812, USA**

urban forestry economic impact

United States; urban trees; trees; urban environment; economic aspects; public health

Examines from various angles (urban environment, aesthetics, public health, economics) the role of trees in urban settings, notably in the USA. (WB)

Berg, Leo van den, and W. van Winden **(2002 Information and Communications Technology as Potential Catalyst for Sustainable Urban Development: experiences in Eindhoven, Helsinki, Manchester, Marseille and The Hague. Euricur: European Institute for Comparative urban Research, Erasmus University Rotterdam, The Netherlands**
Supplier: Ashgate Publishing Limited, Gower House, Croft Road, Aldershot, Hamspshire, GU11 3HR, England

economic impact R&D methodology

European Union; sustainable urban development; communication; Netherlands; Finland; United Kingdom; France;

At the dawn of the 21st Century, ICT is at the centre of interest for businesses and governments. Increasingly, urban policy makers are also concerned with the new developments, opportunities and threats offered by digital revolution, and feel the need to respond strategically. Usually, technology policy is not associated with the

urban level but rather with the national or the European level. However, cities can pursue technology policies as well, as a means to reach economic and social objectives, as well as objectives intended to raise the quality of life and improve the internal and external accessibility of the urban region. To she dmore light on the impact of ICT on urban development and the consequences for urban management, the European Institute for Comparative Urban Reseatch has been invited by the city of The Hague to carry out an investigation into the "state of the art" concerning the use of information and communication technologies in 5 European cities. This book contains the results of an analysis of the impact of new technology and new technology policies in the cities of Endhoven, Helsinki, Manchester, Marseilles and The Hague.

Bibangambah, JR **(1992). Macro-level constraints and the growth of the informal sector in Uganda. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 303-313**

economic impact rural-urban linkages

Uganda; informal sector; survival strategies

The author reviews a number of works on urban agriculture in Africa, with particular reference to Kampala, Uganda. He calls “unhelpful” those who argue that urban agriculture has an important contribution to make to Africa’s economic development. He counters that, like other aspects of the informal economy, it is a manifestation of the socioeconomic decay representative of Africa’s development crisis: the decay of institutional capabilities, infrastructures, and social values and standards. Uganda’s economic crisis (1970-1985) featured: marked decline in the capital-intensive industrial sector; drastic decline in major export crops; increasing dependence on coffee for foreign export earnings; smuggling of large quantities of primary produce and imported goods across Uganda’s international borders; outflow of resources from the agricultural export sector into subsistence agriculture and informal trading; intensified problems of low income and absolute poverty; and extreme difficulty in getting imported inputs, spare parts and raw materials. It resulted in the collapse of the agrarian economy and the ruralization of the city, as even salaried employees took up subsistence farming to supplement unbearably low wages. He concludes that it is necessary to transcend justifications based on mere survival and short-term crisis management, and examine the extent to which the informal sector is productive, unproductive or counter-productive. What is needed are institutional and policy reforms to reverse the negative economic trends, eliminate regressive forces and create an environment and framework for a progressive economy. (HC, IDRC)

Blair, Dorothy; Giesecke, Carol; Sherman, Sandra **(1997). A dietary, social and economic evaluation of the Philadelphia urban gardening project. Urban Agriculture Notes on: http://www.cityfarmer.org/nutritionstudy.html#diet. 6 p. Nutrition Department, College of Health and Human Development, Pennsylvania State University, University Park, Pennsylvania 16802, USA**

Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition economic impact
United States; home gardening; surveys

An evaluation study among 144 gardeners in the Philadelphia Urban Gardening Project and 67 non-gardening controls. Data collected included demographic variables, food frequencies and dietary habits, measures of life satisfaction, and neighbourhood involvement. The average value of garden site produce was assessed. Interestingly, gardening was positively associated with community involvement and life satisfaction. An interesting and important study. (WB - from original abstract)

Chiapa I.; King B. **(1997) Urban agriculture in Gweru: household nutrition, economic costs and benefits; results of household monitoring interviews conducted between September 1996 and April 1997. Harare: ENDA.**
food security and nutrition economic impact
economic impact; cost-benefit analysis; household survey; Zimbabwe; Gweru

This report presents the results of an International Development Research Centre (IDRC)-supported study (95-0007) carried out in four densely populated suburbs of the small city of Gweru, Zimbabwe. The study involved a preliminary survey to determine the socioeconomic (economic activities, income levels, agricultural practices and tenure) and demographic characteristics of the population in general. The survey provided a basis of comparison between the agricultural and non-agricultural households. It also allowed the researchers to identify 50 farming households in each of the four suburbs for monitoring on a monthly basis during the agricultural period.

The monitoring study revealed that women were the main participants in all agricultural activity, both cropping and vegetable production. Gardening activities were carried out throughout the year, while cropping is only practiced during the rainy season. Gardening relies heavily on organic manure, while chemical fertilizers are used in cropping. There was a higher use of pesticides in the garden than on the crops, however. Low-income urban farmers tended to have more meals per day than their non-farming counterparts and greater ability to purchase protein-rich foods such as meat and fish. This was reflected in their overall health and child growth rate: children under 5 years old from farming households were generally taller and heavier than those from non-farming households. Savings from urban agriculture amounted to approximately 1 287.00 ZWD per annum. It was concluded that urban agriculture benefits a significant proportion of the households in Gweru. A number of recommendations for formalizing and improving the activity are put forward. (HC, IDRC)

Cleveland, David A **(1997). Are urban gardens an efficient use of resources? Arid Lands Newsletter no. 42 (fall/winter 1997). 4 p.**
economic impact city ecology
gardening; arid zones; resource management; water efficiency

Explores the functions and importance of gardens. There is an information gap with regard to productivity of gardens. This paper tries to fill some of the gaps based on monitoring the results of gardens in Tucson. Furthermore, the paper discusses ways to improve water efficiency in gardens. (NB)

Chisholm, Alyson **(1996). City farming in Albania Urban Agriculture Notes. http://www.cityfarmer.org/albania.html. 3 p. City Farmer, Canada's Office of Urban Agriculture**
economic impact
Albania

Tells the story of Albania's transition from a communist regime to a free market economy, from the perspective of life in the northern city of Shkodra where people manage to survive through vegetable production and small livestock keeping on rooftops and in gardens. (WB)

Cox, Stephen **(1999). Oases of food security in the urban sprawl? The case El Alto, Bolivia. In: Gate: Technology and Development no. 2 (April-June 1999) p. 34-37**
food security and nutrition economic impact
Bolivia; El Alto; food security; ornamental plants

The South American continent has the highest degree of urbanisation in the developing world. In the light of major shortages of affordable fresh food for urban communities, the prospects of food production in El Alto are being discussed. Awareness raising on nutritional aspects of food is an issue that needs to be addressed. Furthermore, ornamental plant production by the urban poor for income generation is also included in the analysis. There are plenty of new ideas, but progress in the hard climatic conditions of El Alto has been slow. (NB)

Craig, E. , L. Falco and L. Sabatte **(2002) Municipal Strategies for the Primary Sector of the District of Moreno, Buenos Aires. Municipality of Moreno, National University of Lujan, Buenos Aires In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.7-9.**
economic impact urban horticulture
Argentina; horticulture; ornamental plants

The horticultural and ornamental plant production sector of the district of Moreno, in Buenos Aires, is strategically located in an urban area with direct access to the major markets of the country. Horticultural producers predominantly belong to the Bolivian colony, with scarce income. Growers of ornamental plants are mostly from the Japanese (herbs) and Italian (trees and shrubs) communities, who are capable of undertaking larger capital investments.

Danso, G.P. Drechsel, P. Wiafe-Antwi and L. Gyiele **(2002) Income of Farming Systems around Kumasi. Dept of Agricultural Economics, KNUST/IWMI,**

Kumasi In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.5-6.
economic impact
Ghana; farming systems; income generation

Market proximity is a major incentive for the intensification of farming systems or change of systems to more profitable ones. A common example is the production of perishable products, such as vegetables in urban and periurban areas. Around Kumasi, many rainfed maize-cassava farmers started dry-season vegetable production along in the city itself, year-round open-space vegetable production is common, especially in bottomslands with water access for irrigation.

Del Mar Lopez, T., T. Mitchell Aide and J.R. Thomlinson**, (2001) Urban Expansion and the Loss of Prime Agricultural Lands in Puerto Rico. Royal Sweidsh Academy of Sciences. In: *Ambio, Vol. 30, no. 1*, pp. 49-54, February 2001**
economic impact
urbanisation; Puerto Rico; historic overview, Caribbean

In many countries where the economy has shifted from mainly agricultural to industrial, abandoned agricultural lands are lost to urbanization. For more than 4 centuries the Puerto Rican economy depended almost entirely on agriculture, but sociopolitical changes early in the 20th century resulted in a shift to industry. This shift in the economy, and an increase in population, has resulted in an increase in urban areas. This study describes the rate and distribution of urban growth on the island of Puerto Rico from 1977 to 1994 and the resulting influence on potential agricultural lands. Urban extent and growth were determined by interpreting aerial photographs and satellite imagery. The 1994 urban coverage was combined with a soil coverage based on agricultural potential to determine the distribution of urban areas relative to potential farmlands. Analyses showed that in 1977, 11.3% of Puerto Rico was classified as urban. After 17 years, urban areas had increased by 41.6%. This represents a loss of 6% of potential agricultural lands. If this pattern of encroachment by urban growth into potential farmlands continues, Puerto Rico's potential for food production in the future could be greatly limited.

De Melo Neto Segundo, J.J. **(2002) Urban Agriculture Project: In the Conjunto Palmeira Slum, Fortaleza-Ceara, Brazil. Banco Palmas, Brazil. In: The Economics of Urban Agriculture - Urban Agriculture Magazine no. 7, August 2002, pp.10-11.**
economic impact
urban agriculture; Brazil; projects; slums

Conjunto Palmeira is a slum with 30,000 inhabitants, situated in the southern area of Fortaleza-Ceara, a metropolis located in the northeast of Brazil. The first inhabitants arrived here in 1973 and started building their houses spontaneously, without access to purified water, electric power, schools or other public services. In 1981, the Association of Settlers of the Conjunto Palmeira (ASMO-CONP) was founded, starting the process of organisation of the families.

Drechsel, P.; Kunze, Dagmar **(1999). International Workshop on Urban and Periurban Agriculture, 2-6 August 1999, Accra, Ghana. Urban Agriculture Notes http://www.cityfarmer.org/africaworkshop.html. 8 p. IBSRAM Regional Office for Africa, Ghana; FAO Regional Office for Africa, Ghana**
Supplier: City Farmer, Canada's Office of Urban Agriculture
health and environment waste recycling economic impact
food security; environment; West Africa; health; urban planning; economic aspects

Concisely presents the results of the International Workshop on Urban and Periurban Agriculture in Accra. The main theme of the conference was Closing the nutrient cycle for urban food security and environmental protection. Within this theme four sub-theme were distinguished with background papers and working groups: (1) Environment and public health; (2) Nutrient recycling; (3) Policy, Planning and Economics; (4) Farmers' point of view. For these themes priority actions and main constraints were identified. (NB)

Drechsel, P.; Kunze, Dagmar (eds) **(2001) Waste composting for urban and periurban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa. ca 200 p. ISBN 0-85199-548-9. CABI, Wallingford, UK; IBSRAM Regional Office for Africa, Ghana; FAO Regional Office for Africa, Ghana**
health and environment waste recycling economic impact

Rapid urbanisation has created a major challenge with regard to waste management and environmental protection. However, the problem can be ameliorated by turning organic waste into compost for use as an agricultural fertiliser in (peri-)urban areas. The forthcoming CABI hardcover (May/June 2001) provides an African perspective on potential and constraints of urban waste recycling for soil amelioration (and integrated pest management) as well as on urban and periurban farming systems as beneficiaries. Most papers derived from an IBSRAM - FAO workshop held in Ghana in August 1999 with authors from several European, as well as African, countries, representing various disciplines. The book will appeal to a readership in soil science, urban and rural planning, environmental science, waste management, developing studies and farming systems.

Contents include:

- Potential use of waste stream products for soil amelioration in periurban interface agricultural production systems
- Economic, sociocultural and environmental considerations
- Turning urban waste into fertilizer: Case studies from East and West Africa
- Modelling urban and periurban biomass and nutrient flows
- Urban agriculture: International support and capacity building in Africa

(PD)

Eberlee, J**. Neglected industry of Kenyan cities**

economic impact
Kenya

From the findings of households surveys in Nairobi, Kenya it can be concluded that urban agriculture is a vital tool for alleviating poverty and achieving sustainable development in the cities of developing countries. Two out of three urban households grow their own food and 51% of families keep livestock and 17% urban livestock in Nairobi. (NB)

European Commission (EC). **Network for the Pan-European food data bank based on household budget surveys: DAFNE 2. 32 p. European Commission (EC), Directorate-General XII, Science, Research and Development, 200 rue de la Loi, B-1049 Brussels, Belgium; National Nutrition Centre, National School of Public Health, 196, Alexandras Ave., GR-11521 Athens, Greece**
food security and nutrition economic impact
surveys; food security; databases

Describes the Data Food Networking initiative, aiming at the creation of a pan-European food data bank based on household budget surveys. Data referred to households as the statistical unit and covered 5 European countries, namely Belgium, Germany, Greece, Hungary and Poland. (WB)

Feenstra, Gail **et al (1999). Entrepreneurial community gardens: growing food, skills, jobs and communities. ANR University of California Publication No. 21587. Also on: http://danrcs.ucdavis.edu. 106 p**
community development economic impact services
community gardens; United States; entreprise development

Entrepreneurial community gardens are identified as a potential strategy for meeting multiple community needs, addressing both food security and economic development simultaneously. A survey of 27 such gardens nationwide was carried out. The following questions were posed: (i) what products and marketing strategies have worked under which conditions, (ii) how much income is being generated, (iii) how many jobs have been created, (iv) what kind of training is provided, (v) how much land and capital are required, (vi) what are the typical operating costs, (vii) to what degree can these enterprises be self-sufficient? Five cases explore all these questions and others. A set of 12 recommendations for success are posited. The appendices offer resources and addresses. (JS)

Gerstl, S., G. Cisse and M. Tanner **(2002) Economic Impact of Urban Agriculture on Home Gardeners in Ouagadougou Swiss Tropical Institute, Bale, Switzerland / Ecole Inter-Etats d'Ingenieurs de l'Equipement Rural, Ouagadougou, Burkina Faso. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.12-15.**
economic impact
economic impact; urban agriculture; home gardening; Burkina Faso

Urban agriculture can provide benefits but also risks for urban inhabitants. This study confirmed that the strengths overshadow the risks of practicing home gardening in a sub-Sahelian setting, and underlined the positive economic impact and food security for home gardeners. However, these two benefits depend on seasonal variations and external factors.

Gonzalez Novo, M. **(2002) Impact of Urban Agriculture: Reduced Prices in Havana. Red Latinoamericana de Investigaciones English Agricultura Urbana, Peru. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.25**.

economic impact

impact analysis; Cuba; urban agriculture

Urban agriculture emerged in Cuba, and specifically in Havana, from the critical economic crisis of 1989, as a response to food insecurity. Today, it has become one of the largest sources of employment in Havana, improving the supply of fresh produce and ensuring greater stability and availability of, especially, leafy vegetables. Until the emergence of urban agriculture, the agricultural markets (numbering 58 in April 2000) were the only option for unregulated agricultural produce, gradually becoming a reference point for prices in the domestic economy.

Goulven, K.L. and R. Gardiner **(2002) Sustaining Our Global Goods: Briefing Paper UNDP / UNED Forum. In: Towards Earth Summit 2002, Economic Briefing no.3.**

economic impact

globalisation; sustainable development; security

Global Public Goods (GPGs) cut across many aspects of our lives. Many GPGs have historically existed outside of human interference, such as the oceans and seas, the atmosphere, and ozone layer. Whilst other GPGs have emerged as different aspects of globalisation have advanced. The opening of national borders has increased the volume of cross-border influences, both positive and negative. As a result, it has become increasingly important to name and frame the growing phenomenon of GPGs. The concept of GPGs is relatively new and an agreed precise definition of GPGs has been lacking. However growing pressures have drawn international attention to the fact that public policy-making has been largely reactive in response to the challenges they pose. GPGs cover global issues that range across the whole spectrum of the sustainable development agenda, from the global environment, international financial stability and market efficiency, to health, knowledge, peace and security and humanitarian rights. This paper seeks to outline some of the latest policy ideas, framing the international debate about some of these key global issues by examining them through the 'lens' of Global Public Goods.

Gutman, Pablo; Gutman, Gabriela; Dascal, Guillermo**. (1987). El campo en la ciudad: la producción agricola en el Gran Buenos Aires. Informes de Investigación del CEUR, no. 6. Buenos Aires: Centro de Estudios Urbanos y Regionales, 1987. 155 p.**

economic impact land use planning

Argentina; periurban agriculture; land use; history; horticulture; vineyards

This is the report that presents the results of one of the pioneering studies in urban agriculture, conducted within the UN University's Food-Energy Nexus program. It describes the range of agricultural activities that can be found in Greater Buenos Aires. Prepared by prominent urban researchers, it emphasizes changes in land uses. One chapter is devoted to a historical overview of the city's urban expansion and its impact on agriculture. After a chapter describes the state of horticulture in the metropolitan area, one chapter presents a case study of a periurban sector known for its vineyards. The report contains many data tables and maps. (JN)

Hargesheimer, Ken**. Urban agriculture: gardening, market gardening, mini-farming, mini-ranching. Gardens / Mini-farms Network, Lubbock, TX, USA**

horticulture economic impact rural-urban linkages

home gardening; gardening techniques; urban livestock production; youth; United States

Focuses on the potential of various forms of urban agriculture, notably from the perspective of an opportunity for youth employment. Much of this paper is a mapping of production techniques. In addition, a condensed overview is given of important publications and suppliers' addresses, for the American market. (WB)

Hermann, Hans-Joachim **(1999). Planning for survival spaces in the city: how urban agriculture could be promoted. In: Gate: Technology and Development no. 2 (April-June 1999) p. 10-13**

economic impact services food security and nutrition

urban dwellers; rural-urban migration; urban poor; survival strategies

The majority of poor people live in urban areas. The received wisdom of development theory that the poor migrate to the city is being challenged in this article. Urban agriculture is an important element in survival strategies. However, the isolated promotion of urban agriculture as part of a solution of the problems of the urban poor will be of little help. (NB)

Hietkamp, Fern **(1995). Opportunities and constraints for urban agriculture in Bandung, Indonesia. AURN working paper no. 7. 36 p. Asian Urban Research Network (AURN), Centre for Human Settlements, School of Community and Regional Planning, The University of British Colombia, Vancouver, Canada**

land use planning city ecology economic impact

Bandung; Indonesia; urban planning; land resources; resource management

Focuses on the competition for space between urban agriculture and other activities in Bandung, Indonesia. When the author states that with the current rate of development, much of the land now used for food production within the urban area will disappear in the next 15-20 years, we must realise that this statement was made before the economic crisis hit Indonesia. The author's suggestion that city administrators should include urban farming more systematically in urban planning remains as valid as before, however. (WB)

Holmer, Robert J; Schnitzler, Wilfried H **(1999). Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems: Vietnam, Laos and Philippines. Urban Agriculture Notes http://www.cityfarmer.org/laos.html. 5 p. Periurban Vegetable Production Project (PUVeP), Xavier University College of Agriculture, PO Box 78900, Cagayan de Oro, Philippines**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture economic impact services
vegetable production; Vietnam; small- and medium-sized enterprises; Laos; Philippines

Gives a description of the Urban and Periurban Small and Medium-Sized Enterprise Development for Sustainable Vegetable Production and Marketing Systems. The project is implemented in Vietnam (Ho Chi Minh City), Laos (Vientiane) and the Philippines (Cagayan de Oro). The project aims to facilitate small and medium sized enterprises in South-East Asia with access to the market by developing socially, economically and ecologically sustainable vegetable production systems. (NB)

Howorth, Chris; Convery, Ian; Majani, Bituro **(1995). Feasibility study of urban horticulture in Dar es Salaam. 31 p. Natural Resources Institute (NRI), Central Avenue, Chatham Maritime, Kent ME4 4TB, UK**
Supplier: ETC(UK)
horticulture economic impact
Tanzania; economic impact; political aspects

Gives an overview of the urban agriculture situation in Dar Es Salaam. The report provides figures about cost and benefits of urban and periurban farming. A number of other issues are also discussed: local authority perception of urban farming, water and land supply, urban waste management, composting and recycling. Different projects for the promotion of urban horticulture undertaken in the Dar Es Salaam area are briefly described. (WB)

Instituto de Investigaciones Fundamentales en Agricultura Tropical (INIFAT) **(1995). Primer Encuentro Internacional sobre agricultura urbana y su impacto en la alimentación de la comunidad. 92 p. Instituto de Investigaciones Fundamentales en Agricultura Tropical (INIFAT)**
food security and nutrition economic impact
home gardening; economic analysis; IPM; hydroponics; permaculture; crop rotation; biofertilisers

Contains a number of papers on various technical aspects of homegardens and communal gardens on Cuba. (WB)

Jacobi, Petra **(1997). Importance of vegetable promotion in Dar es Salaam, Tanzania. 15 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**

horticulture economic impact services

Tanzania; agricultural production systems; economic analysis; marketing

Urban agriculture in Dar es Salaam involves a large proportion of the city population, Therefore, the city has been of major interest for research undertaken in this area for many years. The Urban Vegetable Promotion Project, started in 1993, deals with the different production systems of vegetables in and around Dar es Salaam. Three major production systems are determined: periurban production, open space system and homegarden production. The report gives useful information about the number of people engaged in gardening, different cropping patterns and cultivars used, cultivation periods, and approximate yield. It is argued that the different production systems all occupy a specific niche with regard to vegetable production and consumption in Dar es Salaam. (WB)

Jacobi, Petra **(1998). Food production as a survival strategy for urban households: state of knowledge and state of research in Tanzania. 10 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**

economic impact food security and nutrition rural-urban linkages

horticulture; Tanzania; urban livelihoods; food security

Provides an overview of urban agriculture in Dar es Salaam with its estimated 3 million inhabitants and its growth rate of 8%. In such a setting, urban food production has revealed itself to be very important as a survival strategy for the urban poor. The paper provides interesting figures and statistics out of which emerges a varied picture as to who is practising urban agriculture, with what purpose, scale of production, and more. Various production systems are presented and typified: crop based systems, periurban crop production, open space production, homegarden production, and livestock based systems. (WB)

Jaramillo Avila, C. and R. van Veenhuizen **(2002) The Economics of Urban Agriculture – Editorial. Municipality of Quito, Ecuador / ETC-RUAF. In: The Economics of Urban Agriculture - Urban Agriculture Magazine no. 7, August 2002, pp. 1-4.**

economic impact

urban agriculture; economics

Urban agriculture provides multiple functions and benefits to urban dwellers and cities. Political support is growing and further research and financial support to enhance the contribution of urban agriculture to sustainable urban development is necessary. In this issue of the UA-Magazine we focus on the analysis and understanding of the economics of urban agriculture, during periods of economic recession as well as in times of a well developing economy.

Jacobi, Petra., Drescher, Axel W. and Amend, Jörg (2000) Urban Food Security;

urban agriculture response to crisis. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.
food security and nutrition economic impact
crisis; poverty alleviation

Why people get involved in urban agriculture is the basic question of this article, which is based on information extracted from 20 city case studies on urban agriculture world-wide and additionally draws from experiences of the Urban Vegetable Promotion Project in Dar Es Salaam (Tanzania). It is argued that local authorities have to take their responsibilities in securing urban food security and to create an impact on urban poverty alleviation.

Knierim, Andrea **(1996). Agricultural development potential around Dolisie in the Congo: a case study in the catchment area of a small town. In: Agriculture + Rural Development vol. 3 (1996) no. 2 p. 51-54**
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)
economic impact horticulture rural-urban linkages
Congo; periurban agriculture; socio-economic aspects

Examines the potential of periurban agriculture around the city of Dolisie in the Congo. Technical issues are addressed, but also who are the target groups for agricultural innovations and intensification activities. In this analysis, a distinction is made into 3 agricultural circles in and around the town: (1) lots within the town and around its fringes; (2) areas within a radius of 10 to 15 kilometres; (3) villages in a radius of up to 50 kilometres. All 3 different circles are farmed by different groups of producers. (WB)

Knowledge and Learning Center Africa Region, The World Bank **(1999). CARE Periurban Lusaka Small Enterprise (CARE-PULSE) project, Zambia. Findings no. 147. 4 p. Knowledge and Learning Center Africa Region, The World Bank, 1818 H Street NW, Room J-5-055, Washington DC 20433, USA**
economic impact
Zambia; periurban areas; small scale industries; development projects

The paper describes project approach and results. The overall goal of this project was to increase household income, economic security and employment opportunities among the families of poor micro-entrepreneurs in periurban areas of Lusaka.

Lamb, Gary **(1994). Community supported agriculture: can it become the basis for a new associative economy? In: Biodynamics Nov-Dec 1994 p. 8-15. Bio-Dynamic Farming and Gardening Association**

community development rural-urban linkages economic impact
community initiatives

Describes the intricacies of Community Supported Agriculture (CSA), a community-based organisation of producers of consumers. This concept has spread primarily in the USA since the beginning of the 1990s. CSA is an approach and common understanding rather than a blueprint. The close links between producers and consumers have the potential of adapting offer and demand much more adequately to each other and to seek for optimisation instead of maximisation of production. In practice, the production-driven focus of farmers is not easy to wipe out. As much of the support work is done by volunteers, the movement may find itself to weak to provide proper guidance and support in the long run. Still, this is a very interesting and important approach in the light of urban and rural renewal. (WB)

Little, Peter D **(1992). Petty trade and household survival strategies: a case study of food and vegetable traders in the periurban area of Maputo, Mozambique. Periurban economic growth in Africa series. 37 p., annex. Institute for Development Anthropology, Binghampton NY**
economic impact
Mozambique; marketing; employment; vegetable trade

Presents results of a study on small-scale traders in the periurban area of Maputo. The report gives an overview of the periurban labour market, methodology and parameters of the study, patterns in vegetable trading, the role of self-employed trade in household survival. Lastly, policy implications are discussed. (NB)

Lueke, Markus **(1996). Urbane Landwirtschaft in den Tropen und Subtropen. Thesis, Institute for Agrarian Economy, Universisty of Goettingen, Germany. 120 p.**
economic impact
household economy; urban development; classification; economic theory

This thesis is on “Urban agriculture in the Tropics and Subtropics: A socioeconomic analysis of agricultural activities inside urban centers”. It contains an extensive literature survey on research on the subject until the mid-1990s, including some summary tables of this research. He develops a typological classification of urban farming in these regions. The study emphasizes socioeconomic aspects, placing urban agriculture within the larger context of urban development on one hand, and the household economy on the other. Theoretical models are developed of time allocation within different types of households. (JN)

Mawoneke, Sthembile **(1998). Impact of the urban agriculture research study in Zimbabwe. ENDA Zimbabwe, Box 3492, Harare, Zimbabwe**
economic impact food security and nutrition health and environment
Zimbabwe; economic impact assessment; food security; off-plot cultivation; health

hazards; heavy metals

Reports on the results of a household monitoring study aiming at determining the economic impact of urban agriculture on urban households in Harare, Zimbabwe, assessing the nutritional impact of agricultural produce on urban households; and identifying crop types and off-plot cultivation. Simultaneously, environmental research was conducted focusing on assessing the impact of urban agriculture on the urban environment. (WB)

Maxwell, Daniel G.; Armar-Klemesu, Margaret **(1998). The impact of urban agriculture on livelihood, food and nutrition security in Greater Accra. 30 p. Nutrition Unit, Noguchi Memorila Institute for Medical Research, University of Ghana, PO Box 25, Legon, Ghana**

food security and nutrition economic impact health and environment
food security; Ghana; Accra; nutrition; livelihoods; health; environment; land use systems; food contamination; gender; multi-disciplinary approach; institutional aspects; human resource development; farming systems

Part one of the paper summarises the major findings of the urban agriculture component of the overall study. The geographic, demographic, and socio-economic distribution of urban agriculture in Accra is presented. The impact of urban agriculture on food and livelihood security and nutritional status at household level and individual level are discussed as well as the environmental impacts and the impacts on health. An analysis is made of how city growth affects land use, property rights and livelihoods on the urban fringe. Finally, various other areas like human resource development, institutional strengthening, local partnerships gender are discussed. (NB)

May, Julian; Rogerson, Christian M **(1995). Poverty and sustainable cities in South Africa: the role of urban cultivation. In: Habitat International vol. 19 (1995) no.2 p. 165-181. Data Research Africa, Durban; University of the Witwatersrand, Johannesburg, South Africa**

R&D methodology land use planning economic impact
household survey; farming systems; access to land; land rights

Urban agriculture is increasingly seen as a major means of supplementing incomes in the cities of South Africa. In light of that nation's transition to a non-racial democracy, the particular task of the paper is to review the potential and policy implications of urban agriculture in the context of national initiatives for post-apartheid reconstruction. To reach these objectives, findings of household surveys are presented on the nature, methods and problems of production of groups of urban and periurban farmers. Income surveys supplemented by participatory techniques are used to gather further information on the problems faced. These major problems include gaining access to land with secure title for cultivation, finance, machinery, transport, crop security and the need for support services. The policy implications which emerge are then discussed. (Original abstract)

Mbaye, Alain **(et al.) (1999). Some more urban agriculture case studies: Dakar, Cairo, Zambia and Cagayan de Oro. In: Gate: Technology and Development no. 2 (April-June 1999) p. 40-47**

food security and nutrition economic impact city ecology

food security; ecology; economic impact; nutrition; land use planning; political aspects

Discusses case studies on urban agriculture in Dakar, Cairo, Lusaka, and Cagayan de Oro (Philippines). An overview is presented including what are the main agricultural activities, who is involved, what are the environmental and economic impacts and policy implications. Extended versions of the case studies can be found in 'Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda' published by DSE-ZEL. (NB)

MDP **(2001) The Political Economy of Urban Agriculture, report of a preparatory workshop, Harare, February 2001.**

land use planning economic impact

Africa (Southern); Africa (Eastern); ;political economy; land use; planning; Uganda; Kenya; Zimbabwe

This report contains one general paper by B. Mbiba (The Political Economy of Urban Agriculture in Eastern and Southern Africa; Overview, Settings and Research Agenda) and five case studies commissioned by the Municipal Development Programme, for a preparatory workshop in Harare, February 2001. The aim of the workshop was to discuss new insights and jointly work on a research proposal on the subject. The five country case studies are on Uganda, Kenya, Tanzania, Zambia and Zimbabwe.

Ministry of Foreign Affairs **(1994). Stedelijke armoedebestrijding. Sector- en themabeleidsdocumenten van Ontwikkelingssamenwerking no. 5. 163 p. ISBN 90-5328-063-4. Ministry of Foreign Affairs, Directorate General International Co-operation (DGIS), PO Box 20061, 2500 EB The Hague, The Netherlands**

economic impact land use planning

poverty alleviation; urban poor; government policies; development co-operation

This publication elaborates on the general policies of the Netherlands department for development co-operation on urban poverty alleviation. The policy starts with a description of the processes of urbanisation and impoverishment in the urban environment. From there, the themes employment and income, habitat (housing, land, water, sanitation, waste, energy, transport and gender), basic social services, institutional development, policies of international donors and the thematic programme of the Dutch government are discussed. (NB)

Ministry of Foreign Affairs **(1994). Urban poverty alleviation. Sector- en**

themabeleidsdocumenten van Ontwikkelingssamenwerking no. 5. 178 p. ISBN 90-5328-076-6. Ministry of Foreign Affairs, Directorate General International Co-operation (DGIS), PO Box 20061, 2500 EB The Hague, The Netherlands
economic impact
poverty alleviation; urban poor; government policies; development co-operation

This publication is an elaboration of the policy of the department for development co-operation on urban poverty alleviation. The policy starts with a description of the processes of urbanisation and impoverishment in the urban environment. From there, the themes employment and income, habitat (housing, land, water, sanitation, waste, energy, transport and gender), basic social services, institutional development, policies of international donors and the thematic programme of the Dutch government are discussed. (NB)

Ministry of Planning **(1991). Investigation into the potential role of urban agriculture: towards the preparation of policy guidelines. Pretoria: Ministry of Planning, South Africa. 69 p.**
land use planning economic impact
South Africa; policy; labour; smallholder farming; land use

This reports investigates the potential role urban farming can play in South African cities. It emphasizes the use of land by small holders, the labor issues they face, and the policies that can be put in place to foster their activities. (JN)

Mireri, C. **(2002) Private Investment in Urban Agriculture in Nairobi, Kenya. Dept of Environmental Planning and Management, Kenyatta University, Nairobi, Kenya. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.19-21**.

economic impact food security and nutrition
urban agriculture; Kenya; commercial agriculture; food security;

Urban agriculture is an important economic activity both for poor and commercial urban farmers. Urban agriculture constitutes an important food security strategy for poor urban farming families. Commercial urban agriculture makes a significant contribution to employment and income generation. The role of urban agriculture has become even more critical in Kenya because of the deteriorating urban poverty situation. Kenyan urban poverty is estimated at 50 percent and it is feared that the situation will deteriorate in the future (Republic of Kenya 2002).

Moskow, Angela Lynne **(1999). The contribution of urban agriculture to gardeners, their households, and surrounding communities: the case of Havana, Cuba. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 77-83. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development economic impact food security and nutrition
food security; community development; economic impact; food quality; Havana;

Cuba

Urban agriculture is promoted in Havana, Cuba, as a means of addressing the acute food-scarcity problems that developed when Soviet aid and trade were drastically curtailed in 1989. Today more than 26 000 gardens in Havana provide for the gardeners' own food needs. Research was conducted in 1995 to determine the ways these gardens contributed to the gardeners' sense of control over their lives and the role of the gardens in enhancing the surrounding communities. Results indicate that the gardens significantly incremented the quantity and quality of the food available to the gardeners' households and neighbourhoods; improved financial welfare through reduced gardeners' households weekly food bills and through money earned from sales of garden products; and made aesthetic, environmental, and other contributions to the community. (Abstract adapted from original)

Mougeot, Luc JA; Egziabher, AG; Lee-Smith, Diana; Maxwell, Daniel G.; Memon, Pyar Ali **(1994). Cities feeding people: an examination of urban agriculture in East Africa xiv, 146 p. ISBN 0_88936_706_X. GBP 9.95. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK**

food security and nutrition rural-urban linkages economic impact
case studies; Africa (Eastern); farming systems; food production; urban communities

Urban agriculture is gaining importance in order to reduce developing countries' dependency on food imports in order to feed rapidly growing urban populations. The underlying book studies urban agriculture in four East African countries: Tanzania, Uganda, Kenya and Ethiopia. In these countries, IDRC began examining impact and feasibility of urban agriculture a number of years ago. Urban agriculture has long been neglected by researchers as a marginal, unproductive activity undertaken by the urban poor. However, under the pressure of falling per-capita food production in Africa south of the Sahara, and subsequent migration to urban areas resulting in high unemployment, urban agriculture can no longer be ignored as an important part of the urban informal sector, providing income or income-substituting food. An important aspect of the study of urban agriculture is that the approach that looks at rural and urban economies as completely separate entities is seriously questioned. In reality, these economies have many links, although they do not necessarily appear in official statistics. Better land use agreements are needed for urban food production to flourish. More government involvement and interest in urban agriculture will be necessary to achieve this. (WB)

Mougeot, Luc JA **(1998). Farming inside and around cities. In: Urban Age (winter 1998) p. 18-21**

economic impact food security and nutrition
Africa; development projects; agricultural production; urban planning; urban development

General overview on urban agriculture, with, mostly, African examples. The author

expects increased opportunities for urban agriculture in the twenty-first century, e.g. as a result of lower-density urban expansion and because urban planning will more systematically include an UA component. (WB)

Moustier, Paule **(2001) Assessing The Socio-Economic Impact Of Urban And Periurban Agricultural Development. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology economic impact horticulture
West Africa; Central Africa; policy; vegetables

The paper provides practical indicators and field methods for assessing the impact of urban and periurban agriculture in social and economic terms (employment, income, added value, and food supply). In a context of growing advocacy for policy support in favour of urban agriculture, while public resources are shrinking, it is more and more necessary that researchers provide rigorous assessment of the contribution of urban agriculture to policy objectives. The paper is based on the author's fieldwork in West and Central Africa, mostly centred on vegetable production and marketing, as well as some literature review.

Moya, Rita; Montero, Alejandro; Yurjevic, Andres **(1996) Invest in the poor to allow to create wealth: the Tomé project in Chile. In: Agriculture + Rural Development vol. 3 (1996) no. 1 p. 53-55. Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)**
community development economic impact
Chile; community initiatives; local government; development projects

Tells the story of a town in southern Chile hard hit by the closure of its 3 textile factories back in 1982. Local government, the population and an NGO worked together towards in a successful programme covering 400 families. The plan contained an analysis of costs and benefits, investments, and expected productivity. (WB)

Mushamba, S. **(2002) Different Kinds of Investment in Urban Agriculture: Kintyre Lake County and Musikavanhu Project Experiences. Municipal Development Programme Eastern and Southern Africa. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.26-28.**
economic impact
urban agriculture; Zimbabwe; financing

One principal factor for the slow development of the urban and periurban agricultural sector in Zimbabwe is the inadequate, or in some cases total absence of financing

arrangements, especially from the formal sector. There are two explanations for this state of affairs, first that the rapid rise in urban agriculture is a fairly new phenomenon, and second, that it has also retained the tag of an illegal activity in most urban settlements. As such, funds that have been available to other sectors from especially non-governmental organisations and international development agencies have not been extended to urban and periurban agriculture.

Mvena, ZSK; Lupanga, IJ; Mlozi, MRS **(1991). Urban Agriculture in Tanzania: a study of six towns. Draft. Morogoro, Tanzania: Sokoine University of Agriculture, Department of Agriculture, Education & Extension, 1991.**
economic impact
Tanzania; surveys; household economy; food security

This important survey mirrors the one conducted by the Mazingira Institute for six Kenyan cities in the mid-1980s (see Lee-Smith et al. Above), also funded by Canada's IDRC. Six Tanzanian towns (Dar es Salaam, Dodoma, Kilosa, Makambako, Mbeya, and Morogoro) were surveyed in the late 1980s and early 1990s. As in Kenya, the study revealed that urban crop and livestock production is an integral part of the urban economy, constitutes a disproportionately large share of the household economy. (JN)

Niang, Demba **(1998). A statistical look at the Senegal River delta's economy: urban domination and activities linked to the agri-food sector. In: Club du Sahel: The Bulletin no. 18 (March 1998) p. 2. Organisation for Economic Co-operation and Development (OECD), 2, rue André-Pascal, 75775 Paris Cedex 16, France**
economic impact rural-urban linkages
Senegal; Saint-Louis

Examines city-countryside linkages in the Senegal River Delta. The author concludes that, in spite of a poorly developed modern sector, the economy has essentially urban traits. Economic development of the Delta must be sought both in increasing agricultural productivity and in strengthening the capacity of the urban world to develop its agriculture-based activities. (WB)

Nugent, Rachel A. **The sustainability of urban agriculture: a case study in Hartford, Connecticut. Urban agriculture notes; on: http://www.cityfarmer.org/rachel.html#rachel. 20 p. City Farmer, Canada's Office of Urban Agriculture**
horticulture economic impact
economic impact; sustainable agriculture; sustainability; United States

This study defines a framework for examining the impacts of urban agriculture and applies it to data from the city of Hartford, Connecticut, USA. It uses an extended cost-benefit approach which includes market and non-market economic, social, and environmental factors affected by urban agriculture. Non-quantifiable factors are

discussed qualitatively as they are integral to understanding the effects of urban agriculture. The author concludes that, on the basis of data gathered, it cannot be concluded that urban agriculture in and around Hartford is sustainable, be it economically, socially, or ecologically. A longer time frame would be needed to draw conclusions about this issue (WB - from original abstract)

Nugent, Rachel A **(1999). Measuring the sustainability of urban agriculture. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 95-99. ISBN 0_88936_882_1. CAD 35.00**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
R&D methodology economic impact
economic impact; food systems; cost-benefit analysis

The paper defines economically relevant benefits and costs of urban agriculture to evaluate conditions needed for sustainable urban agriculture. Urban agriculture is sustainable if the benefits exceed the costs over a relevant period and the impacts are equally distributed. A cost-benefit framework is presented to measure whether the benefits of urban agriculture outweigh the costs in a particular locale. A comparison of a sustainable local food system and the traditional import-export local food system model is discussed. Sustainable urban food systems can form a closed loop if they reduce the need for cities to import resources to satisfy their production and consumption needs and reduce the amount of waste leaving the city. A theoretical model for measuring the sustainability of urban agriculture in a community is presented. (Abstract adapted from original)

Nugent, Rachel A **(1999). The significance of urban agriculture. Urban Agriculture Notes http://www.cityfarmer.org/racheldraft.html. 14 p. Department of Economics, Pacific Lutheran University, Tacoma, WA 98447, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture
economic impact
economic aspects; resource reuse; urban policies; poverty; rural-urban linkages; food availability

The paper explores what is urban agriculture and what is its significance. To this end the author discusses (1) urbanisation and growing food requirements; (2) the conditions of urban agriculture among the poor practitioners; (3) the benefits and costs of urban farming; (4) the obstacles to urban farming; (5) the relation to rural agriculture; (6) the policy implications; and lastly provides an example of resource reuse for urban agriculture in urban livestock waste reuse and an example on waste water treatment and irrigation. (NB)

Nugent, Rachel A **(2000). The impact of urban agriculture on the household and**

local economies. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 76-97. DSE, GTZ, CTA, SIDA

economic impact food security and nutrition health and environment

household economy; local economy; employment; income generation; labour markets; gender; economic diversification; urban policies; macro-economic impacts

On basis of the case studies presented in the reader the article analyses the economic impact or urban agriculture on individual, household, city and macro-economic level. The paper explores the economic conditions and policies in urban areas that create the impetus for urban agriculture to exist and which affect its viability. The capacity of urban agriculture to provide jobs and income and value of production are analysed, which all are badly needed in fast growing cities. Conclusions are drawn on the economic relevance of urban agriculture based on both quantitative and qualitative knowledge. (NB)

Nugent, Rachel A**. (2001).Using economic analysis to measure the sustainability of urban and periurban agriculture: A comparison of cost-benefit and contingent valuation analyses. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology economic impact

diagnosis; economic method; sustainability

One of the claims made about urban and periurban agriculture is that it adds to the “sustainability” of an urban area. This has been used as a selling point for local, national and international policy-makers to support the development of it, with clear and fair policies, and to integrate it with other components of the food, planning, and agricultural systems under their jurisdictions. But whether urban and periurban agriculture really makes a city more “sustainable” is an open question and will remain so until methods are developed to measure what is meant by sustainability. This paper describes several economic methods, a combination of standard and recently-developed economic methods, and seeks answers to the following questions about the social, environmental, and economic impacts of urban agriculture: In what ways does UPA affect the community, and why? Are the positive and negative effects temporary or permanent and how might they change over time? Who are the important stakeholders affected by UPA, what conflicts arise among them, and how might they be resolved? Are the impacts of UPA better for the community than an alternative use of the resources, and how should choices be made about alternatives? How do factors from outside the community affect UPA and its role in the community?

Organisation for Economic Co-operation and Development (OECD) **(1998). Popular urban economy at the heart of the economy and of urban society. In: Club du Sahel: the Bulletin no. 18 (March 1998) p. 3. Organisation for Economic Co-operation and Development (OECD), 2, rue André-Pascal, 75775 Paris Cedex 16, France**

economic impact rural-urban linkages
Sikasso; Mali; San Pedro; Ivory Coast; added value; employment; informal economy

The modern sector of an urban economy provides a significant portion of the added value. Most jobs, however, are created by the popular urban economy sector which is based on meeting basic needs. (WB - based on original abstract)

Pearce, Barry **(1995). Towards an economic evaluation of urban innovative projects: micro projects for mega change. 75 p. ISBN 92-828-1104-2. ECU 20.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland**
Supplier: Office for Official Publications of the European Communities, Luxembourg
city ecology economic impact R&D methodology
sustainable cities; sustainable development; urban planning; European Union; innovations; project evaluation

Report of an overview of 110 projects on innovative urban projects in EU member states. There are interesting and relevant appendices presenting a checklist on evaluation criteria on urban sustainability and an evaluation matrix. (WB)

Petts, J. **(2002) Costs and Benefits of Urban Agriculture in East London: A Discussion Paper. SUSTAIN UK In: The Economics of Urban Agriculture - Urban Agriculture Magazine no. 7, August 2002, pp.34-36**.
economic impact
horticulture; food production, United Kingdom, Europe (Western)

Studies calculating the contribution of urban agriculture to income are unlikely to accurately estimate the quantities of food produced because informal agricultural activities are not generally included. One estimate (Blair et al. 1991) calculated that the 30,000 or so allotment holders in London produce nearly as much fruit and vegetables in weight terms as horticultural enterprises. Prices are also difficult to measure due to fluctuations and variations in different markets.

Pinzás, Teobaldo **(1994). Can city farming survive? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 10. Instituto de Estudios Peruanos, Horacio Urteaga 694, Lima 11, Peru**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
economic impact food security and nutrition horticulture
home gardening; horticulture; Peru; urban communities; urban development; urban environment; urban population; urban wastes; vegetables; waste recycling; women

Early 1994 ETC Foundation asked Theobaldo Pinzás to make an exploratory study on urban agriculture in Peru. This is an excerpt from his report, focusing on his findings about urban vegetable growing. In his full report, he suggests that more attention be given to recycling of waste and sewage water. (ILEIA)

Poner, U. (ed.) **(2001), Reform of the World Trade Order: Reform of the World Trade Organisation and the Interests of the Poor; The TRIPS Agreement threatens the Human Rights of the Poor. Deutsche Kommission Justitia et Pax, Bonn: German Commission for Justice and Peace. Supplier: Justitia et Pax, Kaiser-Friedrich-Str. 9, D - 53113 Bonn, Deutschland.**

economic impact

poverty; human well-being

In 2000, the German Commission for Justice and Peace - a specialist organisarion of th eCatholic Church with responsibility for development, peace and human rights policy - established a committee on "Political control of economic globalisation" and thus shifted the focus of attention to questions of the world trade order. After all, no other area probably exerts a greater influence on the development opportunities of a large number of poor countries and on the opportunities which the poor and marginalised populations in the Third World will have in life.

The committee produced 2 declarations which could also be described as studies on account of their specialist focus. The present publication documents these declarations. The one declaration addresses the rules and procedures of the World Trade Organisation, while the other treats the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPS). The questions posed here, are: To what extent do the rules of world trade (and the practice which has emerged on the basis of these riules) benefit or harm the poor? To what extent do they encourage or obstruct the fulfilment of the human rights of the poor and the realisation of their justified social and economic interests?

Purnomohadi, Ning **(2000). Jakarta: agriculture as an alternative strategy to face the economic crisis. In: Growing cities, growing food: urban agriculture on the policy agenda. - p. 453-465. DSE, GTZ, CTA, SIDA**

horticulture economic impact

crisis response; commercial agriculture; vegetable production; food security; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; Jakarta; Indonesia

The production of fresh vegetables in Jakarta is essential as the congestion of the city inhibits timely rural imports. As a result of the Asian crisis urban farming spread rapidly and the governor of Jakarta gave permission to the people to farm vacant land left by broke developers. There are two main types of farmers: land owners and workers. Most workers are male migrant workers who lost their jobs in the fallout of the crisis. Farming occurs among others on vacant land, along rivers and roadsides and in home gardens. Almost all produce is marketed. Despite the widespread nature of urban agriculture it is seen as a temporary phenomenon and is not included in the city master planning. The city government could play an important role to expand the activity in Jakarta. (NB)

RCD Consultants **(1990). Urban Agriculture in Latin America, Africa and Asia. Washington, DC: UNDP/IBRD**

city ecology economic impact

Latin America; Africa; Asia; surveys; survival strategies; history; development programmes

This document was based on the principal investigator's 15 years of part-time research and experience with urban agriculture in Asia, Africa, the Middle East and the United States, plus visits to 17 developing countries. Although urban agriculture varied more than expected from country to country, the author notes that it increases as the economy gets worse; it is strongly influenced by urban management policies and practice, especially antagonistic ones; it has no comprehensive support programs similar to those for rural farmers; and is perceived as rural, old-fashioned, temporary and low-yielding. The last indicates that the principle barriers preventing urban agriculture from achieving its potential are cultural. This report examines the various kinds of urban agriculture; the history of and trends in urban agriculture; the places where urban agriculture is carried out; the various actors involved; and the economic, social, equity and environmental impacts of urban agriculture. It also looks at technology and assistance programs for urban agriculture, and identifies a number of areas for further action. (HC, IDRC)

Rees, William E **(1999). Why Urban Agriculture? Notes for the IDRC Development Forum on Cities Feeding People: A Growth Industry, Vancouver, BC, 20 May 1997. University of British Columbia, Vancouver, Canada**

economic impact

economic aspects; social aspects

Describes context and rationale for interest in urban agriculture, and highlights differences according to the countries or regions where urban agriculture is practiced. (WB)

Research, Development and Consultancy Division (REDEC) **(1996). Urban agriculture in Gweru: proceedings of a one-day workshop organized by ENDA - Zimbabwe, Midlands Hotel, Gweru, 16 October 1996. 24 p. Research, Development and Consultancy Division (REDEC), Environment and Development Activities (ENDA) - Zimbabwe, PO Box 3492, Harare, Zimbabwe**

food security and nutrition economic impact horticulture

Gweru; Zimbabwe; workshops; home gardening; off-plot cultivation

At this workshop, results of a household survey conducted by ENDA in Gweru in 1996 were presented, looking both at on-plot and off-plot cultivation. A fair number of parameters was discussed and quantified. (WB)

Rogerson, Christian M **(1993). Urban agriculture in South Africa: scope, issues and potential. In: GeoJournal vol. 30 No. 1 (May 1993) p. 21-28.**

economic impact

South Africa; poverty; gender; policy

This paper examines the present state of urban agriculture in South Africa and

analyses its potential for poverty alleviation. It finds the activity underdeveloped relatively to neighboring countries. It raises policy issues regarding how farming can be expanded beyond the most marginalized and vulnerable groups. (adapted by JN)

Sawio, Camillus J **(1998). Urban agriculture in Dar es Salaam. Workshop on Cities feeding people: lessons learned from projects in African cities. IDRC. Nairobi. 21-25 June 1998.**

R&D methodology economic impact

Tanzania; workshops; project implementation; monitoring & evaluation; project impact; impact assessment

This International Development Research Centre (IDRC)-supported project (93-0037) aimed to build up baseline data to feed into the Urban Environmental Planning and Management process taking place under the auspices of the Sustainable Dar es Salaam Project. The research team, which included urban planners, geographers and scientists, examined the extent of urban agriculture and its role in the urban economy, income-generation and food security; health issues; the impact of urban agriculture on the environment (including analyses of water, crops and soil for heavy metals and other contaminants); and actual and potential instruments for urban agriculture support. The result was a broad data collection, in-depth analysis and presentation of the results in readily understandable form using maps, diagrams, tables and figures. This paper examines the impact of the project on institutional capacity strengthening, human resource development, partnerships with other institutions, gender sensitive analysis, scientific and methodological advances, and research utilization by non-researchers. It was noted that the project strengthened the University College of Lands and Architectural Sciences (UCLAS) and the University of Dar es Salaam (UDSM), both in terms of equipment and research capacity; inspired a number of students to pursue postgraduate studies in aspects of urban agriculture; and sensitized farmers, stakeholders and local governments to the importance of urban agriculture. The project generated information that was used in the Strategic Urban Development Plan for Dar es Salaam and leveraged funds for rehabilitating the Horticultural Gardens. These gardens are becoming vehicles for disseminating knowledge, seeds, and technologies for developing urban agriculture. (HC, IDRC)

Schilter, Christine **(1991). L'agriculture urbaine à Lomé. Geneva: IUED, and Paris: Karthala Press. 334 p.**

horticulture economic impact

Togo; food supply; farming practices; cooperatives; marketing; economics

This is one of the first book-length commercially published studies on urban agriculture. It considers the range of farming practices found in Togo's capital, Lome. A whole chapter is devoted to the role of cooperatives. The second half of the book assesses the economic dimension of the urban food production system. (JN)

Silk D **(1985). Urban agriculture. Background study prepared for the World Commission on Environment and Development. Sao Paulo. 25 October - 4 November 1985. Geneva: WECD. Volume 6, Document 71**
economic impact
history; impact analysis

This paper gives some examples of urban agriculture in ancient and modern times, provides an overview of the current literature on the subject, and points out some of the positive aspects of urban agriculture. The obvious benefits of urban agriculture are that it improves household food security, especially between major harvests; acts as a buffer against inflation; and results in better family nutrition. As well, converting vacant land into productive green space displaces illegal dump sites, reduces noise pollution, helps moderate the climate, provides an opportunity for recycling organic waste and reduces the need for expensive - in economic, environmental and energy terms - transportation, processing, packaging and storing. One of the intangible benefits of urban agriculture is that it raises people's awareness of the importance of ecologically sustainability and the need to protect the environment. (HC, IDRC)

Smit, Jac **(1992). Profit from raising rabbits in the city. Developing Countries Farm Radio Network package no. 26, script 2. 5 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada M5G 2C2**
urban livestock economic impact
rabbits

A radio script for dissemination in a large number of developing countries, explaining how to raise rabbits in the city. Contains practical information about uses, housing, feeding and breeding. (WB)

Smit, Jac **(1993). Analysis of the urban agriculture sector in the metropolitan area of Port-au-Prince, Haiti. CARE. International, Atlanta. 3 Volumes.**
economic impact horticulture
Haiti; small livestock; land use

The purpose of the study reported herein was a rapid appraisal of the opportunities, constraints and potential interventions in assisting small-scale agricultural producers, processors and marketers within the Port-au-Prince metro area to increase their incomes. Twenty-two sub-sectors were analyzed and twelve identified as worthy of support. Bidonville Agriculture was particularly commended. CARE selected Vegetable production for further study and support. (JS)

Smit, Jac **(1994). Evaluation of urban agriculture possibilities in Côte d'Ivoire. Prepared for UNICEF, New York and Abidjan, Côte d'Ivoire. Unpublished. 52 p.**
economic impact

youth; gender; poverty; nutrition; micro enterprise; Africa

This field report has special value in its broad scope of potential for urban agriculture development in West Africa based on squatter settlement women and youth. And it has a structure for project proposals. (JS)

Smit, Jac **(1999). What would the world be like in the 21st century if cities were nutritionally self-reliant: the prospect for urban agriculture. Urban Agriculture Notes. http://www.cityfarmer.org/21century98.html. 5 p. The Urban Agriculture Network, 1711 Lamont St. NW, Washington, DC 20010, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture
economic impact city ecology
waste management; urban policies; environment

Summarises findings from the book "Urban agriculture: food, jobs and sustainable cities" and outlines prospects for the 21st century on the basis of questions emerging form the book: what if waste is food and sewage and garbage were prime inputs to food production? What if urban landscape were edible, what if vacant land in cities were productive, what if urban areas were increasing rather than diminishing biodiversity? The author argues that the characteristics of the 21st century city with more productive land use, with fertile soil contributing to increased biodiversity and a major shift to healthy and greener cities are already there. However we haven't noticed it and too often policies and investment have been hindering its emergence. (NB)

Soriano, R., J.D. Leaver, G. Woodgate and H. Losada **(2002) Economic Impact of Agro Biodiversity in the Chinampa Sub Urban System. Metropolitan Autonomous University, Mexico / Imperial College at Wye, University of London, Wye, UK. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.16-18**.
economic impact
economic impact; urban agriculture; biodiversity; Mexico

A study was carried out in order to assess the economic performance of the periurban agro-ecosystem known as "chinampa". Chinampa is a small piece of land of irregular form, of pre-Hispanic origin, where inhabitants from the valley of Mexico still produced a diversity of plants for the city. These were built in a lacustrine setting by reclaiming bordering a lake and building the plots and a network of channels.

Stassen, Saskia **(1997). Cities in the global economy = Las ciudades en la economía global. Columbia University**
economic impact
economic globalisation; local government; privatisation

Major cities and metropolitan areas have become a third player next to the global economy and national governments, in view of infrastructure and human resources accumulated there and of specialised services that can be rendered. Also, the large

wave of privatisation and deregulation has led to a shift towards the private sector and/or local government of large cities. (WB)

Tremante L. P.**(2000) Livestock in Nineteenth Century New York City. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock economic impact

United States

Commercial agriculture existed in two forms in nineteenth century New York City: livestock husbandry and horticultural productions. Both are similar in that they emerged as viable forms of production soon after the year 1800. Both also depended for their existence on location, the availability of low-cost immigrant labor and urban waste products. Yet by the end of the century, urban livestock production had slipped into decline while urban horticulture continued to thrive. The article discusses the question: "why did commercial livestock production live such a short life in New York City?".

Whyte, A; MacKenzie, F **(1999). Cities Feeding People: a review of the CFP program initiative of IDRC. Ottawa: IDRC**

R&D methodology food security and nutrition economic impact

development programmes; project impact; impact assessment

The reviewers examined the implementation of the objectives set in the International Development Research Centre (IDRC)'s Cities Feeding People program initiative: prospectus 1997-2000, as evidenced in the following five projects: Urban agriculture in Dar es Salaam (93-0037); Socioeconomic and ecological impacts of urban agriculture in Harare (95-0007); Urban horticultural technologies in Port-au-Prince (96-0035); International research awards in urban agriculture (97-0026); and wastewater treatment using water lettuce in Dakar (98-0214). The reviewers agree that CFP has been effective in raising awareness of urban agriculture among international organizations, donors, and national and urban governments; knowledge creation; publication and dissemination; and training. They note that it needs to better integrate gender and social relations into is conceptual framework and to make the political economy of conflict more integral and explicit in that framework.

The reviewers also looked at the question of whether adequate recognition of urban agriculture has been achieved and whether CFP should move on to more strategic issues. They conclude that it would be premature to move on, as the battle has yet to be won on three fronts: in the cities, which may have the will but not the tools to move from attitude change to policy change; within the research community, which has difficulty attracting practitioners in urban agriculture due to its inherently multidisciplinary nature; and within the international donor community, where urban agriculture is not central to any agency's mandate and therefore vulnerable in all. (HC, IDRC)

World Commission on Environment and Development (WCED) **(1985). Official minutes of the Commission's fourth meeting held in Sao Paulo, 25 October - 4 November 1985. Geneva: WCED. Volume 41**

economic impact food security and nutrition

policy development; economic development; sustainable development

The Brazilian meeting took place half-way through the Commission's life. Priority issues to be dealt with were the outline of the official final report, two alternative versions of which were put before the Commission for its consideration, and the preliminary outline of the popular final report. Additional discussions focused on international economic relations, environment and development; food security, agriculture, forestry, environment and development - tropical forests; human settlements, environment and development; and international cooperation - legal principles for environmental protection and sustainable development and resolving environmental disputes. Some 15 annexes include the background documents used in the discussions. Annexes include the following: list of participants, press seminar, opening address, list of submissions, agenda, progress report, preliminary and alternative outlines of the official report, revised alternative version of official final report, outline of final popular report, and background documents pertaining to the discussions. (HC, IDRC)

Wohl, Hope **(2000). The feasibility of urban agriculture: with recommendations for Philadelphia Pennsylvania Horticulture Society. Contains 8 case studies.**

economic impact

greenhouses; herbs; poultry; mushrooms; hydroponics; ornamental horticulture; United States

This four-part study identifies and describes viable urban agriculture businesses on the East Coast of the United States. It discusses the issues surrounding economic viability of inner-city urban agriculture and recommends next steps that will be critical in creating a public/private/civic support structure to guide and nurture new ventures. (JS)

Yeung DS **(1997). Policy intervention in the streetfoods trade and its effects on health and livelihood: a case study of Quezon City, Philippines. (MA thesis) Vancouver: University of British Colombia**

services economic impact

Philippines; Manila; urban livelihoods; street vendors; street food; marketing; policy development; social participation; food supply; food distribution

A case study of the process of developing a municipal ordinance on street food activities was carried out in Metro Manila. The author examined three themes: the creation of institutional linkages between local government units and community organizations to develop and deliver support services for street food vendors; the impact on health and livelihood of the introduction of a municipal ordinance regulating street food vending activities; and the implications of street food activities

for the municipal planning process. The principal findings were that urban planning interventions of a regulatory nature are insufficient to deal with street food issues; the participation of interested community groups in the development of such policies is very important for their effective implementation; and education and awareness-raising must take place both within government agencies and within the community in order to obtain support for policy provisions. It was concluded that street vended foods are an important link in the urban food delivery system - some regulation of their nutritional content and safety is an effective intervention in managing the health of the urban population, especially the urban poor; that street food vending is an important means of income generation for many of the urban poor, especially women - recognition of the activity is therefore an effective means of addressing the employment issue; and that street food vendors have intimate knowledge of their business needs — they should be consulted by government officials in the process of developing a street foods policy. (HC, IDRC)

Yoveva, Antoaneta; Gocheva, Boriana; Voykova, Galya; Borissov, Boris; Spassov, Al **(2000). Sofia: urban agriculture in an economy in transition. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 501-518. DSE, GTZ, CTA, SIDA**

economic impact land use planning

crisis response; food security; food processing; food policy; land use systems; health; ecology; economic impact; reuse of waste; poverty; land tenure

Historically urban agriculture and processing of produce is common in Sofia in various forms. With the transition to a market oriented system it function and importance changed. There are private farms and household agriculture in different forms in Sofia. Urban agriculture provided mitigated the impacts of the collapse of the economy. People could reduce their food bill and generate some additional income. Production is for self-supply and the market. At the same time it is attractive to change the land allocation from agriculture to residential area to maximise short term profits. Environmental pollution poses serious problems to agriculture as industries during the socialist era could contaminate the area unchecked. Under pressure because of budget cuts are the remaining government institutions, which could facilitate urban agriculture, could exercise the necessary control on product quality and uphold regulations. Unclear land tenure situation is a serious constraint. Environmental awareness and proximity of markets and knowledge infrastructure present good opportunities to enhance urban farming. (NB)

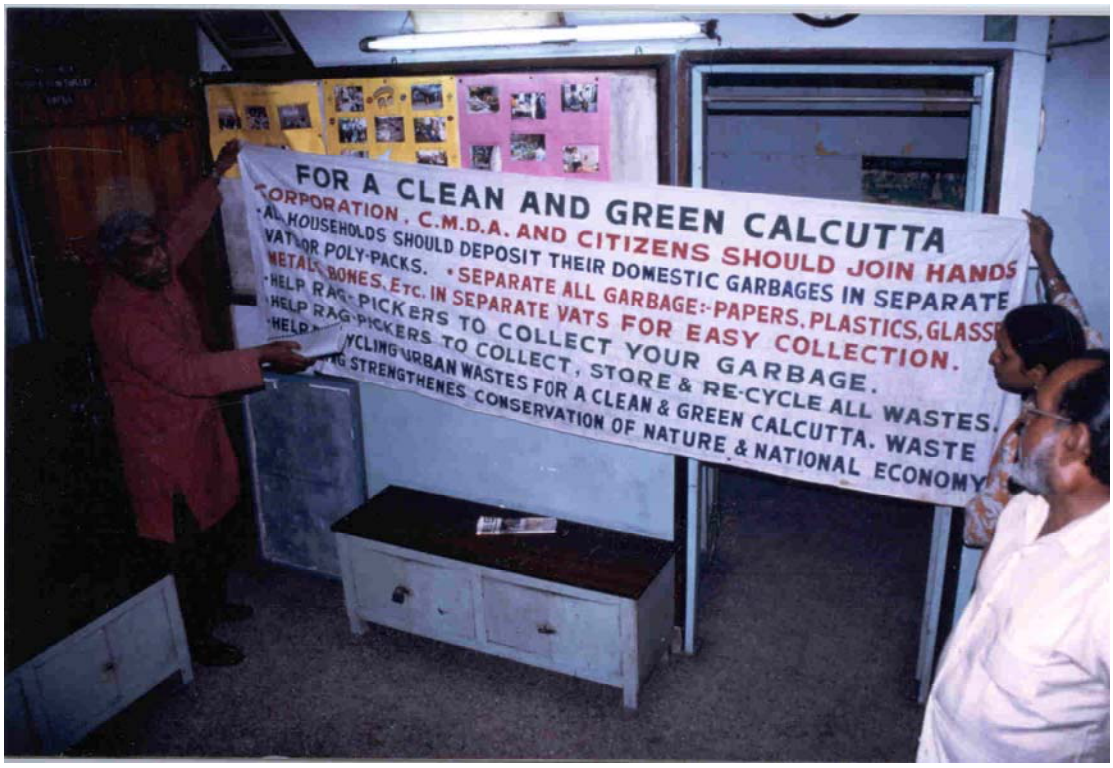
Zalle, Dieudonné **(1999). Les stratégies politiques pour l'agriculture urbaine: rôle et responsabilité des autorités communales: le cas du Mali. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 1-18. 18 p. Institut Supérieur de Formation et de Recherche Appliquée du Mali**

food security and nutrition economic impact

policy environment; economic aspects; Mali

The increase of fruit and vegetable consumption might be linked to the process of urban development, and the evolution of nutritional habits. Vegetables produced for sale play an important role in the economy of the urban family. Land tenure problems pose a big threat for the development of the sector, other constraints relate to human resources and lack of communication between stakeholders. (NB)

1.3 Urban Agriculture and the City Ecology



Organising for recycling of organic wastes.

(Picture: Christine Furedy)

Urban agriculture functioning in urban ecosystems

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Introduction

Urban ecology cannot be seen as one clear concept, as it can be approached from a number of fundamentally different perspectives. In normative usage, it describes urban design programmes at the political and planning level. In sciences, three concepts can be distinguished, two based on natural sciences and one approach based on social sciences. Within the natural sciences, urban ecology is used to refer to that area of biology (for the purpose of this article: natural sciences include the science of agriculture, fisheries and forestry) that is concerned with urban areas. There are two kinds of natural scientific concept in urban ecology: the study of ‘nature’ (natural species) in the city (including nature based systems such as agriculture, aquaculture and forestry) and the urban area as an ecosystem. The urban ecosystem approach proposes that the city, as with other ecosystems, shows structure and function, including biotic and abiotic components and the cycling and conversion of energy and materials. There also exists spatial organisation and change through time, which results in certain patterns of behaviour and distribution of species, populations and communities. As such, the urban ecosystem can be seen as an open system, highly dependent on other surrounding ecosystems with which there are flows, exchanges, and interactions. Social sciences also study urban ecology, putting emphasis on the interactions between humans in the urban area, also referred to as human ecology.

Many concepts are attributed to urban agriculture. First, a distinction between rural agriculture and urban agriculture has to be made. The main feature of urban agriculture that distinguishes it from rural agriculture is its integration into the urban economic and ecological system, or 'urban ecosystem'. It is not its urban location which distinguishes urban agriculture from rural agriculture, but the fact that it is embedded in and interacting with the urban ecosystem. A useful definition for urban agriculture is given by Luc Mougeot (2000): "Urban agriculture is an industry located within (intraurban) or on the fringe (periurban) of a town, a city or a metropolis, which grows or raises, processes and distributes a diversity of food and non-food products, (re-)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services mainly to that urban area".

To define the opportunities, threats and possibilities of urban agriculture it is important to place urban agriculture within a certain urban development and planning context. In Rio, an overall programme has been defined as: "Human settlements shall be planned, developed and improved in a manner that takes full account of sustainable development principles and all their components, as set out in Agenda 21... We need to respect the carrying capacity of ecosystems and the preservation of opportunities for future generations...".

Using the Agenda 21 framework as a starting point, urban agriculture can best be located in the natural science context of urban ecology. Functions of urban agriculture as analysed in the natural science can be defined. However, urban agriculture can also be approached as part of a large urban ecosystem in which the impact on the sustainability of the urban ecosystem is considered.

In view of the above, this article mainly reviews the state-of-the-art literature dealing with the consequences and possibilities of urban agriculture to sustain urban areas. The bibliography is screened on research topics dealing with positive and negative aspects of urban agriculture, on city ecology and on societal conditions needed for urban agriculture.

Systematisation of references

Important impacts of urban agriculture on the city ecology indicated in the literature are the following :

Potential positive impacts of urban agriculture on the urban ecosystem

- Recycling urban organic wastes and nutrients
- Waste water management
- Reclaiming of degenerated areas
- Reduction of transport
- Reduction of energy use for urban food production
- Dust filtration by plants
- Noise reduction
- Drain trough the soil of rainwater and runoff
- Biodiversity through local differences in habitat
- Reduction in the dispersion of diseases
- (Micro-) climate improvement amelioration
    - Reduction of heat
    - Reduction of CO_2-discharge
    - Wind breaks
    - Improvement of micro-climate
- Multifunctional use of space

Potential negative impacts of urban agriculture on the urban eco system

- Destruction of vegetation
- Erosion
- Siltation
- Contamination of soils or groundwater with pesticides
- Depletion of water bodies

Conclusions

- There is a substantive body of research on urban agriculture, dealing with its incorporation into the urban ecosystem, with respect to recycling nutrients, wastewater and solid waste.
- Fewer studies have been done on the role of urban agriculture in urban climate management.
- Some studies are available which deal with polluted environments effecting food and consequently human health.
- Studies of the impact of urban agriculture on environmental components such as groundwater and soils are scarce.
- Also the benefits of urban agriculture for the urban ecosystem with respect to multiple use of space are not well researched yet.
- Often, urban ecological research is pure observation of what happens in the realm of urban vegetation, groundwater management and microclimate. Urban agriculture studies focus in particular on cases.
- Guidelines or generic models to promote urban agriculture as a component of sustainable urban ecosystems are not yet available. It is recommended that more studies should be done on how to incorporate urban agriculture in the flows of water and energy in the urban ecosystem.
- Also environmental risk assessment is an important subject to focus on.
- Macro-urban ecological studies, in which conclusions are drawn about the degree of self-reliance with respect to food and timber in relation to geographical features and regional characteristics, would help to build strategies for improving urban ecosystems towards sustainability. Unfortunately, very little has been produced on this subject.
- Within the framework of Agenda 21, an enormous task lies ahead to limit the impacts of cities on their wider environments. The knowledge collected so far on urban agriculture indicates that it is likely that further development of urban agriculture can substantially help to reduce urban ecological footprints. Given the potential role of urban agriculture for the sustainability of the urban ecosystem it would be important to formulate a specific research agenda. A key research area is to analyse scenarios and strategies with respect to the role of urban agriculture as a ‘cleaner’ as well as its role in reducing flows (of energy, water, nutrients, raw materials, and transport) from urban hinterlands to cities.

Aipira, Hoffman; Cockburn, Charles **(1994). Urban farming in low-income cities: proceedings of the first workshop on 'Urban Farming: Strategy for Food and Environmental Health in Low-Income Cities. One World Series. 26 p. ISBN 0_904761_44_4. Institute of Advanced Architectural Studies (IoAAS)**

food security and nutrition city ecology

waste recycling; food security; climate amelioration; energy; land reclamation; nutrition; garden city

This booklet contains the workshop report on the first workshop on 'Urban Farming: Strategy for Food and Environmental Health in Low-Income Cities' as well as a paper by Hoffman Aipira 'Urban farming: beyond feeding the masses'. From the notion that in many low income cities informal cultivation of crops and raising

animals are increasingly adopted as a strategy for self-reliance in food and fuelwood supply, this paper introduces the concept of urban farming. Issues, policies and practices including problems are discussed. Links with other city systems such as waste management, energy, land reclamation, are evaluated. (NB)

Bartolucci, Marisa **(ed.) (1996). The seeds of sustainability, Special Issue of Metropolis**
city ecology
urbanisation; ecology; sustainability; eco-tourism; composting

An excellent overview by several authors of the sustainable city movement inside city planning and design professions. Includes description of planned suburban agriculture outside Chicago. (JS)

Barton, Hugh **(ed.) (1998). Sustainable communities Earthscan, London**
city ecology
community; ecology; decision making

This volume, by an expert team, provides a practical direction to anyone interested in advancing communities as eco-systems. It examines the technologies of food, energy, water, and flora and fauna. Cases from UK. Denmark, Germany, Australia, New Zealand and the USA, list of current eco-villages and eco-neighborhoods by country. (JS)

BC Housing Management Commission **(1999). People, plants and homes: brings gardens to life. Urban Agriculture Notes http://www.cityfarmer.org/peopleplant.html. 5 p. Community Information and Education, BC Housing Management Commission**
Supplier: City Farmer, Canada's Office of Urban Agriculture
city ecology services
inner city gardening; housing; Canada; British Columbia

Describes the British Columbia Housing's People, Plants and Homes Program, which promotes gardening in its residential complexes. (NB)

Bellows, Anne C **(1999). Urban food, health, and the environment: the case of Upper Silesia, Poland. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 131-135. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
health and environment food security and nutrition city ecology
Poland; health; ecology; access to food; crisis response; organic agriculture; education

Allotment gardening is typically conducted by women, retirees, and other reserve labour. This local production has provided a measure of shelter from the vagaries of inefficient production and food distribution (typical of centralized socialist states) and from inaccessibly high food prices, compounded by unemployment (typical of market systems). However, the yields and safety of local food labour can be reduced in severely polluted regions. The case study from Gliwice, in Upper Silesia, southwest Poland, discusses (1) organizing an acquisition, labeling, and distribution system for retailing chemically tested organic products, linking farmers to consumers; (2) distributing chemically tested produce directly to schools and hospitals and creating subsidies for their purchase; and (3) educating community groups about food contamination and the benefits of organic and farming. (Abstract adapted from original)

Brook, Robert M.; Dávila, Julio (eds) **(2000) The periurban interface: a tale of two cities. 251 + vii p. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK; Development Planning Unit, University College London, UK London: DFID**

city ecology land use planning waste recycling
natural resources; periurban agriculture; GIS; Ghana;; India

A publication written in the framework of research conducted by the Natural Resource Systems Programme of the UK Department for International Development (DFID) on natural resources in the 'periurban interface'. It describes research conducted in two city-regions: Kumasi, Ghana, and Hubli-Dharwad, India. An exhaustive comparison is made between the national development of India and Ghana and between the two cities, in terms of spatial, human and economic development, but also with regard to the institutional framework under which the periurban interface has developed in recent years and to the decision-making processes that are likely to shape the future of the interface. The resources base of the two cities is examined considering cropping and livestock systems, and soil, water and waste management, and how the urbanisation process has affected these. Also, there is a chapter on comparing livelihood strategies of poor families in the two cities. Geographical Information Systems (GIS) play an important role in the research conducted by the NRS Programme and receive much attention in this publication. The strength of this tool for planning and analysis in a rapidly changing environment is clearly demonstrated, notably for the case of Kumasi. (WB)

Brouwers, Joost; Harms, Eric; Juffermans, Jan; Koetsenruijter, Willem; Perebooms, Harrie **(1998). De duurzame stad.131 p. ISBN 90_75365_11_X. De Kleine Aarde**

city ecology land use planning
urban transport; wastewater; waste recycling; sustainable building; renewable energy; green management

In 50 cases from Holland and elsewhere in Europe sustainability in urban development is discussed. Themes included are spatial use, traffic, water, climate policies, waste, sustainable building, use of solar energy and green space

management. In the last chapters exemplary municipalities and promising developments are presented. (NB)

Carter, Jane E **(1995). The potential of urban forestry in developing countries: a concept paper. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

urban forestry city ecology

environmental aspects

The paper first defines urban forestry and next the changing role of trees in Third World cities is discussed, with reference to growing environmental concerns. The third section elaborates various locations in which trees may be cultivated after which the benefits and problems associated with urban forestry are discussed. Further key issues like socio-cultural aspects are highlighted in section five. Tree management and tree establishment issues are discussed in section 6 and institutional aspects are reviewed in section seven. The last section deals with topics requiring further investigation and information gaps in developing countries. (NB)

Centre de Documentation Tiers Monde de Paris (CDTM) **(1996). Au sud: des villes en marche. Les dossiers de presse du CDTM Thèmes & Pays no. 65 (November 1996). 88 p. 50.00 FF**

city ecology

case studies; urban livelihoods

Presents a number of background articles and case studies inspired by the Habitat II conference in Istanbul. In spite of all the misery in slums the various authors also see chances arise through ever increasing community development initiatives. (WB)

Chagnot, Isabelle **(1998). Agriculture périurbaine et paysage. Paris, France: Institut d'Aménagement et d'Urbanisme de la Région d'Ile-de-France (IAURIF), 1998. 26 p.**

city ecology

France; Paris; periurban agriculture; landscape

This short document, prepared by the principal public research institute specialized in the planning of Greater Paris, focuses on the landscape aspects of the periurban agricultural spaces of this region. It suggests proposals for “landscape management through agriculture.” (JN)

Chaplowe, Scott G **(1997). Sustainable prospects in urban agriculture. In: For all generations: making world agriculture more sustainable / J. Patrick Madden and Scott G. Chaplowe (eds), p. 70-100. World Sustainable Agriculture Association (WSAA), California Chapter, 8554 Melrose Ave., West Hollywood, California, 90069 USA**

city ecology community development
community initiatives; case studies

A chapter from this important publication treating urban agriculture. It conveniently groups together the various aspects of urban agriculture henceforth well known and well described. There are many boxes with examples of successful community initiatives. (WB)

Cleveland, David A **(1997). Are urban gardens an efficient use of resources? Arid Lands Newsletter no. 42 (fall/winter 1997). 4 p.**
economic impact city ecology
gardening; arid zones; resource management; water efficiency

Explores the functions and importance of gardens. There is an information gap with regard to productivity of gardens. This paper tries to fill some of the gaps based on monitoring the results of gardens in Tucson. Furthermore, the paper discusses ways to improve water efficiency in gardens. (NB)

Davidson, Joan **(1988). Building more resourceful cities: community-based initiatives in energy saving, recycling and greening. In: Cities and ecology / MAB Program. - Collected reports vol. 2 p. 172-175. Division of Ecological Sciences, UNESCO, 7 Place de Fontenoy, 75700 Paris, France**
community development R&D methodology city ecology
resource conservation; environmental management; United Kingdom

Concentrates on community involvement in urban environmental management in the UK and examines various aspects of environmental management namely energy conservation, waste recycling and greening the city. (WB)

Deelstra, Tjeerd et al **(1989). The resourceful city: management approaches to efficient cities fit to live in. Royal Netherlands Academy of Arts & Sciences, Den Hague 63 p.**
city ecology
urbanisation; ecology; UNESCO; biosphere; health

This is essentially a conference report written by six experts. It defines the problems faced by the need for a sustainable and livable city in the 21st century. (JS)

Deelstra, Tjeerd; Nijwening, Stefan **(1997). Environmental sustainability of cities: management issues and experiences in developing countries. 65 p. International Institute for the Urban Environment, Nickersteeg 5, 2611 EK, Delft, Netherlands; SNV Netherlands Development Organisation, Bezuidenhoutseweg 161, 2594 AG, Den Haag, Netherlands**
city ecology

environmental management; urban development

Purpose of this paper is to give an overview of the many and diverse environmental and human issues related to urban development. At the beginning, the authors give some indicators about present-day urbanisation. Cities are usually seen as a potential threat to the environment due to their unsustainability. Still, they are also places that hold great promise for becoming more sustainable. Examples of ecological footprints of different cities are presented. The paper looks at all issues affecting one city, from land use and tenure rights to waste disposal, transport, street lighting and pollution. A chapter is dedicated to institutional constraints being one of the most important impediments for sustainable city development. Different approaches, strategies and methods for urban development are given, most of them supported with real life examples from different countries. The paper ends with a list of proposed further reading and useful addresses. (WB)

Deelstra, Tjeerd; Girardet, Herbert **(2000). Urban agriculture and sustainable cities. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 43-65. DSE, GTZ, CTA, SIDA**

city ecology

sustainable development; urban planning; urban policies; ecological footprint; microclimate; soil conservation; waste recycling; nutrient cycling; water management; biodiversity

The article explores the possibilities to create a sustainable world and city from an ecological perspective. It is argued that today urban dwellers don't really live in a civilisation but in a mobilisation (of natural resources people and products). The challenge is to create loops and closes cycles. The contribution potential and constraints of urban agriculture to this are discussed. (NB)

Departamento del Distrito Federal **(19??) Documentos sobre la problemática agraria en el Distrito Federal. Mexico City, Mexico: Comision Coordinadora Para el Desarrollo Agropecuario del Distrito Federal. 153 p.**

city ecology

Mexico; agricultural policies; communal land; open space planning; access to land

This document, published by the Federal District's commission for agricultural development, combines three separate reports. The first and especially the third report deal with the *ejido* (communal land holdings) and their impact on land access by urban farmers of Mexico City. The second report focuses on the plan for the Ajusco region, which has been set by the national government as a major natural reserve to the south of the city. (JN)

Departamento del Distrito Federal **(1992). Rescate Ecológico de Xochimilco. Mexico: City of Mexico, DDF. 57 p.**

city ecology

Mexico; Chinampas; ecology; restoration

This document reviews the plan, approved in November 1989 by the Mexican president, for the “ecological rescue” of Xochimilco, the exceptional aqua-terra cultivation district in southern Mexico City. The plan considers ecological, hydrological, infrastructural, archeological, agricultural and other dimensions. (JN)

Dimanlig, Horacio C **(et al.) (1979). Urban agriculture: an approach to landscaping for marginal settlements. 36 p. United Nations Environment Programme (UNEP) , National Housing Authority (NHA)**

land use planning city ecology

Philippines; settlement areas; urban planning; urban landscaping; urban vegetation; planting materials

A landscaping manual dealing with physical aspects of the housing landscape in the Philippine setting and with applying urban agriculture or, more generally, introducing vegetation into the urban environment, 'the soft landscape'. There is a detailed descriptive list of suitable plant materials for this purpose. (WB)

Donadieu, Pierre **(1998). Campagnes urbaines. École Nationale Supérieure Du Paysage. Arles: France, Actes Sud. 219 p.**

land use planning city ecology

France; periurban agriculture; landscape; leisure; neighbours; multifunctionality; urban planning

This book on “urban countryside” addresses the central question: rather than to seek to no avail to control the growth of the city through webs of belts, barriers and green spaces, why not construct the urban fabric *with* agricultural and forested spaces? It therefore proposes that periurban agriculture could be considered by metropolitan planners as a planning tool that is capable of organizing sustainably the territory of cities. Widely illustrated with color photos and examples from across France, the book (by the co-director of the Urban Agriculture Program at the *Ecole Nationale Supérieure du Paysage* in Versailles) is exemplary of contemporary French literature on urban agriculture, particularly appropriate more developed countries. (adapted from original by JN)

Easton, Charlene **(1993) Local Initiatives: ICLEI members in action, 1991-1992. ICLEI, Toronto; 38 case studies. On: www.ICLEI.org.**

community development city ecology

forestry; wastes; ecology; sustainable development; environmental health; land use management; natural resource conservation

This report is 38 case studies of cities coping with environmental issues. It is the first in a series. Substantial data, how to and who information is included. (JS)

Ellis, Frank; Sumberg, James **(1998). Food production, urban areas and policy responses. In: World Development vol. 26 (1998) no. 2 p. 213-225**
rural-urban linkages food security and nutrition city ecology
Africa; rural-urban linkages; food policy

A literature review focusing especially on food production in and around sub-Saharan cities and towns. The authors emphasise the importance of rural-urban interactions in resource management and output markets. At the same time, they warn against too high expectations about the role of urban agriculture for food security of urban dwellers. (WB)

Esrey, Steve and Andersson, I. **(2001) Ecological Sanitation - Closing the Loop. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment waste recycling city ecology
sanitation

Today, half of humanity does not have access to any type of sanitation. This is a fundamental denial of human dignity and threatens human well-being. The rest of humanity relies on conventional approaches to sanitation, which fall into one of two categories: waterborne systems and pit latrines. Both “flush and discharge” and “drop and store” technologies were built on the premise that the nutrients we excrete have little value, and the waste is suitable only for disposal. Consequently, the environment is polluted, nutrients are lost, and a wide array of health problems result. The authors argue that a different approach is needed to both sanitation and agriculture. The approaches are non-polluting, rely on biological processes, recycle nutrients, and can be safe and effective in promoting health and nutritional well-being. Ecological sanitation is given here as a representation of that shift in the way people think about and act upon human excreta.

European Foundation for the Improvement of Living and Working Conditions **(1993). Innovations for the improvement of the urban environment: a European overview. 556 p. ISBN 92_826_6302_7. ECU 56.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland**
Supplier: Office for Official Publications of the European Communities, 1993
R&D methodology city ecology
development projects; case studies; sustainable development; networking

Provides an overview of some 90 urban innovative projects aiming at increased sustainability. The report examines cases from the 12 member states (in 1993) and in an additional band also gives cases from Austria, Sweden and Finland, countries that joined the European Union in 1995. Projects are listed per country. There is a wide range of themes, unfortunately not grouped together in a subject index. The report is concluded with a list of resource persons. (WB)

Fleury, André; Gonthier, Michel; Hamel, Jean-Maurice **(1998). Actes de la rencontre franco-québécoise: points de vue sur l'agriculture périurbaine contemporaine. Quebec: n.p., 1998. 36 p.**

land use planning city ecology

France; Quebec; periurban agriculture; farmland preservation; regional planning; landscape

This is a conference report on a meeting in October 1998 between planners, professors and students from France and the Quebec region of Canada, part of an ongoing cooperation between French and Quebecois universities on this topic. Participating students from one country all undertook internships in the other country and report on them here. It focuses on issues that regard the periurban areas surrounding cities, and how these parts of metropolitan areas can be planned for. It includes issues of land management, agrotourism, and multifunctional agriculture. (JN)

Foeken, Dick; Mwangi, Alice Mboganie **(1998). Farming in the city of Nairobi. ASC Working Paper no. 30/1998. 49 p. African Studies Centre, PO Box 9555, 2500 RB Leiden, The Netherlands**

city ecology land use planning

food security; nutrition; food policy; land use systems; health; economic impact; land tenure; urban policies; reuse of waste; poverty; Kenya; land use policies; agricultural production; land use policies; urban livestock; wastewater reuse

Urban farming can be seen everywhere in Nairobi, especially in informal densely populated residential areas, which do not exist on official maps. Three types of urban farming are distinguished: farming in backyards, farming in open spaces and farming in former rural areas surrounded by city expansion. The second type of farming is usually practised by the urban poor and there is ample open space in the city boundaries. A description is provided on the scale of urban farming, the urban farmers and the farming practises. Next the importance of urban farming and the constraints urban farmers face are presented. Lastly the prospects of urban farming are discussed, which include environmental and policy aspects and development efforts. To further develop urban farming the first step to be taken by the Nairobi authorities is to admit that the slum dwellers are a fact of life in the city, that policies directed at improving the living situation of the poor are needed and that urban agriculture should be part of such policies.

Forster, Tobias Edmund **(1999). The role of the living landscape as an element of sustainability in Asian cities during the 21st century. Urban Agriculture Notes http://www.cityfarmer.org/Asiancities.html. 8 p. Able Charity, Team 73 Hong Kong, Hong Kong, SAR, China**
Supplier: City Farmer, Canada's Office of Urban Agriculture

city ecology

urban planning; Asia; environment; urban forestry; landscape

Provides an understanding of sustainable city development by outlining the concepts of urban agriculture and urban forestry listing the benefits and describing examples. Subsequently, the framework of an Asian city as a living ecosystem is illustrated. The paper describes how the concept of the living landscape can be integrated with the theories and practices of sustainability to produce living cities. (NB)

Frick, Francis **(1999). A seaside arcology for Southern China. Urban Agriculture Notes http://www.cityfarmer.org/frick.html. 12 p.**
Department of Architecture, University of Hong Kong
Supplier: City Farmer, Canada's Office of Urban Agriculture
city ecology
urban planning; architecture; ecology; urban design; environment; wastewater; bioremediation; renewable hydrogen systems; China; Hong Kong

Architectural ecology, or arcology, is a way to physical design intervention associated with a temporary, localised decrease in entropy within a defined context. The paper highlights its role in urban agriculture and waste water bioremediation. Rapidly emerging problems in China's southern coastal urban areas already provide a need and a context to realise the arcology "seed" design as described. Arcology's significance will probably increase as ecological/resource problems intensify. Hong Kong is presented as a positive "green" influence for green technology and advanced design services implied by arcology. (NB) (Abstract adapted from original)

Garnett, Tara **(1996). Growing food in cities: a report to highlight and promote the benefits of urban agriculture in the UK. 90 p. ISBN 1_900_670_56_9. National Food Alliance / SAFE Alliance, 5-11 Worship street, London EC1A 2BH, UK**
food security and nutrition city ecology
community development; economic development; vegetable production; horticulture; United Kingdom;

In the UK, many poor urban neighbourhoods have become food retailing deserts, where access to good food shops and markets is rare. Parts of the countryside too are becoming desertified economically with farming employing just over 2% of the population. The author pleads for people to reconnect to the land and their culture by growing food, following a long tradition of allotment gardening in the UK, and also with the 'Dig for Victory' campaign during the 2nd World War in mind. This report presents and analyses a wide variety of case studies classified by aspect: community development, economic development, education, environment, health, leisure, and sustainable neighbourhoods. There is a useful resource section with addresses in the UK. A number of recommendations are formulated with regard to policy integration; funding, support and promotion; and land and water. (WB)

Garnett, Tara **(1996). Farming the city: the potential of urban agriculture. In: The Ecologist vol. 26 no. 6 p. 299-307**

city ecology horticulture
home gardening; allotment gardens; political aspects; United Kingdom

Describes urban agriculture in Great Britain, primarily allotment gardens, of which there are around half a million in Britain nowadays. In spite of the fact they are thriving, with long waiting lists, allotment gardens are under heavy threat from urban development schemes. There is a highly interesting description of the rise of the allotment movement in Britain, as a result of political considerations. (WB)

Gbadegesin, Adeniyi **(1991). Farming in the urban environment of a developing nation: a case study from Ibadan metropolis in Nigeria. In: The Environmentalist vol. 11 no. 2 (1991) p. 105-111**
horticulture city ecology
Nigeria; Ibadan; surveys; food security; urban poor

Reports on a survey among 800 part-time or full-time farmers in the urban fringe of Ibadan. Results showed well-known considerations such as reducing people's expenses on food and supplementing the family's income. Major threat was reported to be competition from non-agricultural land uses. The article describes characteristics of the urban farming system in Ibadan, in which the proportion of crops grown for staple is high. Interestingly, roughly half of all those who had been approached to sell their land, had turned down this offer (though the article does not give information about prices offered). (WB)

Garnett, Tara **(2000). Urban agriculture in London: rethinking our food economy. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 477-500. DSE, GTZ, CTA, SIDA**
services food security and nutrition city ecology
food policy; nutrition; community development; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; food systems; United Kingdom; food deserts; education

Starting with the ecological footprint of London the London foot system is analysed. Increasing alienation of Londoners from agriculture and the emergence of food deserts are raised as issues. Despite a small contribution in quantities produced a wide range of farming activities occur in London (allotment gardens, private gardens, county farms, parks etc). From this perspective the potential and actual contribution of urban agriculture towards health, the environment, household economies, education and training and community development are discussed. Factors affecting urban agriculture and the perspectives for urban agriculture are presented in which it is argued that sustainable food growing is a metaphor for social change, catalysing new ways of thinking about our society, our economic system and our environment. It is argued that there are plenty of opportunities in the multiple and flexible forms of urban agriculture. (NB)

Gertel, Jörg; Samir, Said **(2000). Cairo: urban agriculture and visions for a 'modern' city. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 209-234. DSE, GTZ, CTA, SIDA**

city ecology Urban livestock land use planning

urban livestock; food security; food policy; asset strategy; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Egypt

Forms of urban agriculture in Cairo are related to its extremely high population pressure and the government policy, especially with regards to food subsidies. Green open space is scarce. Small-scale animal husbandry, such as chicken raising, is interesting as it provides for expensive proteins and can be practised in confined areas. In certain cases organic waste is used as cheap fodder to feed the animals. Most people engaging in urban agriculture are poor and production is mainly for subsistence purposes. A second element is that animals are important assets. The image of food produced in Cairo is not very positive and there are indications of health risks associated with urban farming. Scientist and authorities consider urban agriculture an oxymoron as they associate urban with modern and agriculture with rural and backward. It is believed that urban farming tarnishes the image of Cairo with negative implications for the modernisation of Cairo. Nevertheless to a section of the urban poor small-scale animal husbandry is of critical importance and is an important strategy to cope with food security in Cairo. (NB)

Giles, José **(1997). Agriculture in green belts of urban centers. In: Agriculture + Rural Development no. 2/97 p. 58-60**

city ecology

food security; crisis response; green belts; periurban agriculture; urban planning; Mozambique

Makes a case for developing green belts around urban centres in order to enhance food security, especially in times of crisis. However, this is not enough as appropriate modern technologies need to be used to improve efficiency. Examples are discussed from Mozambique, Peru and China. It is argued that careful planning on green belt production now can avoid disasters later. (NB)

Girardet, Herbert **(1992). The Gaia atlas of cities: new directions for sustainable urban living. ISBN 1 85675 065 5**
Supplier: Gaia Books Limited, 66 Charlotte Street, London W1P 1LR, United Kingdom

city ecology

ecology; sustainable development; urban history; rural-urban linkages; food systems; land use systems; waste recycling; health; urban planning; poverty

The book is a source book of innovative ideas and strategies for making cities ecologically sustainable aiming to generate discussion of new ways of living and contains over 80 small case studies. The book starts if with an analysis of urban ecology and discusses the concept of urban metabolism. The discussion is put into a

historic context of developments. The second part of the book argues what has gone wrong in urban development and presents a diagnosis on many aspects of the diseased city. Ways of how to heal the city towards a more sustainable place to live are presented in the third part and new directions for sustainable urban living are summarised. (NB)

Girardet, Herbert **(1999). Growing food in cities: assessing the potential of a long-standing tradition. In: Gate: Technology and Development no. 2 (April-June 1999) p. 4-9**
city ecology land use planning
economic aspects; natural resource management; recycling

Looks at some of the origins of urban agriculture and examines its present potential with examples from past and present. Urban agriculture has a long history as an important source of food for the masses. The article asserts the importance of creating a circular urban metabolism. (NB)

Gordon, David **(ed.) (1990). Green cities: ecologically sound approaches to urban space. Montreal and New York: Black Rose Books, 1990. 299 p.**
city ecology
ecology; land use; environmental problems; selfreliance; resources

With visions of an ecological urban model, with some green technologies now in place that could implement this model, and with an emerging view of a social organization supportive localized “green” decisions, this work suggests that the green city is a real and emerging prospect. In the first part, six leading thinkers seek to define what a green city is. The second part presents a series of articles that analyze how cities can be “naturalized”. The papers in the final part then describe how this change can be effected and obstacles overcome. While many of the articles here deal with cities more broadly, several are explicitly on urban agriculture. (adapted from original by JN)

Graham, Elizabeth **(1999). Farming the built environment. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 150-154. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
city ecology
architecture; food production; urban planning; soil fertility

New interest is being generated in cities as sites for food production. In this context, people are focusing on what the soils in and around urban centres can produce. The fertility of urban soils and their relationship to the built environment must be viewed

as a dynamic regime in which building breakdown, drainage patterns, burials, industrial debris, garbage dumping, and human and animal waste disposal are acknowledged and analysed. This article introduces the idea that urban decay and the destructive processes of cities can be harnessed productively. An argument is made that archaeology can play a role in planning for sustainable cities as it can provide guidelines for highly effective recycling, not only of organic waste, but also of the built environment itself. (Abstract adapted from original)

Hamm, Bernd; Muttagi, Pandurang K **(eds) 1998. Sustainable development and the future of cities. 290 p. ISBN 1_85339_452_1. GBP 14.95**
Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK
city ecology
urban development; environmental degradation; pollution; urban environment

Based on the outcomes of four International Summer Seminars on Sustainable Development and the Future of Cities held between 1991 and 1994 at the Bauhaus Dessau, Germany, this collection of papers examines urban sustainability. An increasingly urban world can also be a world in where the ideas of sustainable development are put into practice. The issue is how to turn these centres of major pollution into ecologically, economically and socially sustainable environments. The underlying book looks primarily at social issues as central to understanding how sustainability can be achieved in cities. In the first part, a conceptual framework for assessment is provided. Part two presents case studies having a regional perspective, in Southeast Asia, North America and Eastern Europe. Part three descends to the local level with cases analysed from Iran, Poland, Canada and Finland. A number of methodologies is described here, such as Environmental Impact Assessment, Life Cycle Assessment, Eco-logistics and Material Flux Analysis. Of interest to urban planners, but also to a scientific audience interested in the Agenda 21 debates and not shied off by the rather strenuous access of the material, otherwise very relevant (WB)

Harahi, Gamez Rodriguez **(1999). Agriculture in the Metropolitan Park of Havana, Cuba. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 84-89. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
city ecology land use planning
integrated urban development; ecology; deforestation; waste management; Havana; social impacts

This paper outlines the fundamental mission, objectives, goals, and strategic planning of the Metropolitan Park of Havana (PMH, an urban, social, and ecological project being developed around the final 7 km of the Almendares River, the most

important river of the Cuban capital. The PMH is committed to integrating development, environmental recovery, education, and participation. The PMH will retain a dense urban network of industries, military entities, and population centres that today occupy the territory. As an ecological park, the PMH will provide a solution to the problems of deforestation in the zone, the uncontrolled social and industrial waste, and the general lack of care for the region that threatens the area's flora and fauna and the River itself. As a social project, the PMH will provide a space for a population of nearly 9 000 inhabitants, who will be an integral part of the development planning of the park. (NB) (Abstract adapted from original)

Hardoy, Jorge E; Mitlin, Diana; Satterthwaite, David **(1992). Environmental problems in Third World cities. London: Earthscan Publications, 1992. 302 p.**
city ecology
environmental problems; ecology; health problems; sustainable development; urban impacts; political context; pollution

This authoritative book describes the environmental problems of cities in the Third World and how they affect human health, local ecosystems and global cycles. It analyzes the causes of the problems and reveals their political roots. A number of the issues are of direct relevance to urban agriculture: from water pollution and hazardous wastes, to an in-depth discussion of sustainability. The authors show that practical solutions to many of the problems can be found. (adapted from original by JN)

Helka-Liisa, Hentilä **(et al.) (1996). Innovations for the improvement of the urban environment: Austria - Finland – Sweden. 340 p. ISBN 92_827_9014_2. ECU 36,50. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland**
Supplier: Office for Official Publications of the European Communities
R&D methodology city ecology
development projects; case studies; sustainable development; networking

Provides an overview of some 90 urban innovative projects aiming at increased sustainability. The report examines cases from the 12 member states (in 1993) and in an additional band also gives cases from Austria, Sweden and Finland, countries that joined the European Union in 1995. Projects are listed per country. There is a wide range of themes, unfortunately not grouped together in a subject index. The report is concluded with a list of resource persons. (WB)

Hietkamp, Fern **(1995). Opportunities and constraints for urban agriculture in Bandung, Indonesia. AURN working paper no. 7. 36 p. Asian Urban Research Network (AURN), Centre for Human Settlements, School of Community and Regional Planning, The University of British Colombia, Vancouver, Canada**
land use planning city ecology economic impact
Bandung; Indonesia; urban planning; land resources; resource management

Focuses on the competition for space between urban agriculture and other activities in Bandung, Indonesia. When the author states that with the current rate of development, much of the land now used for food production within the urban area will disappear in the next 15-20 years, we must realise that this statement was made before the economic crisis hit Indonesia. The author's suggestion that city administrators should include urban farming more systematically in urban planning remains as valid as before, however. (WB)

Hough, Michael **(1995). Cities and natural process. Routledge, London, 326 p.**

city ecology

environment; energy; urban design; landscape; planning; climate; policy; urban nature

This book is a discussion of the basic conflict of the perception of nature and the practice of urban design. It suggests a framework for integrating the precepts of city and countryside. Chapter five is on City Farming.

Instituto de Desarollo Urbano Ciudad **(1994). Proyecto 'Programa Integral de Medio Ambiente y Salud', comunidad urbana autogestionaria de Huaycan, 1996-1998. Instituto de Desarollo Urbano Ciudad, Lima, Peru**

city ecology

Peru; urban planning; development projects

Project proposals for integrated urban development in Huaycan to be supported by SNV (Netherlands development assistance organisation). The proposals include the establishment of adequate planning and management mechanisms, the introduction of urban agriculture, the improvement of access to sanitary services and the establishment of urban management methods. (NB)

International Institute for the Urban Environment (IIUE) **1996. Sustainable urban development in the Third World: proceedings of a seminar held in Utrecht, September 12, 1996. 27 p. International Institute for the Urban Environment (IIUE), Nickersteeg 5, 2611 EK Delft, Netherlands; Nijmegen Urban Health Group (NUHG), Nijmegen, Netherlands; WASTE Advisers on Urban Environment and Development, Gouda, Netherlands**

city ecology waste recycling

urban development; Habitat 2; sustainability indicators; integrated waste management

In the wake of the Habitat II Conference in Istanbul, this seminar dealt with urban livelihood issues in developing countries. A good diagnostic approach to urban development is no easy undertaking in the light of its multidisciplinary character. During the seminar were addressed: indicators for urban sustainability, the integrated relationship between health, environment, culture and political development, and the role of different actors in integrated waste management. (WB)

Kaldjian, Paul **(1997). Istanbul: opportunities in urban agriculture. In: Arid Lands Newsletter no. 42 (fall/winter 1997). 10 p.**
city ecology food security and nutrition
food systems; Istanbul; Turkey; food production; resource management; food security

Provides an overview of the Istanbul food system resource use and agricultural production. The paper makes an attempt to identify the potential role of urban agriculture within the urban food system with regard to resource use, land tenure, social relations and political ecology. (NB)

Katzir, Raanan**. Agroecological aspects of the periurban process. Urban agriculture notes: http://www.cityfarm.org/israel.html - israel**
city ecology rural-urban linkages
periurban agriculture; agroecology

Looks at the consequences of urbanisation from an agroecological point of view, covering aspects like water, soil, city waste, and industrial residues. In addition, the paper looks at implications of periurban farming, such as production of special crops, exporting, agrotourism and handicraft work. (WB)

Kuchelmeister, Guido **(1989). Hedges for Resource-Poor Land Users in Developing Countries. Eschborn, Germany: GTZ. 256 p.**
urban forestry city ecology
hedges; resources; crop selection; crop management

This is a thorough evaluation (including technical assessment) of the use of hedges in developing coutnries. While not specifically focused on urban areas, the document emphasizes the use of hedges where land availability is constrained. (JN)

Lebre La Rovere, Emilio **(1985). Food and energy in Rio de Janeiro: provisioning the poor. UNU Paris. 59 p.**
city ecology food security and nutrition
market gardens; marketing; farmers' associations; smallholder food production

This report looks at experiments in a large city in the face of energy and food shortages. It detail the cooperation of an electrical utility and small-scale periurban farmers and the formation of a marketing cooperative by small-scale urban farmers. (JS)

Lee, M**. Farming logic in Kampala**
city ecology

Uganda; farming

Based on an interview with Daniel Maxwell the article describes the situation with regard to urban farming in Kampala, where a 30% of the residents engages in urban agriculture. The four main logics for farming: food self sufficiency, commercial production, food security and survival. (NB)

Lee-Smith, Diana; Lamba, Davinder **(1998) Good governance and urban development in Nairobi. 40 p.. Mazingira Institute, Nairobi, Kenya**
city ecology

This booklet, which is a study for the background report of the World Report on the Urban Future 21, gives a good historical overview and description of the development of Nairobi and its governance. It puts the situation of agriculture in its wider context of urban planning and policy making, forcing urban agriculturists to look at the institutional structure and governance of the city and perhaps understand the problems planners might face. In a comprehensive way, it shows that food security of the poorest is increasingly threatened by urban development, but that the poor might also be under threat by the encouragement of urban agriculture by city planners. (RvV)

Losada, Hermenegildo **(et al.). Urban agriculture and livestock in the City of Mexico: an option for a sustainable future. Urban Agriculture Notes http://www.cityfarmer.org/mexico.html. Animal Production Systems Area, Department of Biology of Reproduction, Division of Biological and Health Sciences, Universidad Autónoma Metropolitana, Iztapalapa, Mexico Supplier: City Farmer, Canada's Office of Urban Agriculture**
urban livestock city ecology
Mexico; livestock; crop production; reuse of waste; environment; family production

Presents research findings on urban agriculture of a team of the Autonomous Metropolitan University at Iztapalapa in Mexico. Three forms are distinguished and within these forms, animal production and arable production are discussed as well as the different perceptions of producers and authorities towards the phenomenon of urban agricultural production. Characteristics common to all three types are the use of recycled materials and the involvement of all family members in the activities. (NB)

Lugo, Ariel E **(1991). Cities in the sustainable development of tropical landscapes. In: Nature and Resources vol. 27 no. 2 (1991) p. 27-35**
city ecology
ecosystems analysis; modelling; sustainable development; overexploitation

Describes the processes involved in sustainable development, provides a socio-economic perspective, and discusses ecological engineering and economics. It also suggests ten steps to lead to better accommodation of cities in tropical landscapes.

A publication with a strong focus on modelling of ecosystems. (WB - from original abstract)

Mapatano, S. **(2002) Urban Agriculture in Kivu: How Roots Help Population With Low Income in African Great Lakes Cities . 26 th International Horticultural Conference, Toronto, August 11-17, 2002.**

city ecology

Africa (Central);Congo, DCR (Zaire); urban agriculture

Built in 1900, the town of Bukavu is located in the province of South Kivu, in the East of Democratic Republic of Congo. At the start, it counted about 10,000 inhabitants. For the moment, its population is estimated to be more or less 600,000 inhabitants. From the 1980ís, former open spaces, outlying areas and lower lands of the town started being exploited to fill in the food deficit in families and palliate the lack of salary payment and the fall of the purchasing power. The advent of the two successive wars in DRC since 1996, left insecurity pockets in rural areas which used to provide food to urban ones : more than 80 per cent of households with low income get part of their food from agricultural activities in town and in its periphery and more than 75 per cent of the crops sowed are races (roots) and tubers, essentially cassava and sweet potatoes, completed by seasonal sowing of beans. For all these crops, leaves and roots are highly consumed. Women are particularly active in that sector (more than 86 per cent) Unfortunately, farming practices are likely to favour the degradation of the urban environment if no urgent measure is foreseen. That is why thanks to close collaboration with the WFP office in Bukavu, we have undertaken a number of activities which aim at helping cultivators increase their productive capacity (of those crops) on small spaces. The feebleness of spaces available to each household and the high number of family dependants (average of 9 persons per family) justifies the preference given to races (roots) and tubers, of which tuber leaves harvest is often spread over a long period in a year.

Today, our efforts aim at :

- facilitating partnership relation between farmers and other social actors ;

- enlightening farmers on the decisions of the administrative authority in terms of protection of the environment and the management of waste ;

- Popularising farming techniques in a participative approach ;

- Valorising plants with multiple properties in urban gardens ;

- Developing a network gathering actors of the Eastern Congo towns as well as those in similar context in the neighbouring countries (Rwanda and Uganda).

Mbaye, Alain **(et al.) (1999). Some more urban agriculture case studies: Dakar, Cairo, Zambia and Cagayan de Oro. In: Gate: Technology and Development no. 2 (April-June 1999) p. 40-47**

food security and nutrition economic impact city ecology

food security; ecology; economic impact; nutrition; land use planning; political aspects

Discusses case studies on urban agriculture in Dakar, Cairo, Lusaka, and Cagayan

de Oro (Philippines). An overview is presented including what are the main agricultural activities, who is involved, what are the environmental and economic impacts and policy implications. Extended versions of the case studies can be found in 'Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda' published by DSE-ZEL. (NB)

Munkstrup, Nina; Lindberg, Jakob **(1996). Urban ecology guide. 144 p. ISBN 87-87487-993 Danish Town Planning Institute, Copenhagen, Denmark**
city ecology community development
Denmark; development projects; urban planning

45 examples of projects in the greater Copenhagen district are presented in this guide together with different descriptions of urban ecology relations in the city. Very useful information can be found on the projects (ideas, purpose, time frame) as well as contacts for anybody inspired to work on a similar type of project. Projects vary from new residential developments, urban renewal and renovation to nature in the city and green centres. All of projects have in common the aim towards promoting and ensuring sustainable development. The report contains many photos from different project sites and maps of the locations. A very useful guide that can stimulate new ideas. (WB)

Muster, Gisa **(1998). Environmental problems of urban agriculture: a case study of Dar es Salaam, Tanzania. 58 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
Supplier: Ministry of Agriculture and Co-operatives (MoA&C) and Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ).
city ecology horticulture R&D methodology
Tanzania; open space management; off-plot cultivation; vegetable production

Shows the interaction between the urban environment of Dar es Salaam and agricultural production in open spaces, examining environmental effects in particular. In addition, the role played by urban agriculture in the city's economy is examined. A methodology is presented to estimate the environmental impact of vegetable production on the city's environment. (WB)

Nasr, Joe; Kaldjian, Paul **(1997). Agriculture in Middle Eastern cities: commonalities and contrasts. Arid Lands Newsletter no. 42 (fall/winter 1997), also on http://ag.arizona.edu/OALS/ALN/aln42/nasr.html. 10 p.**
city ecology
Middle East

Urban agriculture in the Middle East has received relatively little attention thus far. Yet, the long history of urbanisation in Islamic countries has exerted a strong influence on the development of agriculture in cities, also in the light of the fragility of agricultural lands in this region with its arid or semi-arid climate. The underlying

paper sums up a number of particularities of urban agriculture in this region while identifying existing differences between countries in the region. (WB)

Nasr, Joe. and Smit, Jac. **(2000) Urban Agriculture and Urban Patterns: Implications for Sustainability. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom)**

land use planning city ecology
urban patterns; architecture; history

Urban agriculture has emerged as an activity over the course of the past decade, gaining recognition as a contribution to the sustainability of urban settlements on multiple grounds: health improvement, community-building, environmental enhancement, etc. The presence of this activity is now becoming visible in widely different settings: from devastated inner cities to the periurban fringe, from frigid Russian cities to towns that ring the Equator, from community gardens in the richest countries to cultivation on landfills of the poorest countries. This paper seek sto tackle the question: what are the impacts of the variety in such settings on the existence and type of urban agriculture? In other words, how do different urban patterns influence how and where urban residents farm? Different ways of classifying urban form are assessed for their consequences on potential and actual urban agricultural practices, and a typology of urban patterns is developed and cross-linked to types of urban agriculture.

National Institute of Urban Affairs **(2000) The role of urban and periurban agriculture in metropolitan city management in the developing countries: a case study of Delhi**

Research Study Series No. 74. Rs. 250; US$20. New Delhi: NIUA

city ecology land use planning
environment; management; Delhi; policy

This study developed from earlier collaboration under the British DFID project on policy implications of air pollution on urban and periurban areas in developing countries. Its main concern is the contribution of urban agriculture to the national capital area of Delhi in India. After a general discussion of urban agriculture, there is a review of the policy orientation and planning provisions of the Government of India that impinge on urban agricultural practices. The case study of Delhi is described as a 'cursory review.' It gives a considerable amount of information about Delhi from official sources, and the characteristics of the periurban area or rural-urban fringe. The study tries to understand the concept and characteristics of urban agriculture, it reviews the policies that might influence such developments, studies the importance given to urban agriculture in both city development and urban environmental management and estimates its potential role in sustainable urban development. Among the conclusions: urban agriculture is important but there is no clear responsibility for these varied activities in the capital area, and planning does not yet address the issue from the standpoint of the urban poor. (Abstract by Christine

Furedy)

Nederlandse Ontwikkelingsorganisatie (SNV) **(1998). Uitdagingen voor het stedelijk milieu. 38 p. Nederlandse Ontwikkelingsorganisatie (SNV), Bezuidenhoutseweg 161, 2594 AG The Hague, The Netherlands**

city ecology waste recycling

urban environment; urban planning; waste management

Contains papers presented during a series of study meetings organised by Dutch development organisations in 1997-98. Papers deal with the various aspects of urban environment, notably waste management, urban agriculture and the role of NGOs in urban planning. In Dutch. (WB)

Newcombe, K **(1977). Nutrient flow in a major urban settlement: Hong Kong In: Human Ecology vol.5 (19077)no. 3 p. 179-208. Human Ecology Group, Centre for Resource and Environmental Studies, Australian National University, Canberra, Australia**

city ecology waste recycling

Australia; ecosystems; China; Hong Kong; nutrient balance; nutrient cycling; nutrient transport; phosphorus; recycling; urban environment

The flow of minerals is examined including current and potential nutrient recycling patterns. The flow of mineral phosphorus in the Hong Kong food system is examined in detail. A comparison is made between the land based forage area demand of the population of Hong Kong and the similar population of Sydney, Australia. It is estimated that the average Hong Kong person has a diet which requires only half of the land area needed for a Sydney inhabitant. However, Hong Kong relies on the ocean for 25% of its protein intake whereas a Sydney inhabitant only for 2.5%. Patterns of food production and nutrient recycling are proposed, with the aim of optimising resource utilisation. (NB - adapted from original abstract)

Newland K **(1980). City limits: emerging constraints on urban growth. Worldwatch Paper 38. Washington, D.C.: Worldwatch Institute**

city ecology

urban growth; urban development; sustainable development

This paper examines the rising trend in urbanization and the phenomenon of the city that must import its food from distant sources. The author notes that three conditions distinguish the growth of cities today from those of the past. One is the expanded population base that forms the backdrop to urbanization, particularly in the Third World; the second is the unfolding of an era of severe resource constraint, as evident in the “skyrocketing” price of oil; and the third is the prevalence of capital-intensive technology, which has severed the link between increased production and expanded employment. The last explains the rise of informal sector employment in the cities. The author advocates building industrialization from the ground up by

investing first in agriculture, and concludes that if rural incomes achieve parity with urban ones, the element of economic coercion in rural-to-urban migration will be largely removed. (HC, IDRC)

Nitsch, Egbert; Aue, Christina **(199?). Bedeutung staedtischer Land- und Gartenwirtschaft in Einer Welt: Gaerten als Beitrag zur Welternaehrung und zur Oekologisierung der Staedte. 33 p.**

horticulture food security and nutrition city ecology
food security; urban poor; urban policies

Examines the role and position of urban agriculture in the light of food security for the urban poor. A number of policy measures are presented that are necessary to reach a wider impact. The authors argue that this role is not restricted to cities in developing countries but plays an important role in greening cities in industrialised countries as well. (WB)

Payne, Steven **(19??). Pursuing urban harmony. In: Simply Living p. 28-30**

city ecology community development
urban design; urban planning; ecological systems; community initiatives

Paints a picture of ecologically oriented urban planning schemes, and what community initiatives can achieve within the often strict boundaries of city administration. There is particular attention for the Village Homes housing development scheme near Davis, California, with its large communal areas and food producing greenbelts, as an example of successful, functional and holistic urban design. In addition, cases are described of community initiatives in Australia. (WB)

Pearce, Barry **(1995). Urban eco-auditing and local authorities in Europe. The sustainable city: a European tetralogy no. 1. 142 p. ISBN 92_827_4917_7. ECU 15.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland**
Supplier: Office for Official Publications of the European Communities, Luxemburg

city ecology R&D methodology
environmental impact assessment; environmental auditing; case studies; Europe; sustainable urban development; Sweden; Spain; United Kingdom

Environmental auditing, or eco-auditing, examines formal and rigorous procedures for reviewing and evaluating a municipality's environmental performance. 'Municipality', in this context, refers to either the local authority organisation or to the community on behalf of which it works. Apart from checking on environmental performance it also critically examines the information used to make the assessment. Environmental auditing is either internal or external looking. In the former, it examines and evaluates the authority's current policies, plans, practices and structures, and in the latter, it reviews and describes the state of the local

environment in the municipality's locality. This report looks at a number of initiatives of European local authorities with environmental auditing, following what has already been going on in the private sector. Three case studies are reviewed in particular: Sundsvall (Sweden), Igualada (Spain), and Kirklees (UK). Among tools presented here, we mention environmental balance sheets containing the accounts of stocks and flows of environmental resources. Links between urban eco-auditing and the economics of the sustainable city receive particular attention. The main issue here is the potential tension that exists between environmental protection and economic development. This report looks at attempts there have been to link or integrate environmental auditing with an economic analysis of policies, plans and projects. Specifically, the report looks at whether economic initiatives are being audited in terms of their environmental impacts and whether an economic appraisal of environmental initiatives is being included in the auditing process. The report concludes that environmental auditing requires much commitment across the municipality, in terms of human resources and finance made available. Some clues are given on how to reduce cost involved. Data collection and interpretation has revealed itself often to be difficult. There is a danger that too much emphasis is placed on procedures and structures for making decisions rather than on securing actual improvements to the environment. Environmental auditing may play an important role in strengthening self-control mechanisms for environmental protection and in creating more environmental awareness. (WB)

Pearce, Barry **(1995). Towards an economic evaluation of urban innovative projects: micro projects for mega change. 75 p. ISBN 92-828-1104-2. ECU 20.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland**
Supplier: Office for Official Publications of the European Communities, Luxembourg

city ecology economic impact R&D methodology
sustainable cities; sustainable development; urban planning; European Union; innovations; project evaluation

Report of an overview of 110 projects on innovative urban projects in EU member states. There are interesting and relevant appendices presenting a checklist on evaluation criteria on urban sustainability and an evaluation matrix. (WB)

Peter, Conradi **(1994). Braziliaanse stad pakt milieuproblemen origineel aan: Curitiba is een laboratorium voor stedelijke problemen. In: (source unknown) (November 1994) p. 34-35. 2 p.**

city ecology
Brazil; urban planning; urban transport; environmental policy; urban wastes

Describes solutions Curitiba, in the Brazilian state of Paraná, has found to cope with urban transport, and with handling city waste. A success story. (WB)

Petts, J.. **(2000) Creating edible buildings –growing food on and around buildings. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning city ecology

United Kingdom; architecture; footprint

The world cannot accommodate an increasingly urbanised society, which continuously draws resources from evermore distant parts and uses the biosphere, oceans, land and atmosphere as a waste sink. We must therefore seek more sustainable ways in which to live and develop solutions to the current economic and ecological crisis. The background to the programme 'edible buildings' is that many parts of the world growing food on and around buildings is an economic necessity. Some city farmers attach long, narrow planters or boxes to their walls and grow cucumber and melon up the walls, supported with sticks or twine. Herbs are grown on rooftops in Santiago, silkworms on balconies in Old Delhi, pigeons in downtown Cairo, rabbits in Mexico City shanties and vegetables in Haiti. In London, at least half of its 2.8 million households have gardens –comprising nearly 20% of the total area of Greater London. 1950s research indicates that 14% of the garden area in London was allocated to fruit and vegetable production but it is likely that the current percentage is lower than this.

Postel, Sandra **(1989). Water for agriculture: facing the limits. WorldWatch, Washington DC; 54 p.**

city ecology wastewater reuse

irrigation; sewage; urbanisation

This policy paper researches the global eminent shortage of water for much of the population. It suggests several means of more efficient use including urban agriculture. (JS)

Potutan, Gerald E; Schnitzler, Wilfried H; Arnado, JM; Janubas, LG; Holmer, Robert J **(2000). Urban agriculture in Cagayan de Oro: a favourable response of city government and NGOs. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 413-428. DSE, GTZ, CTA, SIDA**

city ecology horticulture food security and nutrition

vegetable production; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; land tenure; nutrition; NGOs; school gardens; home gardening; Philippines

Cagayan de Oro is a boomtown in Mindanao. A considerable number of farmers work in the periurban area mainly in vegetable production. Within town about 40% of the households engages in backyard farming and the majority of schools maintain nurseries. Vegetables are considered 'poor man's food'. Farmers consume more vegetables than wealthier people and farming contributes considerably to in-kind family income. There are initiatives to produce and improve composting of urban organic material. As powers became more decentralised, a City Agriculture Office

was established. Awareness on urban agriculture is increasing. This all helps to promote urban agricultural initiatives. Legislation has been passed to secure agricultural land. Activities at local level are backed by a sustained flow of information through the media and by successful co-operation of NGOs and local government. (NB)

Rauber, Paul **(1999). Food for thought: cultivating our cities. On: http://www.sierraclub.org/sierra/199705/fdforthought.html. 2 p.**

city ecology food security and nutrition

home gardening; food security; urban livelihoods

Argues that cities are returning to producing their own food and gives examples of what is already being achieved by urban agriculture inside as well as outside of the USA. (NB)

RCD Consultants **(1990). Urban Agriculture in Latin America, Africa and Asia. Washington, DC: UNDP/IBRD**

city ecology economic impact

Latin America; Africa; Asia; surveys; survival strategies; history; development programmes

This document was based on the principal investigator's 15 years of part-time research and experience with urban agriculture in Asia, Africa, the Middle East and the United States, plus visits to 17 developing countries. Although urban agriculture varied more than expected from country to country, the author notes that it increases as the economy gets worse; it is strongly influenced by urban management policies and practice, especially antagonistic ones; it has no comprehensive support programs similar to those for rural farmers; and is perceived as rural, old-fashioned, temporary and low-yielding. The last indicates that the principle barriers preventing urban agriculture from achieving its potential are cultural. This report examines the various kinds of urban agriculture; the history of and trends in urban agriculture; the places where urban agriculture is carried out; the various actors involved; and the economic, social, equity and environmental impacts of urban agriculture. It also looks at technology and assistance programs for urban agriculture, and identifies a number of areas for further action. (HC, IDRC)

Richard, Matthew J **(1991). Opportunity and conflict in the periurban area of Gaborone, Botswana. 19 p. Department of Anthropology, State University of New York, Binghampton, USA**

land use planning city ecology

Gaborone; Botswana; land use rights; land tenure; resource use

Examines potential conflicts in access to and use of scarce land resources by the various stakeholders in the periurban area of Gaborone, Botswana, one of the fastest growing urban centres in the world. Most of the conflicts have to do with the

transition from communal land to freehold land tenure. This leads to fundamental changes in land use. The role of Land Boards and traditional authorities in manipulating and interpreting local land rights is unclear. (WB)

Richards, Melanie **(1990). Large African cities: a study of green open spaces. SS no. 89-00021. (source unknown)**
city ecology
green spaces; parks; urban environment; environmental aspects

Documents the importance of green open spaces (parks, agricultural areas, vacant lots and other leftover spaces) in urban areas both for environmental, social and economic (in case of growing food) functions. Environmental benefits resulting from these green open spaces are discussed at some length. The paper analyses the difficulty of park maintenance for municipalities in developing countries given the cost involved in maintaining these mostly unproductive spaces. (WB)

Sanyal, Biswapriya **(1986). Urban cultivation in East Africa. UNU Paris, 75 p.**
horticulture urban livestock city ecology
home gardening; surveys; urban livestock; urban forestry; urban management; geography

This is a groundbreaking report, predecessor to a doctoral dissertation defining the role of agriculture in East African cities, focus on Lusaka. It has an economic slant with excellent micro-geography. (JS)

Satterthwaite, David **(ed.) (1999). The Earthscan reader in sustainable cities. 478 p. ISBN 1_85383_601_X (pbk). GBP 16.95**
Supplier: Earthscan Publications, 120 Pentonville Road, London N1 9JN, UK
city ecology
urban planning; sustainable development; health; waste management

An introduction to the field of sustainable cities (part I) which brings together a wide range of published articles covering the key issues. In addition, concepts linking sustainable development and cities (part II) as well as sectoral programmes contributing to sustainable development in cities (part III) are discussed. The section on sectoral programmes includes chapters on urban agriculture and planning green cities, waste recycling and building and designing with nature. Part IV contains case studies on innovative action plans (Local Agenda 21) at city level from South and North America and information systems and urban sustainability indicators. The last part (V) places sustainable city development in a wider regional and global context. The contributing authors are well known experts and scientist in the fields of urban development, urban and community planning, urban agriculture, environmental studies etc. (NB)

Sawio, Camillus J **(1994). Urban agriculture and the sustainable Dar es Salaam Project**
Cities Feeding People Series report no. 10. 19 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
city ecology land use planning
Tanzania; urban planning; environmental aspects; land use planning; development projects

Outlines the scope of urban agriculture and then draws a picture of the situation in Dar es Salaam and a number of other cities in Tanzania, with regard to urban agriculture. The core of this publication is about the Sustainable Dar es Salaam project (SDP) established under the auspices of the Global Sustainable Cities Programme of the United Nations Centre for Human Settlements (UNCHS). Priorities set for this project had to do with management of open spaces, recreational areas, hazard lands, greenbelts and urban agriculture potential, all approached in an integrated manner. The paper presents an (impressive) constitutional framework for this project. A table is provided on the surfaces occupied by the various open spaces in Dar, from which the rise of urban agriculture plots becomes apparent. The increase in surface under residential area, however, is even more impressive. Tanzanian authorities adopt, generally speaking, a fairly positive attitude towards urban farmers (with the possible exception of animal husbandry), as opposed to what has been reported from numerous other countries. (WB)

Siegle, L. **(2001), Green Living in the Urban Jungle. Supplier: Green Books, Foxhole, dartington, Totnes, Devon TQ9 6EB, UK**
city ecology
organic agriculture; United Kingdom, Europe (Western)

Embracing an eco-friendly lifestyle can be a daunting prospect for your average urban dweller. After all, our synthetic surroundings are miles away from inspiring pastoral scenes, and the temptation to indulge in a spot of mindless consumerism lurks around every corner. To exacerbate matters, we are generally pressed for space, probably cash and definitely time. But the good news is that this handbook is here to address these issues head on, dispel the myths and provide some vaible solutions. Chapters including Absolute Beginners, Go Wild with Food, Eco-Chic Comes to Town and Green Scene provide green and organic options for a dynamic urban existence. They explore everything from severing the cord to your local supermarket, looking at some other more exciting shopping options, thinking creatively about recycling and transport, to enjoying a green night out. The City Focus sections keep motivation high by honing in on some successful projects in UK cities, from Cardiff to Leeds. And, in the spirit of learning by someone else's trials and errors, excerpts from the author's diary reveal the real thrills and spills of altering your lifestyle. The end results show that even the most outrageous twonie can discover their green roots with the minimum of disruption. Better still is the news that old habits don't die hard, expecially when replaced with the benefits of new and improved green ones.

Smit, Jac **(2000) Urban Agriculture and Biodiversity. In: Urban Agriculture**

Magazine, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.
city ecology
biodiversity

Jac Smit of TUAN (The Urban Agriculture Network, based in the USA) argues that bringing back agriculture, forestry, aquaculture and livestock rearing to the human settlement is a key component in reducing the negative ecological footprint of cities that is 50 to 125 times the area of the city itself. He illustrates this with a number of interesting examples.

Smit, Jac; Ratta, Annu; Bernstein, Janis **(1996). Urban agriculture: an opportunity for environmentally sustainable development in sub-Saharan Africa. Towards Environmentally Sustainable Development in Sub-Saharan Africa Paper No. 11. Washington, DC: The World Bank, African Technical Department (AFTES). 33 p.**
city ecology
Africa; sustainable development; urbanisation; credit

The purpose of this report is to examine how urban agricultural activities can contribute to sustainable development in Sub-Saharan Africa (SSA) and how the World Bank can expand its involvement in UA in the future. Chapter 1 defines UA, discusses the nature and extent of UA worldwide, and summarizes UA's role in sustainable development. Subsequent chapters examine urbanization trends in SSA and the nature and extent of urban agricultural activities in SSA (chapter 2), key factors that constrain UA in Africa's urban and periurban areas (chapter 3), how the World Bank has addressed UA (chapter 4), and the various means by which the World Bank can promote or support UA (chapter 5). (adapted from original by JN)

Smit, Jac **(1999). What would the world be like in the 21st century if cities were nutritionally self-reliant: the prospect for urban agriculture. Urban Agriculture Notes. http://www.cityfarmer.org/21century98.html. 5 p. The Urban Agriculture Network, 1711 Lamont St. NW, Washington, DC 20010, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture
economic impact city ecology
waste management; urban policies; environment

Summarises findings from the book "Urban agriculture: food, jobs and sustainable cities" and outlines prospects for the 21st century on the basis of questions emerging form the book: what if waste is food and sewage and garbage were prime inputs to food production? What if urban landscape were edible, what if vacant land in cities were productive, what if urban areas were increasing rather than diminishing biodiversity? The author argues that the characteristics of the 21st century city with more productive land use, with fertile soil contributing to increased biodiversity and a major shift to healthy and greener cities are already there. However we haven't noticed it and too often policies and investment have been hindering its emergence. (NB)

Sorensen, Mark **(1997). Good practices for urban greening. Washington, D.C.: Inter-American Development Bank, Social Programs and Sustainable Development Department, Environment Division. 84 p.**
city ecology urban forestry
ecology; urban planning; land tenure; gender; legislation; financing; Latin America

This report was prepared in two drafts, preceding and following a conference in Mexico City, with participants from 23 countries. It is divided into five parts: (i) problems of rapid urban growth, (ii) the benefits of urban greening (particularly social), (iii) the challenges to establishing a greening program, (iv) the requirements of such a program, and (v) the elements of a greening program (including urban agriculture and finance). It includes a useful directory of projects. It is one of the more comprehensive brief reports on urban forestry and agro-forestry. (JS)

South African Department of Environment Affairs **(1994). Urban open spaces: potential for productive utilisation." Conference, Theunis Bester Hall, Technikon, Pretoria, 1994.**
city ecology
South Africa; vacant lands; municipal lands; urban management

These are the unpublished conference proceedings for a meeting focused on the reuse of underused or vacant urban land for farming purposes. It contains 21 papers (in English or Afrikaans) plus a number of other abstracts. (JN)

Spiaggi, E.P. **(2000) Urban Agriculture and Local Sustainable Development in Rosario Argentina. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning city ecology waste recycling
Argentina; Rosario; vermiculture; education

Experiences are given of an project, in a poor neighbourhood (Empalme Graneros) of Rosario city, Argentina on urban agriculture, in operation since 1996. 40 families are participating of the project. In 1998 support came from de Organisation of American States (OAS), and the project collaborated with institutions from Chile Centro de Educación y Tecnología (CET), and Canada Environmental Policy Institute (EPI). One of the aims was to compare the state of UA in those countries.

Spooner, Brian **(1986). MAB urban & human ecology digest. UNESCO, 137 p. Contains list of 746 projects in 32 countries**
city ecology
ecology; urbanisation; Papua New Guinea

This is a fifteen-year summary of UNESCO's Man and the Biosphere Programe. It

expands on the concept of the city as an organism that consumes resources, has its own metabolism, and excretes waste. A major objective of the MAB programme was to show how energy was used in cities, following the systems ecology analysis of energy budgets and nutrient cycles. This digest, presenting 47 projects in 32 countries, is representative of MAB but a full exploration requires reference to the MAB Information System (Blue) Series. One of the studies best related to urban food production is from Papua New Guinea's Lae and its hinterland, reported in five documents. (JS)

Stanhill, G **(1977). An urban agro-ecosystem: the example of nineteenth-century Paris. In: Agro-Ecosystems no. 3 (1977) p. 269-284. Institute of Soils and Water, The Volcani Center, ARO, Bet Dagan, Israel**

city ecology horticulture waste recycling

France; Paris; ecological systems; waste recycling; horses; manures

One hundred years ago a sixth of the area of Paris was used to produce annually more than 100,000 tons of high-value, out-of-season, salad crops, grown on very heavily manured 'hotbeds', partly under glass or protected from the winter cold by straw mats. The cropping system was sustained by the use of approximately one million tons of stable manure produced each year by the horses who provided the power for the city's transport area. This article gives a very detailed, quantitative account of this unique farming system, with a wealth of figures demonstrating its extent and importance. In the first quarter of the 20th century, the system declined rapidly, as a consequence of the replacement of the horse by the motor car, competition for land within the city, and competition from areas with a more favourable climate outside the city, facilitated by improvements in the transport system. A fascinating description of an outstanding system that once was known to the English-reading world under the name of 'French gardening'. (WB)

Stevenson, Christopher **(1996). Market production of fruits and vegetables in the periurban area of Dar es Salaam, Tanzania. Dar es Salaam, Tanzania: GTZ, Urban Vegetable Promotion Project. 40 p.**

horticulture economic impact

Tanzania; fruits; vegetables; market gardening; periurban agriculture

This report is one of the publications to come out of the Urban Vegetable Promotion Project (UVPP) of Tanzania. This study surveys the characteristics of urban horticultural farmers and their activities in Dar. It includes consideration of spatial and marketing characteristics. (JN)

Streiffeler, Friedhelm **(1993). General principles and approaches for sustainable urban greenbelts with special reference to Africa. Unpublished. 59 p.**

city ecology

Africa; green belts; organisation; ecology

This paper is a thoughtful assessment of some key issues and challenges for urban agriculture in Africa. The results of the literature on urban agriculture in Africa in general, and Kisangani, Congo, and Nairobi, Kenya, in particular, are discussed under the following headings: why urban agriculture — the growth of urban centres in Africa, the social situation of large parts of the urban population and the role of women; where urban agriculture — household gardens, urban and periurban agriculture, and the issue of land access; the practice of urban agriculture — what is produced, frequent problems encountered (especially decline in soil fertility and plant diseases), and agricultural techniques; ecological aspects — ecological advantages of urban agriculture, environmental problems associated with urban agriculture and some attempted solutions, including wastewater and solid waste recycling; commercial urban agriculture; the problem of organization — cooperation (or lack of) among urban farmers and the role of municipal administrations; and felt needs in information and extension. It is noted that urban farming is predominantly a subsistence activity, subject to very little experimentation due to the tight margin of manoeuver within which the urban farmer operates and the lack of a supporting network. Suggestions for practical action focus on resolving the issue of access to land and security of tenure, and developing ways of recycling wastewater for irrigation and household wastes for plant nutrition. The author calls for further research into farming systems, farmer organization, recycling, and analysis and evaluation of urban agriculture projects. (HC, IDRC)

Swedish International Development Cooperation Authority (SIDA) **(1995) Towards an urban world: urbanisation and development assistance. 80 p. ISBN 91_586_7227_3. Swedish International Development Cooperation Authority (SIDA), Stockholm, Sweden**

city ecology

urbanisation; Sweden; development co-operation

Urbanisation constitutes a major transformation of society with far-reaching economic and social consequences. The paper argues that Sweden should increase its international development assistance to urban areas as well as analyse the links between rural and urban areas. Suggestions on how this could be done best and what should be taken into account are given. (NB)

Tha Hla, Patima **(1999). Bangkok gardens: how does your garden grow? Urban Agriculture Notes http://www.cityfarmer.org/Thaigardens8.html. 3 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**

horticulture city ecology

Thailand; Bangkok; vegetable production; home gardening

The article is a report of a seminar on how to grow vegetables in urban areas, more specifically in Bangkok, and what are problems encountered. (NB)

Thrupp, Lori A **(ed.) (1998). Cultivating diversity: agrobiodiversity and food security. World Resources Institute. 64 p.**
city ecology food security and nutrition
biodiversity; policy; integrated pest management; organic agriculture; stakeholders

The argument is made that biodiversity is a fundamental factor for agricultural production, food security and ecological stability on planet Earth. Further the case is made that agricultural growth and biodiversity are not always conflicting goals. Evidence is presented to show the multiple benefits of integrating biodiversity into agriculture for both small and large-scale farming. Agricultural biodiversity is presented as lying within the general framework of sustainable human development and settlements. Recommendations include: (i) support sustainable ecological agriculture, (ii) develop and ecosystems approach, (iii) empower farmers and communities to protect their right to resources, (iv) adapt agricultural practices and land use to local agroecological conditions, (v) conserve and regenerate plant and animal genetic resources, (vi) adopt policies and establish institutional changes that support agro-biodiversity and (vii) uphold both the convention on biological diversity and the mandates of the World Food Summit. (JS)

Tjallingii, Sybrand P **(1995). Ecopolis: strategies for ecologically sound urban development. Dorschkamprapport. ISBN 90_73348_34_X. Instituut voor Bos- en Natuuronderzoek**
Supplier: Backhuys Publishers, PO Box 321, 2300 AH Leiden, The Netherlands
city ecology R&D methodology
urban development; ecological development; urban planning; Netherlands

Resulting from ESUD, for Ecologically Sound Urban Development, a Dutch study project looking into the problems of the environment and urban development. Aim of the project is to form a planning strategy, to indicate steps which can be taken at the local level and to draw up priorities for research, design and policy. A number of models together shaping the Ecopolis, are described in this publication: for chains, areas and organisations. Examples cited are from The Netherlands. (WB)

Todd, Nancy Jack; Todd, John **(1994). From eco-cities to living machines: principles of ecological design. 195 p. ISBN 1-55643-150-3**
Supplier: Eco-logic books, 19 Maple Grove, Bath BA2 3AF, UK
city ecology wastewater reuse
urban design; permaculture; waste recycling; urban planning

For more than thirty years, John and Nancy Todd have been advocating a new, provocative approach to urban design. The underlying book was originally published in 1984, at a time when environmental problems began to appear in their full size. The authors describe site-specific technological interventions and systems-wide ecological thinking developed in the framework of the New Alchemy Institute on Cape Cod. The book is centred around two concepts: Eco-cities, or designs for integrating agriculture and flowing pure water into green urban settings; and Living

Machines, a family of technologies for purifying wastewaters without chemicals. This is a far-reaching publication destined for a broad audience. (WB)

Torres Lima, Pablo A; Rodríguez Sánchez, Luis Manuel; Garcia Uriza, Brenda I **(2000). Mexico City: the integration of urban agriculture to contain urban sprawl. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 363-390. DSE, GTZ, CTA, SIDA**

city ecology economic impact community development
urbanisation; land use systems; farming systems; ecology; economic impact; gender; urban policies; Mexico; reuse of waste; poverty; land tenure; ornamental plants; floriculture; fodder production; migration; water management; community organisation

Three different zones for urban agriculture are distinguished in Mexico: the urban nuclear zone, rural-urban fringe and the intermediate urban zone. The land tenure situation and conceptualisation of land as a commodity are important for the urbanisation process and the types of urban agriculture. Some characteristics of urban farming are that it is flexible, small scale, sells at local markets and recycles waste. Functions go beyond strict economic impact and include cultural aspects. Farmers are a mixed group of people of migrant origin with women playing a dominant role in urban agriculture. An important aspect of urban farms is that they do not have a minimum size and enable large sections of the population to benefit. The farms use space very efficiently. The contribution to the household economy varies, but is significant. Urban agriculture also generates numerous jobs. Urban agriculture functions as a green belt, limiting outward migration of the urban poor and the urban sprawl. Analysis of flows of mass and energy demonstrate the efficient reuse of outputs of urban agriculture. Agriculture in the urban zone is illegal and in general government policies have not been favourable to agriculture. Visions and strategies for urban agriculture are presented as well as recommendations of which decentralising political and economic power perhaps is the most important. (NB)

Trans Rural Initiatives **(1996). Agriculture et forêt périurbaines sortent de l'ombre. Special issue, supplement to No. 75 (1996). 24 p.**

city ecology urban forestry land use planning
France; periurban agriculture; policy

This supplement to a French periodical contains several syntheses of actions on the preservation of urban (particularly periurban) agriculture in France. These range from agricultural policies of small towns such as Aubagne to the key principles of Paris' "Green Plan". (JN)

Tricaud, Pierre-Marie; Blancher, Philippe **(1993). Espaces naturels dans une métropole indienne: Ahmedabad. 2 Volumes. Ministère des Affaires Étrangères, Direction du Développement et de la Coopération Scientifique,**

Technique et Éducative, Paris, France; 13+30 p.
city ecology land use planning
urban greening; forestry; food security; home gardening; community gardens; livestock; India; policy; geography

This is one of a series of studies of the un-built urban metropolitan space in Africa, the Middle East, North America and Europe. It places the Ahmedabad metropolis in history (to 1411), in India and in the urban world. It details specific communities, farming areas, and methods of production. Its policy analysis and view of potentials is particularly useful. (JS)

Tricaud, Pierre-Marie **(1996) Ville et nature dans les agglomérations d'Afrique et d'Asie. Collection Etudes et Travaux. Ministère des Affaires Etrangères and Ministère de la Coopération. Paris: Editions du Gret. 103 p.**
city ecology
Africa; Asia; nature; classification; land use policies

This report was prepared by one of the only researchers to have studied the phenomenon of urban agriculture from the 1980s through today, and to have done so in several continents. He develops here a typology of “natural urban spaces” (including agricultural ones), using a range of illustrations. After describing the roles and meanings of these spaces, he examines the city-nature dynamic. These observations lead to recommendations for a general policy for the creation and management of urban natural spaces, which should contribute to an increased sense of responsibility among the stakeholders. (adapted from original by JN)

Urban Resource Systems **(1984). Global urban agriculture: an annotated bibliography. San Francisco: Urban Resource Systems**
city ecology
bibliographies

This bibliography, prepared under a grant from the International Development Research Centre (IDRC), contains about 230 references to books and articles on indoor, outdoor, community, organic, tropical, intensive, container, hydroponic, space-saving and other kinds of gardening, as well as on composting, waste re-utilization, controlling pests, heavy metals, implications for public policy, etc. The literature is international in scope. Most of it is in English, but there are references to a few items in French and Spanish. (HC, IDRC)

Wackernagel, Mathis; Lewan, Lillemor; Borgstroem-Hansson, Carina **(1999). Evaluating the use of natural capital with the ecological footprint: applications in Sweden and subregions. In: Ambio vol. 28 (1999) no. 7 p. 604-612 Supplier: Royal Swedish Academy of Sciences**
R&D methodology city ecology
ecological footprint; footprint calculations; Sweden; economic impact assessment

The ecological footprint assesses people's use of natural resources by comparing their resource consumption and waste production to the regenerative capacity of the earth. Previous studies based on United Nations statistics have shown that humanity's use of natural capital exceeds the global biocapacity. They have also shown a great spread in the size of people's ecological footprints. In this study which focuses on Sweden, the method of footprint and biocapacity calculations is improved and it is demonstrated how a national footprint can be used for regions and even catchment areas. The method is compared to those used earlier and possibilities and limitations are discussed. (WB - from original abstract)

Wade, Isabel Mary **(1981). Fertile cities. In: Development Forum (September 1981) p. 7**
city ecology
urban ecosystems

General overview article stressing the need to develop urban ecosystems to provide food and fuel for the cities. (WB)

Webber, Tammy **(1999). Green roofs cool city rooftop gardens in Chicago to fight smog, heat. Urban Agriculture Notes http://www.cityfarmer.org/greenroofs.html. 2 p.**
Supplier: City Farmer, Canada's Office of Urban Agriculture
city ecology horticulture
United States; rooftop gardening; city microclimate

Discusses the potential and developments of rooftop gardening for Chicago to fight smog and improve the city's microclimate. (NB)

Werna, Edmundo; Harpham, Trudy; Blue, Ilona; Goldstein, Greg **(1998). Healthy city projects in developing countries: an international approach to local problems. 148 p. ISBN 1_85383_455_6 (pbk). GBP 15.95**
Supplier: Earthscan Publications, 120 Pentonville Road, London N1 9JN, UK
health and environment city ecology
health care; primary health care; project development; urban development; health; urban management; urban policies; urban poor; pollution; poverty

Analyses the current state of Healthy City Projects in developing countries. This approach has been implemented by the World Health Organization (WHO) in the wake of the Ottawa Charter (1985) in which a holistic approach to public health care was developed based on the idea that living and environmental conditions are responsible for health. This is particularly acute in cities where so many people live and work together in close proximity. Originally established in 11 European cities, then spreading throughout Europe and then also in other regions of the world, the project is now active in at least 1,000 cities or towns. Core concepts in the Healthy City programme are: (1) Better health will come, not so much from curative care but

from improved living conditions; (2) People must take the initiative to improve their own health and their own environments; (3) Health should be seen as an essential part of overall development within the community. A Healthy City project supports city health authorities and/or local government in the field of information and analysis, in particular monitoring of health status and analysis of requirements. In addition, support in policy and advocacy is of paramount importance, developing policies for individual sectors.

This book draws on a range of examples to illustrate how to design, implement and evaluate the integration of public health into urban management. It provides descriptions of the different project phases. Noteworthy is a list of interesting indicators for evaluation. A number of case studies is presented. There is much attention to rapid appraisal techniques and to priority setting procedures. Community participation is highlighted as crucial. The book ends with an examination of factors influencing the transformation of a project cycle into a continuous process. Illustrations are scarce, but there are many boxes with the case studies. Rather for specialists than for a wide audience. (WB)

Zeeuw, Henk de **(2002) Soil and Water Management in Agriculture Production in Urban Areas (SWAPUA) of CEE/NIS Countries - PART 1: Main report. ETC Netherlands,**
Leusden, The Netherlands INCO : International Scientific Cooperation Projects (1998-2002)
city ecology
policy development; Bulgaria; Romania; Czech Republic; Russia; Slovenia; urban agriculture; periurban agriculture; cities; stakeholders; water management; soil; Europe (Eastern)

The aim of the SWAPUA was to contribute to policy development in CEE/NIS countries regarding urban agriculture by exploring presence, benefits and risks of various types of urban and peri-urban agriculture, as well as by initiating local processes of participatory policy formulation and action planning.

The SWAPUA project was undertaken in 2 cities each of Bulgaria, Romania, Czech Republic, Russia and Slovenia and include a/o the following activities:

- A review of actual policies and programmes regarding urban agriculture in European cities

- Implementation of an exploratory household survey among different types of urban an dperiurban farmers and gardeners.

- Involvement of local stakeholders in a participatory process of problem analysis and action planning in selected urban agriculture areas in the five countries.

- The testing of the quality of soils, water and agricultural products in selected urban agriculture sites in the five countries and the implementation of a desk study on the management of heavy metals in agricultural soils.

- Description of one or two "best practices" for sustainable urban agriculture in each of the five countries.

- The organisation of a dissemination seminar in Sofia with 65 participants from 17 CEE/NIS countries.

The following results were gained:

- New insights were gained in the characteristics, problems and perspectives of the various types of urban small-scale gardeners and farmers in ten cities in five CEE/NIS countries and a new perspective on the potentials and multiple functions of urban agriculture was developed.

- Several Multi Stakeholder Platforms on Urban Agriculture were established and Action Plans on Urban Agriculture were developed.

- The results of the exploratory study and the participatory planning processes provide the basis for the formulation of a policy framework and a video on urban agriculture.

- The findings and recommendations of the project were shared with city administrations and public institutions, in the cities included in the study as well to many others through dissemination activities, which motivated them to take the subject of urban gardening on their policy agenda and ti undertake actions to support urban gardeners and small-scale farmers.

1.4 Community Development

Community building through Urban Agriculture.

(Picture: Lena Jarlov)

The role of urban agriculture in social and community development

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Urban agriculture may function as an important strategy for poverty alleviation and social integration of the urban poor.

Urban agriculture is an important survival strategy for the urban poor. In periods of economic or political crisis a rapid increase in urban agriculture is often observed (Havana, Bucharest and other cities during the transition in the communist countries; Dar es Salaam, Lima and other third world cities during periods of structural adjustment policies; Lebanon, Gaza and other cities during periods of armed struggle; see Moskow for the example of Havana; Moldakov for the example of Petersburg; Sawio for Dar es Salaam; Niñez or Dasso and Pinzas for Lima; Nasr or Kaldjian and Vine,Jeni for the Middle East and Gaza)

With growing urbanisation urban poverty is increasing and ‘ economic crisis’ becomes a permanent situation for a large part of the urban population, for which farming may constitute an important means to survive by providing a substantial part of family food and possibly some income.

Several examples exist of municipalities (e.g. Cuenca, Ecuador) or NGOs (e.g. Care, Haiti) that have initiated urban agriculture projects whose main aim is to provide a basic livelihood for the urban poor.

The PROVE programme in Brasil (Carvalho, 2001) provides an excellent example of a conscious attempt to create a decent livelihood for large groups of the urban poor by the creation and strengthening of a range of small agro-industries and their integration into a vertical market oriented chain or cluster. Social integration of the poor by local economic development is the main aim of the programme.

Others have used **urban agriculture projects as a way to integrate disadvantaged groups** such as female-headed households, young people without a job, recent immigrants, elderly or disabled people with the aim of integrating them more strongly into the urban network and providing them with a decent livelihood. The participants in such a project feel enriched by having the chance to work constructively, building their community, working together and in addition producing food and other products for consumption and for sale.

An aspect that has received a lot of emphasis in low income areas of large cities in the USA and Canada (see e.g. Boulianne, 1999), but gradually also is gaining attention in cities in the South, is **the use of urban agriculture to revitalise degenerated neighbourhoods**. The cleaning up of derelict areas in the neighbourhood (sources of health problems and often the place for drug trafficking) and turning them into green and productive spaces, improves the living climate, strengthens the self-confidence and organisation of the local citizens and spurs other local initiatives. In Toronto, Montreal and Quebec (but also in Mexico and Chile)

community garden projects are selected for their potential to contribute to promoting social justice and active citizenship and establishment of effective partnerships between citizens and local government.

In more and more cities in North and South, **community based initiatives in energy saving, recycling and greening** are developing (Healthy Cities, Agenda 21) that have strong social impacts as well, and include elements of urban agriculture (see Moya for an example for Chile).

The literature also indicates growing attention to analysis and strengthening of '**community food systems**' in which local people undertake an assessment of the local food production and system, taking into account aspects such as the quality of the food produced, ecological foot print, access to and equality of distribution of food. The analysis is followed by organising coalitions, setting up local food policy councils, developing small projects (e.g. food growing, direct link distribution systems) and the formulation of adequate food policies (e.g. Garrett and Feenstra).

Closely related to the former is the aspect of direct producer-consumer linkages through food box schemes and other forms of Community Supported Agriculture (CSA).

In more developed countries, urban agriculture is also encouraged for its **recreational functions** (landscape maintenance, recreational routes, bed and breakfast, youth summer camps, horse riding) **and educational functions** (bringing youth in contact with animals, teaching about ecology, etc.).

The above mentioned aspects of urban agriculture have so far not been sufficiently studied and local initiatives in this field in cities in developing countries need to be supported, documented and exchanged.

References

Boulianne, M. (1999), Agriculture urbaine, rapports sociaux et citoyenneté : le cas du jardinage biologique communautaire au Québec et au Mexique, On: http://www.cityfarmer.org/manon.html, 44p

Carvalho, J.L. H. (2001) PROVE, Small Agricultural Production Verticalization Program. PGU Ecuador, PROVE IV, Cuaderno de trabajo 83

Dasso, J. A.; Pinzás, T. (2000) NGO experiences in Lima targeting the urban poor through urban agriculture. In: Growing cities, growing food : urban agriculture on the policy agenda. - p. 349-361

Kaldjian, Paul (1997) Istanbul : opportunities in urban agriculture. In: Arid Lands Newsletter no. 42 (fall/winter 1997)

Moskow, A. L. Contribution of urban agriculture to gardeners, their households, and surrounding communities : the case of Havana, Cuba.

Nasr, Joe; Kaldjian, P. (1997) Agriculture in Middle Eastern cities : commonalities and contrasts. Arid Lands Newsletter no. 42 (fall/winter 1997), also on http://ag.arizona.edu/OALS/ALN/aln42/nasr.html

Niñez, V.K. (1985), Working at half-potential : constructive analysis of home garden programmes in the Lima slums with suggestions for an alternative approach, In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 6-14

Sawio C.J. (1998) Urban agriculture in Dar es Salaam. Dar es Salaam, TZ: Dept. of Geography, University of Dar es Salaam, 23 p.

Vine, Jeni (1998) Sustainable agricultural development in the West Bank and Gaza strip. In: Landmark no. 24 (March/April 1998) p. 6

Abalimi Bezekhaya & the Cape Flats tree project**: newsletter to our friends. Abalimi Bezekhaya (The People's Garden Centre), Private Bag X12, Observatory 7935, South Africa**
community development horticulture
South Africa; home gardening; community initiatives

A small newsletter in the true sense of the word, giving news flashes and articles on homegardening and how it helps in completing people's diets. There is also room for a notice board in its columns. Lots of pictures. (WB)

Ableman, Michael **(1999). On good land: the autobiography of an urban farm. Urban Agriculture Notes http://www.cityfarmer.org/autourbanfarm.html. 4 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**
horticulture community development
community gardens; community-supported agriculture; United States

A summary of the book 'On Good Land' about the Centre for Urban Agriculture at Fairview Gardens, California. The Gardens marketing systems are described as well as the other activities on the farm. (NB)

Anon. **(2002) Back to the Soil: Supporting Peri-Urban Agricultural Development. Agricongo, In: The Courier ACP-EU, January-February 2002, Country Report, pp. 78-79.**
community development
soil; periurban agriculture; agricultural development; market gardening; training; farmers' associations, Congo, Africa (Central)

In a country where almost 80 percent of the inhabitants live in towns, it is crucial to take account of the urban factor in any sustainable development operations. This article looks at the peri-urban agriculture development structure developed by the Agricongo Institute, which encourages market-gardening, farmers' organisations, information and training.

Bellows, Anne C., Robinson, V., Guthrie, J., Meyer, T., Peric, T. and Hamm, Michael W. **(2000) urban livestock Agriculture in State of New Jersey. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock community development
United States

In old (for the U.S.) established industrial cities of New Jersey, one can often still see the sturdy working class neighbourhoods of early 20th century Italian and German immigrants surviving today with out-buildings for chickens and rabbits securely in place. For the most part, these populations have moved up the economic scale and out. New immigrants replace them, bringing their own rural and urban agriculture traditions, including livestock raising. Personal experience and anecdotal information from residents tell a story of the diverse nature and the importance in food security for urban dwellers in the U.S. Urban livestock agriculture for household consumption

exists in the “hemispheric North” largely as undocumented (unpaid) labour, food production, and land use. The craft and traditions of growing food generally, and ULA specifically, appear to be disappearing, even as they may flourish on a small scale. This article focuses on the United States, with particular reference to the densely populated eastern state of New Jersey. It outlines some of the barriers to and opportunities for urban livestock agriculture with an emphasis on household-scale production in urban centers in the U.S.

Botelho, Zita **(1999). Youth, urban governance, and sustainable food systems: the cases of Hamilton and Victoria, Canada. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 208-215. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development food security and nutrition R&D methodology
youth; food systems; Canada; ecology

This paper examines the challenges that youth groups encounter in their attempts to participate in urban decision making related to developing sustainable food systems. The background for this discussion includes an examination of several important concepts. The first is urban governance, which often frustrates marginalized political actors, thus the relationship between youth and social movements is significant to this discussion. Two relevant problems with urban institutions are that they generally do not promote ecological sustainability and that they do not support youth involvement in decision-making. The barriers faced by youth groups promoting sustainable food practices in the urban environment are discussed, using two case studies. Interviews were conducted with members of the Ontario-based Hamilton Organic Mentorship Experience project to identify the barriers they encountered in trying to participate in urban governance. The second case study is of a group called LifeCycles, located in Victoria, British Columbia. Finally, different roles and strategies for youth to influence urban decisions are suggested. (Abstract adapted)

Biehler, Dawn; Sepos, Melissa **(1999). Replication manual: the Hartford food system. VISTA and World Hunger Year. 104 p.**
community development food security and nutrition
food systems; markets; community supported agriculture; policy

This comprehensive report is about 20 years of work in creating an urban-based local food system in a middle-sized city in a wealthy corner of America, where over ten percent of the population depends on emergency food aid for survival. And it is about how to replicate their success. The mission of the Hartford Food System is *to develop and equitable and sustainable food system capable of addressing the underlying causes of hunger and poor nutrition.* Their programs are grouped into four areas: (i) distribution, (ii) production, (iii) education, (iv) and policy. The first six

chapters present an overview of the Hartford system and the last (7.), along with the appendices, presents a replication guide. (JS)

Boissière, Thierry **(1999). Jardiniers et société citadine dans la vallée de l'Oronte en Syrie centrale. Doctoral dissertation in ethnology, Université Lumière Lyon 2, Lyon, France. 2 volumes. 751 p.**
horticulture community development
Syria; Homs; Hama; history; market gardening; water supply; urban gardening

This landmark study is unique in several regards. It is one of the only dissertations on urban agriculture that adopts the ethnological approach, and to be undertaken by an anthropologist. It is rare in its detailed historical analysis combined with a thorough assessment of the present-day situation. It is a rare in-depth study of the Middle East, an underrepresented region in research on urban agriculture. Finally, it is exemplary in placing at its core the changes in water supply (in addition to farming practices); water is the oft-neglected element in such studies. "Through the management of water and crops, as well as through the human connections and the relation to the city, this study has the ambition to reconstitute the evolution of an entire society that organized itself long ago and to present its main characteristics." This ambition is admirably met in this dissertation. (JN)

Boulianne, Manon **(1999). Agriculture urbaine, rapports sociaux et citoyenneté: le cas du jardinage biologique communautaire au Québec et au Mexique. On: http://www.cityfarmer.org/manon.html. 44 p. Chaire de Recherche en Développement Communautaire, Université du Québec à Hull**
Supplier: City Farmer, Canada's Office of Urban Agriculture, cityfarm@interchange.ubc.ca
community development
biological gardening; Quebec; Mexico; food security; social participation

Based on field work in Quebec and Mexico, this paper contains descriptions of four community gardening initiatives. Purpose of the garden projects was either to contribute to food security or to promote local social development. The latter aspect receives much attention: garden projects are screened for their potential in promoting social justice and active citizenship. (WB)

Chaplowe, Scott G **(1997). Sustainable prospects in urban agriculture. In: For all generations: making world agriculture more sustainable / J. Patrick Madden and Scott G. Chaplowe (eds), p. 70-100. World Sustainable Agriculture Association (WSAA), California Chapter, 8554 Melrose Ave., West Hollywood, California, 90069 USA**
city ecology community development
community initiatives; case studies

A chapter from this important publication treating urban agriculture. It conveniently

groups together the various aspects of urban agriculture henceforth well known and well described. There are many boxes with examples of successful community initiatives. (WB)

City Farmer, Canada's Office of Urban Agriculture **(1999). City farm in Perth, Australia. Urban Agriculture Notes http://www.cityfarmer.org/perth19.html. 2 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture community development
community gardens; Perth; Australia

Gives a description of a community garden in Perth, Australia. (NB)

Community Partnership Center**. Findings and recommendations of the Community Partnership Center EZ/EC learning initiative, volume 1. 106 p. Community Partnership Center, The University of Tennessee, USA**
community development
participatory methods; United States

This overview report presents the findings and recommendations by the Community Partnership Center Learning Initiative from the pilot participatory evaluation process in 10 of the 33 rural Empowerment Zones and Enterprise Communities Program in the USA. (NB)

Community Resources **(1999). Exploring urban non-timber forest products On: http://www.communityresources.org/ntfp.htm. 3 p.**
urban forestry community development
non-timber forest products; resource management

A brief project outlay of the urban non-timber forest products initiative. The paper explains what are urban non-timber forest products and why it wants to explore the potential of this further. (NB)

Cosgrove, Sean **(1994). Une histoire de deux villes: comparing Canadian community gardening programs in Montreal and Toronto. Cities Feeding People Series report no. 11. 9 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
community development horticulture
Canada; Montreal; Toronto; Healthy Cities programme; community gardens

In the early 1970s Montreal developed gardening programmes. In Toronto this development has been much slower. Montreal has one of the best community gardening programmes in North America. Toronto has shown some leadership in urban environmental management including healthy cities approaches. Key

challenges are to develop a valued community gardening culture in Toronto, the implementation of healthy cities principles and the establishment of effective partnerships between citizens and government. (NB)

Cosgrove, Sean **(1999). Community gardening in major Canadian cities. On: http://www.cityfarmer.org/canadaCC.html. 18 p. Toronto Food Policy Council, 277 Victoria Street #203, Toronto, ON, M5B 1W1, Canada**
community development
Canada; Montreal; Vancouver; Toronto; community gardens

After discussing conceptual issues and the wide range of farming types of urban and periurban farming, this paper focuses on community gardening which is described from an historical perspective. The author compares community gardening in Montreal, Vancouver and Toronto. It is argued that Montreal has, up to now, the most successful community gardening programme. (NB)

Crouch, David; Ward, Colin **(1988). The allotment: its landscape and culture. London and Boston: Faber and Faber, 1988.**
community development
United Kingdom; community gardens; allotment gardens; history; cultural aspects; Europe

This is the thorough and well-balanced account of the allotment, community, Schreiber-gardens, and civic leisure garden movement during the past 150 years. It is the essential place to begin when considering the future. (JS)

Dahlberg, Kenneth A **(1998). The global threat to food security. In: Urban Age (Winter 1998) p. 24-26. Danish Agency for International Development**
community development food security and nutrition
food security; food systems

Cities have been lulled by the internationalisation of food and the reduced visibility of hunger. Four threats to food security are identified: (1) population explosion of people, cars and animals (2) global warming with many cities and megacities at the coasts (3) loss of biodiversity and (4) globalisation of injustice and poverty. Local responses are needed based on a shift from linear thinking to systems thinking, the use of much longer term perspectives and a shift in evaluation criteria from production/productivity to long-term health of natural and social systems. One such local response is cities growing more food. To develop adequate responses one should keep in mind that it typically takes five years to learn how the various elements of a local food system operate. (NB)

Dahlberg, Kenneth A **(1999). Promoting sustainable local food systems in the United States. In: For hunger-proof cities: sustainable urban food systems /**

Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 41-45. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition community development
local food system; processing; distribution; access to food; recycling; United States

This paper draws on the experience of the Local Food Systems Project, to assist six communities in the United States in strengthening their local food-policy capabilities. Underlying the effort was a broad food-systems approach that stresses not only production aspects but also processing, distribution, access, use, recycling, and waste issues. To assist local communities in the short term, "practical theories" are needed including the interactions of key variables, such as scale and patterns in landscape, population, socio-economic characteristics, and food organization. In the longer term, both capacity- and infrastructure building are needed to strengthen the emerging community of local, regional, and national groups working on more sustainable and localized food systems. (Abstract adapted from original)

Davidson, Joan **(1988). Building more resourceful cities: community-based initiatives in energy saving, recycling and greening. In: Cities and ecology / MAB Program. - Collected reports vol. 2 p. 172-175. Division of Ecological Sciences, UNESCO, 7 Place de Fontenoy, 75700 Paris, France**
community development R&D methodology city ecology
resource conservation; environmental management; United Kingdom

Concentrates on community involvement in urban environmental management in the UK and examines various aspects of environmental management namely energy conservation, waste recycling and greening the city. (WB)

Davis, Laura; Middleton, John; Simpson, Sue **(1999). Community agriculture initiatives in the metropolitan borough of Sandwell, United Kingdom. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 46-53. ISBN 0-88936-882-1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development
health; environmental regeneration; community agriculture; United Kingdom

This paper explores the issues raised in a 1996 study of the practical, legislative, and economic feasibility of community agriculture in Sandwell. Sandwell's people have experienced at first hand the economic, social, and health effects of the processes of industrialisation and its decline. Local regeneration policy will affect health, and health services can improve regeneration. A coordinated approach to developing a community agriculture program in Sandwell may make an important

contribution to the realisation that environmental regeneration and the regeneration of the health of Sandwell's people are inextricably linked. The paper focuses in particular on general issues of health and sustainability and economic inequality and how these may be tackled at a local level. Also the potential role of community agriculture and direct food link schemes if the are integrated with existing initiatives in community development. (NB) (Abstract adapted from original)

Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ) **(1989). Community participation and hygiene education in water supply and sanitation. Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ), PO Box 5180, D-65726 Eschborn 1, Germany**

wastewater reuse health and environment community development
community participation; water management; sanitation; development projects; indicators

Successful water and sanitation projects should have a community participation and hygiene education component. These aspects are addressed in this manual containing five individual course manuals, designed to be used separately, as the foreword puts it, 'for guidance and as a frame of reference in water and sanitation projects for national and international decision makers; and for field managers of water supply and sanitation projects'. This manual constitutes a great attempt to bring together and analyse this complex material. (WB)

Driskell, D. **(2002) Creating Better Cities With Children and Youth: A Manual for Participation. UNESCO, Supplier: UNESCO, 7, Place de Fontenoy, 75007 Paris, France**

community development
children; community development; urban planning

The Growing Up in Cities project has won the 2002 EDRA/Places Research Award - out of 115 candidates. EDRA is the Environmental Design Research Association and Places is an international environmental design journal, both based in the USA.

Creating Better Cities with Children and Youth is a practical manual on how to conceptualize, structure and facilitate the participation of young people in the community development process. It is an important tool for urban planners, municipal officials, community development staff, non-governmental organizations, educators, youth-serving agencies, youth advocates, and others who are involved in the community development process. It offers inspiration to all who believe in the value of community education and empowerment as a fundamental building block of a vibrant and resilient civil society, and who feel concern for young people and the quality of their lives.

The manual's core ideas and methods have been field-tested in a wide range of

urban settings in both developing and industrialized cities through the work of the UNESCO Growing Up in Cities project. Case studies from project sites help to demonstrate the methods in action and show how they can be customized to meet local needs. They provide lessons and insights to help ensure a successful project, and highlight the universal applicability and value of young people's participation.

The ideas and results from the country studies of the Growing Up in Cities project are presented in the companion volume Growing Up in an Urbanising World.

Duran L.S., Batac, J.H.., Drechsel, P.. **(2001) Planning in a Changing Environment: the Case of Marilao in the Philippines. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning waste recycling community development planning; Philippines; waste; compost

Marilao is a municipality with approximately 15,000 households located on the fringe of Manila in the Philippines. A few years ago, Marilao's authorities faced a typical periurban dilemma. With only 2,625 hectares of land area, just five kilometres from Metro Manila, Marilao's mayor could not find affordable land for a new waste disposal site. There were more than 850 business firms and housing projects that competed for the use of municipal land. Not only the problem of where to bring the waste was a problem, also what to do with recycled waste and changes in policy and urban management needed to be tackled. This paper describes the process set in motion by the Marilao authorities.

Easton, Charlene **(1993) Local Initiatives: ICLEI members in action, 1991-1992. ICLEI, Toronto; 38 case studies. On: www.ICLEI.org.**

community development city ecology forestry; wastes; ecology; sustainable development; environmental health; land use management; natural resource conservation

This report is 38 case studies of cities coping with environmental issues. It is the first in a series. Substantial data, how to and who information is included. (JS)

Eberlee, J **(1999). Urban gardening in Haiti. IDRC Reports. May 28, 1999 http://www.idrc.ca/reports.**

community development horticulture Haiti; home gardening; urban poor; nutritional status

Residents of some of the poorest urban areas of Haiti are improving their health, nutrition status and income by growing vegetables in containers (old tires, baskets, pails, etc.) in confined spaces such as backyards, verandahs and rooftops. Under the supervision of CARE-Haiti and other partners, more than 400 people from 11 neighborhoods in Port-au-Prince and Gonaïves have attended training sessions on how to establish gardens where space is limited. Funds provided by the International

Development Research Centre (IDRC), CARE-Canada, the Canadian International Development Agency (CIDA) and CARE-USA are helping CARE-Haiti design, implement, monitor and evaluate space-confined gardening methods, including technologies tested in other IDRC-sponsored projects. This article is also available in French. (HC, IDRC)

Feenstra, Gail **et al (1999). Entrepreneurial community gardens: growing food, skills, jobs and communities. ANR University of California Publication No. 21587. Also on: http://danrcs.ucdavis.edu. 106 p**

community development economic impact services
community gardens; United States; entreprise development

Entrepreneurial community gardens are identified as a potential strategy for meeting multiple community needs, addressing both food security and economic development simultaneously. A survey of 27 such gardens nationwide was carried out. The following questions were posed: (i) what products and marketing strategies have worked under which conditions, (ii) how much income is being generated, (iii) how many jobs have been created, (iv) what kind of training is provided, (v) how much land and capital are required, (vi) what are the typical operating costs, (vii) to what degree can these enterprises be self-sufficient? Five cases explore all these questions and others. A set of 12 recommendations for success are posited. The appendices offer resources and addresses. (JS)

Fisher, A **et al (1998). Local Food Policy. Community Food Security Coalition**

community development land use planning food security and nutrition
R&D methodology
policy; NGOs; community associations; United States

This manual includes: (i) Tips for Organizing Coalitions and Food Policy Councils, (ii) Inventory of Food-related Policies in Local Government, (iii) Action Ideas for Changing Local Policy, (iv) Tips for Operating Food Policy Councils and (v) Case studies of nine Food Policy Councils and Similar Organizations. It provides useful information for assessing how city and county policies affect food production and distribution, and how they can be changed to promote community food security. It is a valuable resource for activists, academics, policy makers and others working on food and agriculture at the community level. 75 pages, (JS adapted from author)

Freeman, Donald B. **(1991). A city of farmers: informal urban agriculture in the open spaces of Nairobi, Kenya. McGill-Queen's University Press, Montreal; 159 p.**

horticulture city ecology
Kenya; land use; land tenure; informal sector; food security

This book – one of the first commercial publications on urban farming - presents a review of urban agriculture in Kenya over the past century. It reports on a 1987 six-

city survey of urban food production and consumption. And it reports on a central Nairobi metro survey of who farms what, where. It defines the benefits of this activity from several points of view. It provides a good tool for future researcher due to its extensive tables, maps, and references. (JS)

Furedy, Christine**. (2001) Reducing health risks of Urban Organic Solid Waste Use. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment waste recycling community development
India; health risk management, organic wastes, compost, informal practices, community-based composting, composting.

Health concerns received minimal attention at the beginning of the recent thrust to promote urban and periurban agriculture, but progress has been made recently in articulating the health issues, especially in developing countries. Some aspects of the risks of urban organic solid waste reuse are discussed in this paper. The focus in this article is the relation of health risk management to informal or community-based practices, with particular reference to composting and the use of decomposed organic wastes. Because the capacity of governments to intervene in most urban agriculture related activities is limited, it is argued that a gradual progress in self-regulation or self-limitation of risks is necessary and external assistance is needed for assistance with setting appropriate standards, promoting practical measures and stimulating research.

Garrett, Steven; Feenstra, Gail **(1999). Growing a community food system. Western Regional Extension WREP0135, Community Ventures Series.**

community development food security and nutrition R&D methodology
food systems; community; policy; evaluation

This short book defines what a community food system is and how to improve it. It provides guidance and example for project design, coalition building, strategic planning, community food system assessment, attracting resources/funding, building an organization, shaping policy and carrying out an evaluation. The authors' conclude that the following are essential ingredients: (i) long-term vision, (ii) incorporating the values of a wide cross section of the community, (iii) through assessment of the existing community food system, (iv) finding supporting leaders, (v) beginning with doable small projects, (vi) evaluating and documenting progress towards goals, (vii) finding resources on time, and (viii) maintaining a viable organizational structure (JS)

Gibson, Tony**. Showing what you mean (not just talking about it). Neighbourhood Initiatives Foundation, The Poplars, Lightmoor, Telford TF4 3QN, UK**

community development R&D methodology
methodologies; community initiatives

Provides a set of community building tools coined "planning for real". The tool-kit is intended for people trying to organise their neighbourhood. The tool-kit is process oriented and distinguishes tree stages: the model, priorities and resource surveys. (NB)

Groening, Gert; Wolschke-Bulmahn, Joachim **(1995). Ein Jahrhundert Kleingartenkukture in Frankfurt am Main. Frankfurt: W. Kramer & Co. 311 p.**
horticulture community development
allotment gardens; leisure gardens; policy; organisation; food security; community greening; Germany

"One hundred years of community gardening in Frankfurt" is a special history book about urban agriculture in good times and not so good times. It provides a depth of written and visual history not provided in any other book. (JS)

Groening, Gert **(1996). Politics of community gardening in Germany. In: Urban Agriculture Notes on: http://www.cityfarmer.org/german99.html#german, 16 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**
community development horticulture land use planning
community gardens; Germany; municipal policies

Gives quantitative data about community gardening in Germany and highlights difficulties in obtaining urban land for small gardens in Berlin, Germany. The paper examines implications of zoning law in Germany. There is an interesting historic overview of community or allotment gardens and their contribution to community development. (WB)

Guendel, Sabine Zeeuw, Henk de, and Waibel, Hermann **(2000) The integration of Agriculture in Urban Policies. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**
services community development
policy

The major objective of the International workshop in Havana in October 1999 Cuba was; "to move urban agriculture beyond the daily reality of urban farmers to the agenda of policy-makers". In synthesising that conference, the authors review the variety of conditions that facilitate the growth of UA, and secondly, discuss a range of policy options to selectively support the development of sustainable urban food production systems. This article is a shortened but adapted version of article in Bakker et.al, 2000, Growing Cities Growing Food.

Hall, Nicolas; Hart, Roger; Mitlin, Diana **(eds) (1996). The urban opportunity: the work of NGOs in cities of the South. 128 p. ISBN 1_85339_347_9 (pbk). USD 18.95**

Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK
community development
health care; local organisations; NGOs; sanitation; settlement schemes; urban development; urban environment; urbanisation

Examines how nine leading British NGOs are responding to the most profound change in human habitat that is taking place: urbanisation. It is estimated that by 2030, urban populations will be twice the size of rural populations. Together with urban growth, urban poverty has become much more acute. The implication is that the existing bias in development thinking towards rural development has to be revised. There is, at this moment, a trend towards a more positive attitude to urban and periurban development, in recognition of the fact that rural improvements can no longer exert their influence on urban poverty: urban growth has reached its own, independent, momentum. The underlying study reports about policies and practices of British NGOs in urban areas in developing countries. The common factor of all contributions in this book is the insistence on networking in order to bring people together, to share experiences, to transfer knowledge, and to pool people's strength in order to increase their negotiating power. Proposed strategies for poverty reduction move along three lines: (1) promoting new technology; (2) provision of credit and training; and (3) strengthening local organisations. These aspects are investigated through a number of case studies describing activities of the NGOs in a number of developing countries, covering a wide range of aspects of urban development, including health, older people, city partnership projects, rehabilitation schemes, human settlement, and community-led water and sanitation projects. (WB)

Hart, Roger **(1999). The theory and practice of involving young citizens in community development and environmental care. Earthscan and UNICEF, London & New York.**
community development
children; youth; community; environment; housing; governance, health

This book presents the argument that children can play a valuable and lasting role in sustainable development. The author finds, through examples that the planing, design, monitoring and management of the urban environment for living is an ideal domain for children’s participation. It is the ‘one stop’ book on the subject (JS)

Hassell, M. von **(2000) The Impact of Community Gardening Initiatives in New York City on Children In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning community development food security and nutrition
New York, United States, children; anthropology; housing; poverty

This paper describes research of the author on the Lower East Side of Manhattan since 1989. Her current work on community gardens has developed out of research

about a community-based initiative to renovate abandoned buildings. Community gardens on the Lower East Side emerged in conjunction with these housing initiatives from the early 1970s on. They must be understood in the context of fluctuations in the urban economy and attendant shifts in labor markets, housing availability, and market-driven struggles over space. There are approximately 950 community gardens in New York City, predominantly on city-owned land in neighbourhoods marked by poverty and deteriorated housing conditions. Many are contested and targeted by the current city administration as sites for development. In this paper the role of and impact on children in community gardens and community-based initiatives on behalf of these gardens in New York City are analysed. The focus was on food production, art, and education projects involving children in community gardens on the Lower East Side of Manhattan and on children's participation in marches and other events on behalf of the gardens.

Hobbs, K. **(2000) The role of community gardening and community development. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning community development food security and nutrition
New York, United States, children; anthropology; housing; poverty

The White House Task Force on Liveable Communities coordinates federal agencies with missions and resources that affect the liveability of American communities. The Task Force focuses on policies that promote sustainable growth, preserve open space, reduce congestion, improve schools, and make neighbourhoods safe. In pursuing these policies, the Task Force promotes coordinated Federal financial assistance, technical expertise, and information to assist collaborative efforts by communities at the state, local, and regional levels.

Holl, Annegret **(1998). Urbane Landwirtschaft in Havanna (Kuba) zwischen staatlicher Planung und 'moviemento popular'. 90 p.**

food security and nutrition community development hydroponics
Havana; Cuba; home gardening; community gardens; food security; agricultural markets; commodity-oriented agriculture

Urban agriculture in Havana is considered by many authors as an essential contribution to Cuban food security, is very much instigated by the state and now covers over 6,000 hectares within the city boundaries. This paper reports on a fact-finding trip examining if urban agriculture in Havana is as successful as is often claimed. Doing a survey to that effect revealed itself difficult in the current political setting. The author highlights existing discrepancies from state regulations, more particularly with regard to the composition of crops produced: many citizens go for staple food production rather than vegetables. The paper concludes that the contribution of urban agriculture to food security is less than what is often reported and certainly not enough to feed Havana. Also, rural production should be much more directed towards the internal Cuban market. A refreshing look at things which

are so often just taken for granted and therefore an important

Homem de Carvalho, J.L. **(2001) PROVE – Small Agricultural Production Verticalisation Program. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology community development services
Brazil; small enterprise development

The PROVE is a programme designed to promote small agricultural production, processing and trade involving many urban and periurban agricultural systems, including vegetable-gardening, fruit-growing and livestock systems. The State intervenes at the individual and/or collective level, with low-income groups as the main target audience. The PROVE started in 1995, and in the 1995-1998 period, 132 agro-industrial facilities were built in the Federal District. In following years, the Programme was implemented in different cities in the states of Minas Gerais, Mato Grosso do Sul, and Santa Catarina and in 28 cities in other states. In 2001, the Programme also was implemented in Quito, Ecuador. The different stages of the programme are described as the rungs in a ladder (11 rungs) that small farmers have a very hard time climbing. Enabling them to climb these rungs is a fundamental requirement to ensure the success of the PROVE and, consequently, to ensure their social integration with sustainable development and solidarity.

International Institute for Environment and Development (IIED) **(1994). Special issue on participatory tools and methods in urban areas. RRA Notes no. 21 (Nov 1994). International Institute for Environment and Development (IIED), 3 Endsleigh Street, London WC1H 0DD, UK**

R&D methodology community development
urban communities; community survey; participatory methods; urban planning

This issue of RRA Notes contains 13 articles on what might be called Participatory Urban Appraisal. Indeed, the need for the use of participatory research and development approaches in community development programmes in urban areas is high, as the editors indicate. Sections of this issue include: (1) Problem statement; (2) Description of the characteristics of urban settings and how they differ from the rural context; (3) The papers themselves, covering a wide range of issues; (4) Conclusions. A key publication. (WB)

Jeavons, John **(1974). How to grow more vegetables than you ever thought possible on less land than you can imagine. Palo Alto, CA: Ecology Action of the Peninsula. 81 p.**

community development horticulture
history; composting; biodynamic gardening; vegetable crops; integrated pest

management

This book has continued to be updated and reissued until recently. It is a manual of biodynamic raised-bed horticulture, a history, a philosophic statement and a vision. At its core are methods developed in the Marais in Paris in the 1890s, to which were added the biodynamic techniques of Rudolf Steiner in the 1920s. Alan Chadwick integrated biodynamic and intensive farming in the 1940s and brought them to California in the 1960s. This book reports on results and methods carried out at the University of California at Santa Barbara, on the basis of Chadwick's lessons. (JS)

Kaufman, Jerry; Bailkey, Martin **(1999). Exploring opportunities for community development corporations to use vacant land for urban agriculture. Lincoln Land Institute, Boston.**
community development
vacant lands; United States

This report sets out to determine and present the special obstacles in utilizing vacant 'inner city' land for entrepreneurial urban agriculture, with a special focus on community development. It studies over twenty cases several on greater detail than others. (JS)

Klein, Petra; Steen, Anniek **(1999). Urban agriculture: a review of the literature on the sociological and nutritional dimensions of urban agriculture in East Africa. 55 p. ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**
food security and nutrition community development health and environment
Kenya; Uganda; Tanzania; food security; nutrition; social aspects; urban livelihoods; health hazards; home gardening

In the framework of a literature study, this paper reviews a number of publications looking at sociological and nutritional aspects of urban agriculture, mainly in Nairobi, Kampala and Dar es Salaam. (WB)

Lamb, Gary **(1994). Community supported agriculture: can it become the basis for a new associative economy? In: Biodynamics Nov-Dec 1994 p. 8-15. Bio-Dynamic Farming and Gardening Association**
community development rural-urban linkages economic impact community initiatives

Describes the intricacies of Community Supported Agriculture (CSA), a community-based organisation of producers of consumers. This concept has spread primarily in the USA since the beginning of the 1990s. CSA is an approach and common understanding rather than a blueprint. The close links between producers and consumers have the potential of adapting offer and demand much more adequately to each other and to seek for optimisation instead of maximisation of production. In practice, the production-driven focus of farmers is not easy to wipe out. As much of

the support work is done by volunteers, the movement may find itself to weak to provide proper guidance and support in the long run. Still, this is a very interesting and important approach in the light of urban and rural renewal. (WB)

LifeSpin **(1997). Pocket-sized Farms - kid's garden book. LifeSpin. On: www.execulink.com/~life/**
community development horticulture
youth; education; organic gardening

Organized around the seasons the book is designed for children to use as members of a school garden club or in their own backyards. The book uses two fictional characters, the Crow and the scarecrow, in a rhyming story format to guide children through a series of important organic gardening principles. It is intended both as a source of inspiration and a learning opportunity for children. A second part of a package *Teacher's and Parent's Guide to Organic Gardening,* includes organic gardening advice, a number of educational activities, and specific tips for gardening with young kids. A third component is *The Kid's Workbook* – (JS)

Madaleno, Isabel Maria. **(2001) Urban Agriculture Supportive Policies: two distant cities. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning community development food security and nutrition
Portugal; Brazil

Agriculture is an old urban function. Doomed and cursed as it was after the first Industrial Revolution, it never ceased to exist in developing countries and is now once again welcome in most developed countries as well. Poor Brazilian communities see urban agriculture as an alternative survival strategy, because it produces food and improves household's nutrition, but also generates income and jobs, while additionally providing self-respect and hope for a better future. In Portugal, city gardening is small-scale, aimed at giving opportunities for child and adult education, providing ways to produce and consume healthy food, and to enhance contact with land and living things.

Marulanda L. **(2000) Ahmedabad Green Partnership Project. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**
urban forestry community development
India; partnerships; private sector;

urban forestry programmes and projects need longer time to show results. Trees are long-term products and to make an urban forestry programme a success, the project partners need to keep a constant dialogue and a long-term commitment to make it happen. The author illustrates this in a description of the Ahmedabad Green Partnership Project, which is an effort between the Ahmedabad Municipal Corporation (AMC) and the Private Sector towards increasing the green cover and

improving the environmental quality of the city of Ahmedabad in India.

Maxwell, Daniel G.; Zziwa, Samuel **(1992). Urban farming in Africa: the case of Kampala, Uganda. Nairobi, Kenya: African Centre for Technology Studies.**
community development land use planning
Uganda; land tenure; social groups; land use; constraints

This report provides the culmination of Maxwell's research on Kampala in the late 1980s and early 1990s. It paints a general picture of urban agricultural practices in the city, and focuses on the social organization and the access to land by urban farmers. (JN)

Mbiba, Beacon M. **(2001) The Marginalisation of Urban Agriculture in Lusaka's Contemporary Planning and Urban Land Dynamics. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning economic impact
planning; Zambia; poverty; land tenure

In 1987, Sanyal suggested that Lusaka, Zambia, was the capital city of urban agriculture (UA) in Africa. This was at the peak of Zambia's economic crisis when residents took up UA as a form of employment and to improve their nutritional status. Travelling in the region today, one will easily agree that Harare, Zimbabwe, has taken over as the capital of urban agriculture and that the activity may not be as widespread in Lusaka as observed by Sanyal. There is no longer abundant maize growing and in addition, there is little integration into planning. In fact, urban and periurban agriculture has been marginalised out of planning; it is not considered a priority by the city authorities and is being gradually squeezed out by residents seeking lodgings to rent, as well as developers. Under these circumstances, a recurring question is 'what factors determine the integration (or otherwise) of urban agriculture into city planning'?

Meares Cohen, Alison **(1999). People at the Centre of Urban livestock Projects. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 90-94. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
urban livestock community development
food security; environment; employment

Promoting urban agriculture is an important means ensuring sustainability of regional community food security and human settlements. Too often the focus is exclusively on technology and agricultural production methods. In its urban animal-agriculture initiative in Chicago, Heifer Project International promotes a method of participatory

development that enables low-income neighbourhood groups to reach beyond the goals of beautification and environmental improvement and become a vehicle for social and economic development in their communities. The elements of that model include the interdependence of the landscape and lifescape, full participation of intended beneficiaries, values-based planning, and “passing on the gift" When approached as a vehicle for community development, urban agriculture can bring multiple benefits: economic benefits, by providing opportunities to earn income; educational benefits, by teaching technical and job skills; environmental benefits, and, finally, empowerment. It is at the crossroads of these goals that urban agriculture projects can thrive and influence the character of human settlements. (Abstract adapted from original)

Meyer-Renschhausen, Elisabeth; Holl, Annegret **(eds) 2000. Die Wiederkehr der Gaerten: Kleinlandwirtschaft im Zeitalter der Globalisierung. 229 p. ISBN 3-7065-1534-2. Innsbruck: Studien-Verlag**

horticulture food security and nutrition community development
horticulture; gardening; allotment gardens; vegetables; conferences; Germany; United States; Cuba; Mexico; Burkina Faso

More and more city dwellers become involved in producing vegetables and fruit, rather than consume commercially produced food. The reasons strongly vary, however, from sheer necessity in many Eastern European and developing countries to a reaction to the unhealthy commercial products and the benefits of a relaxed pastime for overstressed urban citizens.

A number of chapters in this book were originally presented at the 'International Symposium on Urban Agriculture and Horticulture: the Linkage with Urban Planning' held in Berlin in July 2000. Cases described are from Western Europe -Germany, in particular-, Eastern Europe, the USA and from developing countries. Many different aspects are described, ranging from the land use issues, that never fail to come up in these cases, to community development and to descriptions of gardening systems, like the chinampas near Mexico City. Interestingly, a number of projects are analysed that were unsuccessful in involving the beneficiaries. Invariably, these projects did not take traditional production and consumption patterns enough into account. This is an important warning not to automatically paint a rosy picture of urban gardening. (WB)

Moldakov, O. **(2000) Urban Agriculture in St Petersburg, Russia. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**

rural-urban linkages community development
Russia

The St. Petersburg Downtown Gardening Club is one of the six Eastern European organizations active in SWAPUA, SWAPUA stands for “Soil and Water Management in Agricultural Production in Urban Areas in CEE/NIS Countries”. In this contribution the author who is involved in the St. Petersburg Downtown Gardening Club shows

that the urban gardening movement in St. Petersburg has a long-standing history, both as a strategy to overcome shortcomings in food availability and for income improvement.

Moskow, Angela Lynne **(1999). The contribution of urban agriculture to gardeners, their households, and surrounding communities: the case of Havana, Cuba. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 77-83. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
community development economic impact food security and nutrition
food security; community development; economic impact; food quality; Havana; Cuba

Urban agriculture is promoted in Havana, Cuba, as a means of addressing the acute food-scarcity problems that developed when Soviet aid and trade were drastically curtailed in 1989. Today more than 26 000 gardens in Havana provide for the gardeners' own food needs. Research was conducted in 1995 to determine the ways these gardens contributed to the gardeners' sense of control over their lives and the role of the gardens in enhancing the surrounding communities. Results indicate that the gardens significantly incremented the quantity and quality of the food available to the gardeners' households and neighbourhoods; improved financial welfare through reduced gardeners' households weekly food bills and through money earned from sales of garden products; and made aesthetic, environmental, and other contributions to the community. (Abstract adapted from original)

Moya, Rita; Montero, Alejandro; Yurjevic, Andres **(1996) Invest in the poor to allow to create wealth: the Tomé project in Chile. In: Agriculture + Rural Development vol. 3 (1996) no. 1 p. 53-55. Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)**
community development economic impact
Chile; community initiatives; local government; development projects

Tells the story of a town in southern Chile hard hit by the closure of its 3 textile factories back in 1982. Local government, the population and an NGO worked together towards in a successful programme covering 400 families. The plan contained an analysis of costs and benefits, investments, and expected productivity. (WB)

Munkstrup, Nina; Lindberg, Jakob **(1996). Urban ecology guide. 144 p. ISBN 87-87487-993 Danish Town Planning Institute, Copenhagen, Denmark**
city ecology community development

Denmark; development projects; urban planning

45 examples of projects in the greater Copenhagen district are presented in this guide together with different descriptions of urban ecology relations in the city. Very useful information can be found on the projects (ideas, purpose, time frame) as well as contacts for anybody inspired to work on a similar type of project. Projects vary from new residential developments, urban renewal and renovation to nature in the city and green centres. All of projects have in common the aim towards promoting and ensuring sustainable development. The report contains many photos from different project sites and maps of the locations. A very useful guide that can stimulate new ideas. (WB)

Niñez, Vera K **(1985). Working at half-potential: constructive analysis of home garden programmes in the Lima slums with suggestions for an alternative approach. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 6-14. International Potato Center (CIP), Lima, Peru**

community development horticulture

Peru; home gardening; food security; development projects; programme evaluation

Describes gardening and garden development projects in Lima, Peru, providing the socio-economic and nutritional background of low-income target populations against which small-scale food production development projects were conceived at a time when such initiatives were still rare. (WB)

Orione, Julio **(1990). The cultivated city: kitchen gardens in Buenos Aires. In: UNESCO Sources no. 17 (July/August 1990) p. 13**

horticulture community development

home gardening; Argentina; food security

Describes the research work on homegardening done by the Center of Urban and Regional Studies (CEUR), Buenos Aires. Much of this article deals with the motives of urban dwellers to engage in this activity. (WB)

Pasquier, Elisabeth**.(1997). Jardiner en ville. Les Annales de la Recherche Urbaine No. 74 (March 1997) p. 103-112.**

community development

France; vacant lands; social relations; community gardens; immigrants

The author of this chronicle, an ethnologist turned gardener, gives a day by day account of her integration into the precarious local microcosm of mostly immigrant gardeners at the outskirts of Nantes, France. Her account of this rite of passage also tells of migration, mutual aid and urban coexistence. (adapted from original by JN)

Payne, Steven **(19??). Pursuing urban harmony. In: Simply Living p. 28-30**

city ecology community development
urban design; urban planning; ecological systems; community initiatives

Paints a picture of ecologically oriented urban planning schemes, and what community initiatives can achieve within the often strict boundaries of city administration. There is particular attention for the Village Homes housing development scheme near Davis, California, with its large communal areas and food producing greenbelts, as an example of successful, functional and holistic urban design. In addition, cases are described of community initiatives in Australia. (WB)

Pedneault, André; Grenier, Roll **(1996). Créer un jardin communautaire: l'aménager, le gérer, l'animer. 113 p. ISBN 2_89417_673_2. Mouvement pour l'Agriculture Biologique, Région Métropolitaine (MAB-Métro), 4560, Av. de Bellechasse, Apt. 2, Montréal, Canada H1T 1Z2**
community development
community gardens; Canada

A practical guide for making the most of community gardens in Montreal, Quebec. The publication primarily focuses on organisational aspects: how to organise groups, juridical aspects, financial management. There is much practical information (addresses, legal texts) for the Canadian setting. (WB)

Perez Vazquez, A., Anderson, S. and Rogers, A. **(2001) Urban agriculture in England, Perspectives and Potential. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning community development
United Kingdom; leisure; PRA

Urban agriculture is one of the most important activities in many countries around the world. Its importance is because of the many benefits that holders obtain for it and the multiple opportunities that it brings to minority population. The most important sort of urban agriculture in England is the allotment. Allotments are small pieces of land in cities, which English people use to grow their own food in a peaceful surrounding. Allotments have been very important during Britain's history. It was vital for producing food during the I and II World War and also in modern times the allotment is viewed as an option for many people to avoid GMO food and chemical food. The aims of this field research was to determine and analyse the main characteristics of allotment agriculture in the Southeast of England (London, Ashford and Wye) through Participatory Rural Appraisal (PRA) tools, such as mapping, time lines, seasonal calender, ranking and force field analysis. Interviews were carried out with a selection of allotment holders about a variety of subjects using semi-structured interviews. The results suggest that the main purposes for having allotment are because of fresh and safety food, as a hobby, exercise and to get relaxation.

Peters, Kim **(1999). Community-based waste management for environmental management and income generation in low-income areas: a case study of Nairobi, Kenya. Urban Agriculture Notes. http://www.cityfarmer.org/NairobiCompost.html. 36 p. Mazingira Institute, Nairobi, Kenya**
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling community development gender
waste management; composting; Kenya; gender; organisation; environmental aspects; rural-urban linkages

The paper focuses on community based waste management in Nairobi, Kenya. Women groups started composting organic waste as a means of improving community environmental conditions and generating income through the sale of compost. Through this composting, significant environmental improvements have been achieved including health, agricultural opportunities, improved drainage. It is recommended that local authorities should focus on regulation and co-ordination while NGOs could provide advice and training for local authorities. (NB)

Pro Huerta **(1990?). Promoción de la autoproducción de alimentos: proyecto integrado. Buenos Aires, Argentina: Subsecretaria de Agricultura, Ganaderia y Pesca, Instituto Nacional de Tecnología Agropecuaria, (INTA).**
community development horticulture
Argentina; manuals; training; home consumption; organic agriculture

This binder was prepared by Argentina's Pro Huerta, one of the largest and most important programs for training gardeners in the world. It contains seven training booklets: (0) a general booklet on Pro Huerta and one can use it; (1) a booklet on the small farm; (2) one on the intensive organic garden; (3) one on the organic soil; (4) one on organic soil additives; (5) one on planning for work in the garden; and (7) one on the management of the organic garden. Some technical sheets complete this well-organized collection.

Raja, Samina **(2000). Preserving community gardens in a growing community. Madison Food System Project Working Paper Series, MFSP-WPS-0450.**
community development
community gardens; policy; land use; land tenure

The city of Madison recently engaged in a planing process that centered on community gardens as one alternative for providing a more healthy and sustainable food system. This report is focused on the planning process of establishing and maintaining community gardens in a middle-sized city. It includes a status report: number, size, spatial distribution, types, demand, success, user profile, city policies, and sustainability. It concludes with an action plan based on a set of tools and strategies for preserving and starting-up new community gardens. (JS)

Riches, Graham **(1999). Reaffirming the right to food in Canada: the role of community-based food security. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 203-207. ISBN 0_88936_882_1. CAD 35.00. Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

community development food security and nutrition

food security; food policy; food systems

How is it possible to move from the declarations and rhetoric of world summits, international conventions and governments and their assertions of a right to food when evidence suggests that governments and to some extent civil society have in recent years sought to depoliticize the issue of domestic hunger and make it no longer a responsibility of the state? How is it possible to ensure that the complex and interrelated issues of hunger and food security become the subject of informed democratic debate and thereby publicly understood as being critical not only to the poor and vulnerable but also to long-term ecological and social well-being? The paper examines these questions by asking whether the right to food in Canada exists, addressing the causes of First World hunger, and analysing the responses of federal and provincial governments, businesses, and charities to food poverty in terms of the depoliticization of hunger. It argues that collaborative and adversarial actions at the community level are essential if the right to food is to be established and food security for all is to be achieved. (Abstract adapted from original)

Rogers, Nedjo **(ed.) (1996). Urban agriculture handbook: practical actions for cultivating communities. Youth and Sustainable Cities Series, booklet No. 3. Victoria, B.C.: LifeCycles and The West Coast Ecological Youth Alliance.**

community development R&D methodology

youth;allotment gardens; community gardens; kitchen gardens; community greening; Canada

This is in essence a manual with a lot of justification from history and cases. Its scope is limited to urban agriculture as an anti-poverty greening and education tool. (JS)

Rose, Gregory D **(1999). Community-based technologies for domestic wastewater treatment and reuse: options for urban agriculture. Cities Feeding People report series no. 27, also on: http://idrc.ca/cfp/rep27_e.html. 52, 13 p. International Development Research Center (IDRC), Cities Feeding People Program, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

wastewater reuse community development

wastewater treatment; wastewater reuse; urban environmental management

Stresses the under-management of domestic wastewater in many southern urban areas. Unmanaged wastewater contributes much to the contamination of locally available fresh water supplies and can, obviously, have a negative effect on public

and ecosystem health. As has been pointed out by many different authors, centralised European-style human waste management has not worked out well in developing countries. In contrast, emergent trends in low-cost, decentralised or intermediate level urban wastewater management becomes more important, creating space for innovative appropriate technologies. These often develop along the lines of planning integrated wastewater management strategies in conjunction with urban agriculture as a recipient of grey water. An important study providing a clear overview of the field.

Scharf, Kathryn **(1999). A nonprofit system for fresh-produce distribution: the case of Toronto, Canada. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 122-127. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
services community development food security and nutrition
food distribution; access to food; Canada; Toronto

The Good Food Box (GFB) project of FoodShare Toronto is a nonprofit fresh-food-distribution system that operates like a large buying cooperative: 4 000 boxes of fresh fruit and vegetables are delivered through 200 volunteer-run neighbourhood drop-offs each month. The GFB is a successful continuity-based and market-driven food-distribution alternative. The similarities and divergences from traditional community-development or nonprofit-sector projects are explored, as "business principles" needed to be incorporated to ensure its success in the marketplace. Stimulating community self-organization, improving food access for low-income people, promoting healthy food choices, and avoiding the stigmatisation involved in charity-based models of food distribution are all goals of the GFB. As a free-based service, the GFB must compete effectively, meaning that it must maintain a high level of customer service, a high level of sales, a fairly low level of mandatory time investment from participants, and attractive advertising - charactristics which it are not often seen in non-profit community-development projects. (Abstract adapted from original)

Selener, Daniel; Chenier, Jacqueline; Zelaya, Raul **(1997).. Farmer-to-farmer extension: lessons from the field. IIRR: New York. 150 p. Available in English and Spanish.**
services community development R&D methodology
training; agricultural extension; Mexico; Nicaragua; Ecuador; Latin America; case studies

This book is especially useful for people working in agriculture, health, education, and community development following participatory approaches. This book is the result of two workshops, one in Honduras and another in Ecuador, that were conducted to document and analyze the experiences of several community development projects, using the "farmer-to-farmer" extension methodology. Most of

the information contained in the book is from the farming promoters' points of view, based on their practical experience working in farmer-to-farmer programs. The description and analysis presented offers a broad set of experiences. This information can be analyzed and adapted by the reader to his/her own project, according to the context, project philosophy, objectives, and available resources, among others. (JS adapted)

Shuman, Michael H **(1998). Going local: creating self-reliant communities in a global age. Free Press, New York, 306 p.**

community development R&D methodology

selfreliance; globalisation; ecology

This book details how dozens of communities are regaining control over their economies by investing in locally owned businesses and replacing imports. This is presented as a compliment to globalization. (JS)

Thrupp, Lori A **(ed.) (1996). New partnerships for sustainable agriculture. World Resources Institute. 136 p.**

community development

sustainable agriculture; policy; agroecology; participatory planning

Emerging initiatives to develop sustainable agriculture are illustrated by nine cases from four continents. These collaborative projects focus on implementing ecologically oriented integrated pest management and offer common lessons about sustainable profitable production practices. The editor concludes that these experiences are broadly useful for achieving food security in the countries and regions studied. She identifies needed policy changes and actions to overcome barriers including: (i) spreading agro-ecological practices, (ii) strengthening collaboration and exchanges, (iii) increased information exchange, (iv) changing government policy to eliminate agro-chemical subsidies, (v) changing the advertising practices of agro-chemical firms, (vi) increasing donor support to sustains efforts such as those presented, (vii) building education and community empowerment. Each of the projects followed guidelines suggested by the World Resources Institute. The 30-page overview with 50 references is an excellent presentation advocating sustainable agriculture, which has direct application to urban agriculture. (JS)

Torres Lima, Pablo A **(1991). El campesinado en la estructura urbana: el caso de Milpa Alta. 131 p. ISBN 970_620_023_1. Universidad Autónoma Metropolitana, Xochimilco, Mexico**

community development rural-urban linkages R&D methodology

Mexico

Describes the case of farmers in a commmunity that has provided a megacity with food while maintaining much of its traditional, rural, social tissue. The analysis examines various facors: natural resources in the region, type of population,

structure of the labour force, land use, and socio-economic relations. (WB)

Torres Lima, Pablo A **(ed.) (1998). Procesos metropolitanos y agricultura urbana en México. 221 p. Universidad Autónoma Metropolitana, Xochimilco, Mexico**
community development
Mexico; multi-disciplinary approach; methodologies

This report, in Spanish, reflects the contributions from two events held in México: The 'First National Symposium on Urban Agriculture and Metropolitan Processes' held in October 1997, and the 'International Seminar on Sustainable Development and Urban Agriculture', held in July 1999. Eight presentations in urbanisation in Mexico are taken from the first event, in which the relation between urban and rural production is central. Of the second event, five presentations from Mexico and one from El Salvador and one from Ecuador, both on animal production, are presented. (RvV)

Torres Lima, Pablo A; Rodríguez Sánchez, Luis Manuel; Garcia Uriza, Brenda I **(2000). Mexico City: the integration of urban agriculture to contain urban sprawl. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 363-390. DSE, GTZ, CTA, SIDA**
city ecology economic impact community development
urbanisation; land use systems; farming systems; ecology; economic impact; gender; urban policies; Mexico; reuse of waste; poverty; land tenure; ornamental plants; floriculture; fodder production; migration; water management; community organisation

Three different zones for urban agriculture are distinguished in Mexico: the urban nuclear zone, rural-urban fringe and the intermediate urban zone. The land tenure situation and conceptualisation of land as a commodity are important for the urbanisation process and the types of urban agriculture. Some characteristics of urban farming are that it is flexible, small scale, sells at local markets and recycles waste. Functions go beyond strict economic impact and include cultural aspects. Farmers are a mixed group of people of migrant origin with women playing a dominant role in urban agriculture. An important aspect of urban farms is that they do not have a minimum size and enable large sections of the population to benefit. The farms use space very efficiently. The contribution to the household economy varies, but is significant. Urban agriculture also generates numerous jobs. Urban agriculture functions as a green belt, limiting outward migration of the urban poor and the urban sprawl. Analysis of flows of mass and energy demonstrate the efficient reuse of outputs of urban agriculture. Agriculture in the urban zone is illegal and in general government policies have not been favourable to agriculture. Visions and strategies for urban agriculture are presented as well as recommendations of which decentralising political and economic power perhaps is the most important. (NB)

UNDP **(1989). The productive home and urban community. UNDP Bogota Colombia, 28 p.**
community development hydroponics
housing; poverty; hydroponics; urbanisation; Latin America

This community planning document makes and excellent presentation of rooftop hydroponics with scale models and economic analysis. (JS)

UN-FAO **(1990). Development of Pekarangan Land. FAO (TCP/INS/8852) 50 p.**
community development horticulture
home gardening; policy; training; agricultural extension; ecology; nutrition; micro enterprise ; medicinal plants; herbs

This report presents the results of four surveys of home gardens in Java, Sumatra and Timor (240 farmers in all). In addition, it reviews 22 papers covering the fields of policy, ecology, nutrition, commodities, and case studies. Further, it presents the results o a desktop review of 50 papers written between 1975 and 1988. It suggests the formation of a new institution in Indonesia to support home gardens, as well as further research, extension, training, better inputs, and improved marketing. (JS)

USDA **(1999). Small farmer success stories. On: www.ams.usda.gov/tmd/mta/publications.htm.**
community development
market gardening; United States; farmers' associations

Four bulletins describe a project through which a group of limited-resource growers in the northern Florida area formed a cooperative to market fresh produce to local school districts. The bulletins outline the experiences of the New North Florida Cooperative, now in its third school year of operation. (JS adapted from authors)

Van En, Robyn **(1993). Basic formula to create community supported agriculture. Chelsea Green, White River Junction, Vermont, USA.**
community development
market gardening; United States; community supported agriculture

This is a basic step-by-step guide to establishing a Community Supported Agriculture enterprise. Adjustments will need to be made in different cultures and economies. (JS)

Wasescha, Anna; Ness, Karla **(1999). Involving children in children's gardens: farm in the city, St. Paul, Minnesota. Urban Agriculture Notes. http://www.cityfarmer.org/AnnaW.html. 11 p. Farm in the City, 1312 Dayton Avenue, St. Paul, Minnesota, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture

community development horticulture
children; urban gardens; education; United States; environmental awareness

Description of the project 'Farm in the City' and its achievements. The project area, Dunning Field, lies between two educational institutions. It was hoped that the project would serve as a new town square uniting educational and residential communities and providing a gathering place for community building events. The mission of Farm in the City is to educate children about the environment, food creativity and the importance of diversity. (NB)

Wekerle, G.R. **(2001) Multicultural Gardens: Changing the Landscape of the City. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning community development horticulture
Canada; leisure; PRA; multi-cultural society; immigration

Toronto is one of the world's most multicultural cities, yet, until recent years, the landscape of the city reflected primarily an Anglo-American tradition in landscape design and private gardens. This has changed. The landscapes of private gardens and public spaces, including parks, have begun to reflect the diversity of ethnocultural communities that inhabit and use these spaces. Horticulture forms the basis for communication across cultures; in some instances,it generates conflicts over public plantings and the appropriate use of public space. Immigrants to Toronto bring with them rural traditions formed in far flung parts of the world. Gardeners from Southern Europe, Latin America, the Caribbean, and South Asia bring to the city their agricultural experiences and make new demands on the city to meet their needs for earth to grow foods and plants from their homelands. Drawing from intensive interviews with immigrant gardeners, the paper reports on key themes emerging from the research: the importance of urban agriculture in maintaining cultures and traditional knowledge; the use of urban gardens to transmit culture to the next generation; how horticulture forms the basis for communication across cultures; and the emergence of an underground economy, divorced from the market economy, of seeds and plants to meet the needs of immigrant gardens.

Whitfield, Lin**. City farms: livestock in urban communities. In: Community Development Journal (volume unknown)**
urban livestock community development
animal husbandry; allotment gardens; community initiatives; United Kingdom

Describes the role of City Farms, community projects centred around farm animals and gardening, situated on areas of derelict land in the centre and on the edges of towns and cities in the UK. Many different groups of people benefiting from these farms, these farms fulfil an important social role. Many educational activities are organised around these farms. Often, the City Farms offer facilities for allotment gardening with a communal land management approach. Challenge in the

organisation of the City farms is to become as self-financing as possible, by employing volunteers and receiving donations. (WB)

Winterbottom, Daniel **(1999). Hopeless future for gardens of hope? Casitas gardens of reclamation. Urban Agriculture Notes http://www.cityfarmer.org/casitas.html. 12 p. El Museo del Barrio, 1230 Fifth Avenue at 104th Street, New York, NY, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture community development
United States; community gardens

Documents community gardening among Puerto Ricans in New York. Ten cases of gardens with casitas or wood frame structures are displayed. The people transformed vacant and garbage strewn lots into productive vegetable and flower gardens. The gardeners provide comments and emphasise the community aspect of their work. (NB)

You, Nicolas **(1981). Alternative strategies in urban development: some Chinese experiments in a quest for agrapolitan space. In: Third World Planning Review vol. 3 no. 1 (Feb 1981) p. 77-93**
land use planning community development rural-urban linkages
China; community initiatives; land use planning; rural-urban linkages

Gives a detailed account of land use planning in China since the era of the Han Dynasty up to our days. Rural-urban linkages have always been strong in China, urban dwellers maintaining close links with their ancestral home village. Since the 1950s, the relationship between city and countryside has known different levels of appreciation, but bringing the two closer together was always an overriding aim: 'urbanise the countryside, and ruralise the city'. This article provides interesting background reading and is very revealing about policy considerations of Chinese officials. (WB)

1.5 Health and Environment Risks associated with Urban Agriculture

Crops and/or cereals growing on suspect land and dubious water.

(Picture: René van Veenhuizen)

Health and environmental risks associated with Urban Agriculture

Karen Lock (London School of Hygiene and Tropical Medicine, London) and Henk de Zeeuw (ETC-RUAF, Leusden, the Netherlands)

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1. Introduction

Urban agriculture can have both negative and positive effects on the health and environmental conditions of the urban population.
This section deals mainly with the health and environmental risks of urban agriculture. The positive aspects on health and environment are dealt with in the sections on urban food security and nutrition and the section on urban ecology respectively.

Like rural agriculture, urban agriculture entails risks to health and the environment, if not managed and carried out properly. It is essential to address the health risks associated with urban agriculture for two main reasons (Flynn 1999):

I. to protect consumers from contaminated foods and farm workers from occupational hazards; and

II. to secure the support of municipal and national authorities for sustainable urban food production.

City authorities have often been reluctant to accept urban agriculture because of perceived health risks. Nevertheless, in most cities in developing countries, urban agriculture is practised on a substantial scale, despite prohibitive laws and regulations. Hence, rather than general laws prohibiting urban agriculture, which are largely ineffective, policies are needed that actively **manage** the health risks related to urban agriculture.

2. Overview of the major categories of health risks associated with urban agriculture

Birley and Lock (1999) make an extensive review of the literature on health issues related to urban agriculture.

The main health risks associated with urban agriculture can be grouped into the following categories:

a. Contamination of crops with **pathogenic organisms** (e.g. bacteria, protozoa, viruses or helminths), due to irrigation by water from polluted streams, or inadequately treated waste water or organic solid waste products;

b. Human diseases transferred from **disease vectors** attracted by agricultural activity;

c. Contamination of crops and/or drinking water by **residues of agrochemicals**;

d. Contamination of crops by uptake of **heavy metals** from contaminated soils, air or water;

e. Transmission of diseases from domestic animals to people (**zoonosis**) during animal husbandry, processing or meat consumption;

f. Human diseases associated with **unsanitary post-harvest processing, marketing and preparation** of locally produced food; and

g. **Occupational health risks** for workers in the food-production and food-processing industries.

Review of the available literature indicates that, although insight into the potential health risks of urban and periurban agriculture is growing, detailed information on the actual health impacts of URBAN AGRICULTURE is scant.

3. Contamination of crops with pathogenic organisms by reuse of urban wastewater and organic solid waste products

a. Reuse of urban organic solid waste products

The main use of solid waste is as a soil improver (household waste, market refuse, sewerage, night soil, manure, fish waste, and agro-industrial waste). Agro-industrial waste, household refuse and market waste are also used to produce feed for livestock and fish.

Composting is the most common form of processing urban organic waste products. Composting reduces several health risks by:

- getting refuse ‘off the street’ and so reducing health hazards related to inadequate refuse collection and disposal (and associated risks such as transmission of diarrhoea and dysentery by houseflies, increased breeding of mosquitoes and contamination through scavenging animals);
- by sanitising waste through heat destruction of some pathogens, including helminth eggs found in night soil.

There are four main health risks related to the reuse of organic waste products:

1. Pathogens may not be destroyed (especially helminth eggs in night soil) if the compost is not properly prepared (too low temperature). The risk is greatly enhanced if organic materials are mixed with human excreta from latrines, manure or hospital waste, causing pathogens to breed.
2. Improperly maintained compost heaps may attract rodents (which may be reservoirs of diseases) and insects (which may be vectors of diseases).
3. Non-biodegradable fragments may cause injuries, skin infections, respiratory problems and other occupational problems of waste pickers, waste selectors and others involved in the composting process.
4. Heavy metal contamination due to mixing of organic materials with industrial waste (caused for example by occasional dumping of industrial waste in open spaces within residential areas).

b. Irrigation with improperly treated wastewater

Liquid waste from domestic sewage is widely used for irrigation and fertilisation of field crops, perennials and trees, biogas production, and fish ponds. A large part of the wastewater used is untreated or poorly treated.

Wastewater contains various bacteria, protozoan parasites, enteric viruses and helminths. These risks are not limited to official wastewater but often also apply to rivers and other open

water sources, as indicated by figures gathered by Westcott (FAO, unpublished, cited in Birley and Lock, 1999): 45% of 110 rivers tested carried faecal coliform levels higher than the WHO standard for unrestricted irrigation.

There are many forms through which untreated wastewater can lead to human diseases in urban agriculture. Coliform bacteria are mainly transmitted to humans from contaminated wastewater that has been used to irrigate crops. Another route is by consumption of contaminated meat from domestic animals that ingested tapeworm eggs from faeces in untreated sewage. Poorly treated sewage may contain viable stages of the hookworms that live in moistened soils and affect agricultural workers who expose their bare skin to the soil. Transmission of pathogens may also take place by fertilisation of fish ponds with human and animal waste products (e.g. overhanging latrines, overhanging poultry cages, ducks, addition of urban night soil and use of wastewater).

Furedy (1996) points out that official attitudes towards the health risks associated with reuse of urban waste products have historically changed with necessity. Furthermore, she believes that perceived health risks of the reuse of urban waste products in agriculture are overstated and that regulations concerning waste reuse are frequently outdated or lack comprehensiveness.

Armar-Klemesu et al. (1998) indicate that the major sources of bacterial contamination of fresh vegetables may draw from the distribution, handling and marketing system rather than from production.

Prevention and control measures suggested in the literature:

- Improved intersectoral linkages between health, agriculture, waste and environmental management; well-defined priorities and joint strategies; adoption of clear waste reuse policies for urban agriculture which are based on health criteria and impact assessments of waste reuse schemes in agriculture.
- Waste separation at source; regular collection of organic refuse; prevention of mixing household waste with waste of hospitals and non-agroindustries.
- Establishment of decentralised composting sites; securing the application of proper composting methods (temperature, duration) to ensure killing of pathogens; recognition of the various informal actors involved in the processing of urban waste products and the marketing of recycled products; enabling clean water supply and sanitation services at dump and processing sites.
- Identification of quality standards for municipal waste streams and composts produced from them; monitoring of quality of soils, irrigation water from rivers and wastewater outlets, and of composts; certification of safe production areas; restriction of crop choice in areas where wastewater is used but water quality cannot be guaranteed.
- Establishment of adequate wastewater treatment facilities with appropriate water treatment technologies, e.g. waste stabilisation pond systems rather than sludge treatment plants - the former are cheaper to establish and maintain and retain more nutrients.
- Farmer education on management of health risks, for workers and consumers, associated with reuse of waste in agriculture, including:
  a. avoidance of direct exposure to wastewater and soils treated with wastewater, e.g.

by using boots and protective clothing, and regular washing of hands and feet;
b. adaptation of crop choice in wastewater-treated land: e.g. it is not appropriate to grow fresh salad crops such as tomato, lettuce, parsley, cucumber and mint in poorly-treated water; these could be replaced by fodder, fibre, wood and seed crops; and

- c. application of drip irrigation or other localised irrigation methods (rather than sprinkler, gravity or spraying). Irrigation with wastewater must be stopped three weeks prior to harvesting.
- Consumer education, e.g. scraping and washing of fresh salads; eating only well-cooked crops, meat and fish from wastewater-fed crops, animals and ponds.
- Fish farmer education regarding precautions in the management of wastewater-fed fish ponds.

4. Diseases transmitted by disease vectors attracted by agricultural activity

Malaria occurs in many environments but particularly in areas where irrigation is practised. Malaria in relation to urban agriculture is a serious risk in Africa only. Adaptation of malaria mosquitoes to urban environments has been observed. Most malaria is found on the periphery of the cities where mosquitoes (the main one being *Anopheles gambiae*) breed in temporary water pools that contain clean, sunlit and shallow standing water in rice fields and poorly drained water surfaces (due to irrigation or interfering with natural drainage) and uncovered water tanks.

The type of crops grown and farming methods used in urban agriculture determine to a large extent whether or not urban agriculture increases malaria risks. The conditions for growing wet crops and forms of ridge cultivation (e.g. rice, sweet potato and yams) are favourable for the breeding of malaria mosquitoes. Cassava growing is only occasionally a problem, when it is grown in cultivation ridges in wet clay soil. In contrast, maize and banana crops, as well as tall grasses, present **no** particular malaria risk, as is often thought in African cities. There are many examples where authorities have traditionally justified destruction of urban crops by saying that anopheles breed in leaf axils (such as those of maize) whereas research clearly indicates the axils of maize plants are never breeding sites for malaria or any other kind of mosquito.

Filariasis is transmitted by the mosquito, *Culex quienquefasciatus*, which breeds in standing water that is highly polluted with organic matter. This occurs typically in densely populated human settlements where conditions include pit latrines, blocked sewage drains, cesspits and septic tanks, soak pits and poorly designed sewage-treatment plants. Filariasis is spreading rapidly due to urbanisation.

The Aedes mosquito, which is the main vector of dengue, breeds in water containers that include much solid waste (e.g. tin cans, coconut husks, rubber tyres, water storage jars).

Chagas disease has recently been emerging in periurban areas mainly in Latin America.

Poor disposal of organic solid waste (animal manure, crop residues and other farm refuse) may also attract rodents and flies that may be carriers of diseases (e.g. plague), and scavenging by domestic animals (e.g. cats, pigs and rats) is associated with a range of food-borne diseases such as amoebic and bacillary dysentery.

Suggested prevention and control measures:

- Co-operation between the health sector and the natural resource management sector (solid waste management, water storage, sewerage, agriculture and irrigation) is essential to reduce vector-borne diseases. Filariasis control is not sustainable until related urban problems, such as solid-waste management, are solved in an integrated way (drains are often blocked by garbage due to ineffective collection systems). Solid waste management is also essential for the control of dengue and dysentery (as well as rodent control programmes).
- Water tanks and irrigation systems (especially in periurban areas) need to be properly designed to prevent malaria.
- Application of slow-release floating formulations to control the malarial vector; mosquitoes breeding in latrines and stagnant polluted waters can be controlled effectively by the use of expanded polystyrene balls.

5. Residues of agrochemicals

Urban agriculture provides various potential exposure pathways to agrochemicals including occupational and environmental exposure and consumption. The intensive use of agrochemicals (fertilisers, pesticides, fungicides) may lead to residues of agrochemicals in crops or groundwater, and negative effects on the health of agricultural workers. Because of differences in usage, the level of risk of crop or groundwater pollution due to agrochemicals is higher in intensive commercial horticulture, especially for vegetables, than in traditional and subsistence farming (WHO Commission on Health and Environment 1992).

Acute poisoning due to agrochemicals can cause a range of symptoms which are often not correctly diagnosed (e.g. dizziness, diarrhoea, headache, memory impairment, convulsions, coma, liver and kidney impairment and lung fibrosis). Ingestion of agrochemicals is a common way of committing suicide throughout the world.

Chronic illnesses have been associated with residues in foodstuffs due to concentration of agrochemicals in the food chain, including vegetables, red meat, poultry and eggs, and residues can be found in human milk (FAO and WHO 1988).

Suggested prevention and control measures include:

- farmer education on the proper management of agrochemicals;
- promotion of ecological farming practices and replacement of chemical pest and disease control by IPM (integrated pest and disease management);
- better control of sales of banned pesticides;
- introduction of cheap protective clothing and equipment; and
- monitoring of residues of agrochemicals in groundwater.

6. Uptake of heavy metals from contaminated soils, water and air

The main causes of soil pollution from heavy metals (including lead, cadmium, chromium, zinc, copper, nickel, mercury, manganese, selenium, mercury and arsenic) are irrigation with water from streams and wastewater contaminated by industry, the application of contaminated solid waste products and the use of former industrial land contaminated by

spilled oil and industrial waste products.

Important sources of heavy metals are smelters, refineries, manufacturing plants, vehicles, metalliferous mines, ceramic industry (lead and cadmium), leather tanneries (chromium salts), lignite-based power plants, aluminium industry, electronics industry, and metallurgical industry. Some heavy metals precipitate in sewage sludge, which can therefore contain rather high concentrations.

The heavy metals may accumulate in the edible parts of crops that are consumed by people or fed to animals. Plant uptake of heavy metals varies, which opens up the possibility of adapting the choice of crops in relation to the degree and type of contamination. Generally, the highest amounts of heavy metals accumulate in the leaves, whereas the lowest contents are located in seeds. Beans, peas, melons, tomatoes and peppers show very low uptake figures. Plant uptake of heavy metals (especially of cadmium and lead) also varies with soil pH (Iretskaya and Chien, 1998).

In contrast to pathogenic contamination, the risk of heavy metals in wastewater used in urban agriculture is less conclusive as few studies have examined this issue. The risk depends primarily on the upstream sources of pollution. The extent of industrial pollution in an area is an important factor.

Puschenreiter et al. (1999) conclude that, after considering the several available pathways to reduce the transfer of heavy metals to the human food chain, urban soils with slight heavy-metal contamination can be used safely for gardening and agriculture if proper precautions are followed. However, Birley and Lock (1999,) argue that little is known of the chronic health effects of consuming tiny amounts of heavy metals over long periods of time, and that further research is needed. Increased concentration in the human food chain over a long period can provoke detectable damage to health (carcinogenic and mutagenic effects).

Suggested prevention and control measures encountered in the literature, include the following:

- definition of norms regarding crop restrictions according to type and level of contamination of agricultural soils; testing of agricultural soils and irrigation water for heavy metals;
- a minimum distance is recommended between fields and main roads and/or boundary crops to be planted beside roads to reduce contamination of crops by lead and cadmium;
- soil treatment for immobilisation of heavy metals: application of lime increases pH and thus decreases the availability of metals, except for selenium; application of farmyard manure reduces the heavy metal content of nickel, zinc and copper (but may increase cadmium levels); iron oxides (e.g. red mud) and zeolites are also known to absorb heavy metals such as cadmium and arsenic;
- washing and processing of contaminated crops may effectively reduce heavy metal content: good results were obtained for lead (less so for cadmium) in green beans, spinach, potatoes, whereas peas virtually showed no change;
- use of plants such as Indian grass (*Brassica juncea, L*) for biological remediation of polluted soils or streams (when planted in hydroponic beds); and

- more research on chronic health impacts of heavy metals

7. Zoonosis

Zoonotic diseases are infectious diseases transmitted through direct contact of human beings with animals during production processes or ingestion of contaminated animal products.

Two major bacterial diseases carried by cattle are bovine tuberculosis and brucellosis. Bovine tuberculosis is transmitted via the ingestion of contaminated unpasteurised milk from infected cows, and causes symptoms similar to respiratory tuberculosis. Bovine tuberculosis is transmitted via the ingestion of contaminated unpasteurised dairy products or through direct contact with infected animal material (blood, urine) and forms a main occupational hazard for livestock farmers and slaughterhouse workers. It can also spread by air-borne transmission and inhalation (e.g. in the neighbourhood surrounding a slaughterhouse).

Taeniasis and cysticercosis (beef and pig tapeworm) are transmitted by consumption of meat infected with tapeworm eggs congested by animals that scavenge on human faeces, or of crops irrigated with improperly treated sewage. Pig tapeworms create more severe effects in humans than beef tapeworm. Trichinosis is transmitted by consumption of infected meat of pigs that scavenge on food waste and dead animals.

Anthrax is most common in people who work with livestock or work in animal product industries (e.g. tannery). It can be transmitted through a cut in the skin, by inhalation of bacterial spores or consumption of infected meat.

Leptospirosis (Weil's disease) is transmitted through the contact of humans with infected animal urine or contaminated feedstuff or by swimming in or drinking from water supplies contaminated with animal urine.

Salmonella and campylobacter can be transmitted through contamination of animal feed. Animals (especially poultry) shed pathogens in their faeces in slaughterhouses, which may infect the meat. The wastewater discharge from intensive poultry farms can carry heavy loads of these micro-organisms and may contaminate drinking water supplies.

Suggested preventive and control measures include:

- collection of better prevalence data for the most important zoonoses;
- consumer education regarding thermal treatment of all milk and dairy products and proper cooking or freezing of meat products;
- restriction of uncontrolled movement of livestock in urban areas (e.g. stall feeding) and/or improvement of the urban waste-collection system;
- strict slaughterhouse regulations; condemning pig carcasses infected with tapeworms (which is sometimes a very high percentage);
- simple laboratory antigen-testing for anthrax infection of suspect animal products (such as carcasses and hides); disinfection of wool and fur;
- control of import of dogs and sheep in areas where Trichinosis is rare;

- prevention of genetic reassortment between avian viruses in pigs and human viruses (e.g. human influenza A) by not linking pigs and poultry in combination with fish pond operations; and
- composting of manure before application.

8. Issues and challenges for further research

The consideration of the public health and environmental risks associated with urban agriculture is an important element in policy decisions on urban agriculture.
However, the review of the available literature indicates that, although insight into the potential health risks of urban and periurban agriculture is growing, detailed information on the actual health impacts of urban agriculture is scant. Many of the health risks that are brought in relation to urban agriculture are not specific to urban agriculture and many of the perceived risks are based on research in rural agriculture. One can encounter cases in the literature where warnings are given about e.g. heavy metals in urban produced food due to use of contaminated soils or irrigation water, when later it turns out that rural produce sold in the same town contains similar levels of heavy metals.

There is little information available that allows comparison of the global burden of disease for each of the categories of health risks mentioned above.

Most of the available data are of the snap shot type and there are few longer term studies available, which would enable the assessment of the impacts of accumulation over time (e.g. for heavy metals).

Little of the available literature can assist in the formulation of adequate policies to mitigate the health and environmental risks associated with urban agriculture and there are even fewer studies that monitor and evaluate the impacts realised by such policy measures and their cost efficiency.

In order to be able to formulate adequate policies, more research has to be undertaken that specifies:

- The environmental conditions under which health problems related to urban agriculture occur (i.e., type of agriculture, farm management practices, characteristics of the location, etc.)
- The groups that are most vulnerable to those impacts and the factors that determine this vulnerability (e.g. poverty, gender, age, main occupation).
- The factors that currently restrict the urban poor from engaging in less risky agricultural and food practices
- The resources and technical capacity available in cities to implement risk mitigating policy measures.

It is suggested that city authorities make Health Impact Assessments (HIA) of urban agriculture policies and projects in order to provide evidence-based information for decision making. During the HIA the potential health impacts of such policies and projects are carefully analysed in multidisciplinary teams, involving the direct and indirect stakeholders.

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Iretskaya SN & Chien SH. 1998. Comparison of cadmium uptake by five different food grain crops grown on three soils of varying pH. *Comm. Soil Sci. Plant Anal*. 30: 441–448.

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WHO Commission on Health and Environment. 1992. Report of the panel on food and agriculture. Geneva: WHO.

Amend, Jörg (1998). Status of soil contamination and soil fertility: the case of urban agriculture in Dar es Salaam. 20 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania

Supplier: Ministry of Agriculture and Co-operatives (MoA&C) and Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ).

health and environment food security and nutrition

soil contamination; soil fertility; lead; cadmium; zinc; pH; organic matter; Tanzania

Reports on a survey in Dar es Salaam conducted by the Urban Vegetable Promotion Project (UVPP) with the aim to obtain more information on soil contamination and soil fertility on its project sites. Generally, the contamination with lead and cadmium was very low. The highest concentrations, still below threshold values, were found along a major artery road. Zinc however might cause some problems in some areas. The highest concentrations were found in an area previously used as a dumpsite. Soil fertility was generally good due to constant provision of organic manure. (NB)

Asomani-Boateng, R; Haight, Murray **(1999). Reusing organic solid waste in urban farming in African cities: a challenge for urban planners. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes - Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 14 p. School of Urban and Regional Planning, University of Waterloo, Ontario, Canada**

waste recycling health and environment

waste management; composting; wastewater reuse; urban planning; Africa; organic wastes; solid wastes; waste reuse

Describes urban farming systems based on reuse of organic waste and examines possibilities and constraints in the light of urban planning. Apart from health hazards and economics related to production cost, which can be high as compared to

chemical fertiliser if production uses inappropriate technology, official attitude towards urban farming is often negative. Solutions are to be found in proper planning of waste reuse including all stakeholders involved and in source separation. (WB)

Ayres, RM; Mara, D.D **(1996). Analysis of wastewater for use in agriculture: a laboratory manual of parasitological and bacteriological techniques. World Health Organization: Geneva.**

wastewater reuse health and environment

zoonoses; health; wastewater; environment

The first step that needs to be taken by any local jurisdiction or medium to large scale urban food producer using irrigation is analysis. This volume covers the parasites and bacteria; other tests are needed to define the nutrient content. (JS)

Bellows, Anne C **(1999). Urban food, health, and the environment: the case of Upper Silesia, Poland. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 131-135. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

health and environment food security and nutrition city ecology

Poland; health; ecology; access to food; crisis response; organic agriculture; education

Allotment gardening is typically conducted by women, retirees, and other reserve labour. This local production has provided a measure of shelter from the vagaries of inefficient production and food distribution (typical of centralized socialist states) and from inaccessibly high food prices, compounded by unemployment (typical of market systems). However, the yields and safety of local food labour can be reduced in severely polluted regions. The case study from Gliwice, in Upper Silesia, southwest Poland, discusses (1) organizing an acquisition, labeling, and distribution system for retailing chemically tested organic products, linking farmers to consumers; (2) distributing chemically tested produce directly to schools and hospitals and creating subsidies for their purchase; and (3) educating community groups about food contamination and the benefits of organic and farming. (Abstract adapted from original)

Bengtsson, Bengt-Erik; Bongo, Juvy P; Eklund, Britta **(1999). Assessment of duckweed (Lemna aequinoctialis) as a toxicological bioassay for tropical environments in developing countries. In: Ambio vol. 28 (1999) no. 2 p. 152-155. 4 p.**

health and environment

duckweed; bioassays; environmental impact assessment; heavy metals; environmental contamination

Informs about the use of duckweed (Lemna aequinoctialis) for carrying out bioassays. Effects of heavy metals on the growth of two strains of duckweed were tested, observing differences between the various metal ions as to toxicity. (WB)

Birley, MH; Lock, Karen **(1997). A review of the health impacts of periurban natural resource development. On: http://www.liv.ac/~mhb/publicat/periurban/start.html. 14 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK.**

health and environment rural-urban linkages

health hazards; natural resource management

Describes findings of a study to identify kinds of health hazards that natural resource managers, researchers and users should be aware of. The article gives numerous cases and health survey figures. (WB)

Birley, MH; Lock, Karen **(1999). The health impacts of periurban natural resource development. 185 p. ISBN 0-9533566-1-2. Liverpool School of Tropical Medicine, Pembroke Place, Liverpool, L3 5QA, UK**

health and environment rural-urban linkages

periurban areas; health hazards; natural resource management; diseases; health impact assessment

This important monograph is based on a report commissioned by the UK Department for International Develaopment (DFID), which is conducting research into natural resources in periurban areas through its Natural Resource Systems Programme. In this study, the various health hazards in connection with the periurban interface are identified and systematically examined. Health issues are organised into categories of communicable diseases, non-communicable diseases, injury, malnutrition and psychosocial disorder. In a way, periurban communities may have to face the worst of two worlds, being subject to both traditional and modern health hazards. All major natural-resource-management themes in the periurban setting are closely examined, such as energy, agriculture, fisheries and waste management. The authors, however, do not stop at this examination but also provide techniques for safeguarding health. Also, a procedure for health impact assessment is described which can be used in project design and operation. The final chapters provide a synthesis of important linkages and give a state-of-the-art overview of researchable themes that require collective, natural resource-, social- and health-specialist inputs. Highly recommended reading for an audience of non-health specialists, such as managers of NRM projects, researchers and recipients of development aid. It contains a well-stocked bibliography on urban-health research. (WB - from executive summary)

Blumenthal, U.J. **(1992). A study of the health impact of the use of wastewater in**

agriculture in Mexico. London School of Hygiene and Tropical Medicine: London.
wastewater reuse health and environment
health; Mexico; livestock

Mexico has a very special historical record in the application of municipal sewage effluent to field crops for livestock and human consumption. This study is one of several that begin to define the benefits and costs from a rather narrow epidemiological point of view. (JS)

Blumenthal, U.J.., Mara, D.D., Peasey, A., Ruiz-Palacios, G., Stott, R. **(2000) Using treated wastewater: recommended changes to WHO guidelines. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment wastewater reuse
Measurement; indicators; health impact assessment; policy; WHO

Standards for wastewater reuse in many countries have been influenced by the WHO (1989) health guidelines and the USEPA/USAID (1992) guidelines (which are much stricter). The WHO guidelines are proposed as a guide for policy makers as to what wastewater treatment processes, crops and irrigation methods are appropriate for safe agricultural production. They are not meant as standards for daily water monitoring at a local level. The WHO guidelines recognise the benefits that can be gained from using appropriately treated wastewater in agriculture, and aim to promote safe use of wastewater, and take into account the social, epidemiological and economic conditions that occur in specific countries. Standards are set for microbiological indicators of faecal pollution: faecal colifom bacteria and for nematode eggs. The former are intended to protect exposed persons from bacterial and viral infections (e.g salmonella) and the latter, from helminth (and protozoal) infections. WHO are currently revising the 1989 guidelines. This paper summarises the main recommendations for of a review of epidemiological, microbiological and risk assessment studies and their implications for the WHO guidelines. The article gives recommendations for changing the guidelines and proposes appropriate wastewater treatment methods that can be used to achieve the new microbiological guideline limits. The results of the WHO official review should be available in early 2002.

Borrini, G **(1992). Environment and health as a sustainable state: concepts, terms and resources for a primary health care manager in developing countries. 314 p. International Course for Primary Health Care Managers (ICHM) at District Level in Developing Countries, Instituto Superiore di Sanità (ISS), Viale Regina Elena 299, 00161 Rome, Italy; Italian Ministry of Foreign Affairs**
Supplier: ICHM / ISS, Rome, Italy
health and environment
appropriate technology; environmental health; health care; impact analysis; primary health care; resource management; sustainability

This reference tool is intended for people involved in preventative approaches to health care who have discovered that this cannot be separated from sustainable management of natural resources. It contains a glossary of basic terms dealing with environmental issues relevant to developing countries. It includes checklists for appropriate technology, environmental health impact assessment, and conditions for success in Primary Environmental Care. There is also a guide to journals, publications and institutions dealing with health, ecology and development. This is an unusual attempt to bridge disciplines of health and environment, including agroecology. (AWB)

Bradley, David **et al (1991). A review of environmental health impacts in developing country cities UNCHS/UMP Nairobi, 58 pages, 13 tables, references**
health and environment
health; urbanisation; environment

This report reviews over 100 studies to find similarities in environmental health impacts in cities in diverse situations. It aims to develop a taxonomy and proposes future research. (JS)

Brock, Berend **(1999). Actual and potential contribution of urban agriculture to environmental sanitation: a case study in Cotonou. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.). University of Amsterdam, The Netherlands**
health and environment
horticulture; ornamental plants; staple crops; wastewater management; solid waste management; land use planning; soil fertility

The contribution of vegetables, ornamental plants and staple crops to waste management was examined using participatory methods. All production activities had positive and negative impacts on the drainage system and its environmental planning approaches. Evidence of current and potential contributions to solid and liquid waste management is provided. (NB)

Brown, Kate H; Jameton AL**.(2000). Public health implications of urban agriculture. In: Journal of Public health Policy Vol. 21 (1) p. 20-39**
health and environment
health; gardening; food security; community; environment

The article presents the case for stronger public policies in support of urban agriculture as a means to improve public health. It considers several beneficial aspects of urban horticulture including: (i) food security, (ii) community economic development, (iii) physical exercise, (iv) community socio-psychological well-being and (v) environmental stewardship. It also considers the negative public health

impacts of urban agriculture and suggests policies to ameliorate them. In balance, urban horticulture is found to have potential as an important public health intervention. (JS adaptation of the authors)

Burleigh, J.R. and Black, L.L. **(2001) Supporting Farmers Towards Safe Year-round Vegetables in Manilla. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment horticulture
Philippines; AVRDC; IPM; agrochemicals

AVRDC collaborates with the Central Luzon State University-Philippines, the Bureau of Plant Industry-Philippines, and the Technical University of Munich-Germany in a project entitled “Development of periurban vegetable production systems for sustainable year-round supplies to tropical Asian cities”. The project aims to design, test and implement production systems for sustainable year-round supplies of vegetables to markets in Metro Manila - and by model verification, to other tropical Asian cities as well. This article focuses on part of the work of the periurban vegetable production project, which is to decrease the ubiquitous use of pesticides in periurban Manila through introduction of IPM techniques.

Commission on Health and Environment, World Health Organisation (WHO) **(1992). Food and agriculture. In: Our planet, our health: report of the WHO Commission on Health and Environment, p. 60-105. ISBN 92-4-156148-3. Commission on Health and Environment, World Health Organisation (WHO), Geneva, Switzerland**
health and environment food security and nutrition
public health; health hazards; nutritional requirements; agricultural chemicals

Overview paper of the way environment influences human health and well-being. This chapter focuses particularly on the role agriculture plays. Figures are presented on a variety of parameters, such as the relationship between health and dietary intake. Different food contamination sources are listed and examined. In addition, there are paragraphs on occupational hazards and accidents, notably in connection with agricultural chemicals. At the end, recommendations are given for policy development and research on health and environmental effects of current trends in food consumption and agricultural production. (WB)

Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ) **(1989). Community participation and hygiene education in water supply and sanitation. Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ), PO Box 5180, D-65726 Eschborn 1, Germany**
wastewater reuse health and environment community development
community participation; water management; sanitation; development projects; indicators

Successful water and sanitation projects should have a community participation and hygiene education component. These aspects are addressed in this manual containing five individual course manuals, designed to be used separately, as the foreword puts it, 'for guidance and as a frame of reference in water and sanitation projects for national and international decision makers; and for field managers of water supply and sanitation projects'. This manual constitutes a great attempt to bring together and analyse this complex material. (WB)

Diop Gueye N.F. and Sy M. **(2001) The use of wastewater for urban agriculture; the example of Dakar, Nouakchott and Ouagadougou. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment wastewater reuse
West Africa

In the Sahelian zone water is the major stumbling block to developing agricultural activities, In the cities domestic needs win out over agricultural activities in the competition for water. Given this, it becomes evident that one strategy to offset the water deficit is to reuse wastewater. Such a practice has to be examined closely for its advantages and disadvantages in relation to the issue of urban and periurban agriculture. In this article an overview of constraints and opportunities is given.

Drangert, Jan-Olof; Bew, Jennifer; Winblad, Uno **(eds) (1997). Ecological alternatives in sanitation: proceedings from SIDA Sanitation Workshop, Balingsholm, Sweden, 6-9 August 1997. Publications on Water Resources no. 9. ISBN 91_586_7551_5. Department for Natural Resources and the Environment, Swedish International Development Authority (SIDA), Birger Jarlsgatan 61, S-10525 Stockholm, Sweden**
waste recycling wastewater reuse health and environment
sanitation; workshops; disease control; water management

This sanitation workshop was organised with the need to rethink and with new approaches and techniques in sanitation in mind. This document provides a comprehensive overview of ecological sanitation. Aspects like reuse and disease control are discussed. Within ecological sanitation there are a range of options for various conditions. Furthermore, case studies from several countries in the world and abstracts of background papers to the conference are included. (NB)

Drechsel, P.; Kunze, Dagmar **(1999). International Workshop on Urban and Periurban Agriculture, 2-6 August 1999, Accra, Ghana. Urban Agriculture Notes http://www.cityfarmer.org/africaworkshop.html. 8 p. IBSRAM Regional Office for Africa, Ghana; FAO Regional Office for Africa, Ghana**
Supplier: City Farmer, Canada's Office of Urban Agriculture
health and environment waste recycling economic impact
food security; environment; West Africa; health; urban planning; economic aspects

Concisely presents the results of the International Workshop on Urban and Periurban Agriculture in Accra. The main theme of the conference was Closing the nutrient cycle for urban food security and environmental protection. Within this theme four sub-theme were distinguished with background papers and working groups: (1) Environment and public health; (2) Nutrient recycling; (3) Policy, Planning and Economics; (4) Farmers' point of view. For these themes priority actions and main constraints were identified. (NB)

Drechsel, P.; Kunze, Dagmar (eds) **(2001) Waste composting for urban and periurban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa. ca 200 p. ISBN 0-85199-548-9. CABI, Wallingford, UK; IBSRAM Regional Office for Africa, Ghana; FAO Regional Office for Africa, Ghana**

health and environment waste recycling economic impact

Rapid urbanisation has created a major challenge with regard to waste management and environmental protection. However, the problem can be ameliorated by turning organic waste into compost for use as an agricultural fertiliser in (peri-)urban areas. The forthcoming CABI hardcover (May/June 2001) provides an African perspective on potential and constraints of urban waste recycling for soil amelioration (and integrated pest management) as well as on urban and periurban farming systems as beneficiaries. Most papers derived from an IBSRAM - FAO workshop held in Ghana in August 1999 with authors from several European, as well as African, countries, representing various disciplines. The book will appeal to a readership in soil science, urban and rural planning, environmental science, waste management, developing studies and farming systems.

Contents include:

- Potential use of waste stream products for soil amelioration in periurban interface agricultural production systems
- Economic, sociocultural and environmental considerations
- Turning urban waste into fertilizer: Case studies from East and West Africa
- Modelling urban and periurban biomass and nutrient flows
- Urban agriculture: International support and capacity building in Africa

(PD)

Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ) **(1989). Community participation and hygiene education in water supply and sanitation. Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ), PO Box 5180, D-65726 Eschborn 1, Germany**

wastewater reuse health and environment community development community participation; water management; sanitation; development projects;

indicators

Successful water and sanitation projects should have a community participation and hygiene education component. These aspects are addressed in this manual containing five individual course manuals, designed to be used separately, as the foreword puts it, 'for guidance and as a frame of reference in water and sanitation projects for national and international decision makers; and for field managers of water supply and sanitation projects'. This manual constitutes a great attempt to bring together and analyse this complex material. (WB)

Edwards P**. (2001) Public Health issues of waste water-fed aquaculture. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment wastewater reuse
India; aquaculture

Fish farmed in wastewater-fed ponds provide nutritious and relatively safe food for the urban poor. In spite of most systems being developed by farmers with limited attention to either wastewater treatment or to public health, potential threats from disease causing organisms and chemical contaminants from industrial effluents are mitigated by various mechanisms. Recommendations are made by the author to further safeguard public health.

Esrey, Steve **et al (1998). Ecological sanitation. SIDA, Stockholm, Sweden. 92 p.**

wastewater reuse health and environment waste recycling
ecology; sanitation; sewage; human excreta; pollution

This short volume is focussed on providing a practicable vision of a future of ecological sanitation. It presents the theory, the history (back to the Ancients), design principles and promotion strategies. This is an excellent introduction to the precepts of eco-sanitation and its relationship to urban agriculture, public health, and healthy city and a sustainable city. (JS)

Esrey, Steve and Andersson, I**. (2001) Ecological Sanitation - Closing the Loop. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands**.

health and environment waste recycling city ecology
sanitation

Today, half of humanity does not have access to any type of sanitation. This is a fundamental denial of human dignity and threatens human well-being. The rest of humanity relies on conventional approaches to sanitation, which fall into one of two categories: waterborne systems and pit latrines. Both “flush and discharge” and “drop and store” technologies were built on the premise that the nutrients we excrete have little value, and the waste is suitable only for disposal. Consequently, the environment is polluted, nutrients are lost, and a wide array of health problems

result. The authors argue that a different approach is needed to both sanitation and agriculture. The approaches are non-polluting, rely on biological processes, recycle nutrients, and can be safe and effective in promoting health and nutritional well-being. Ecological sanitation is given here as a representation of that shift in the way people think about and act upon human excreta.

EURO-URBANUT (EUN) **(1998). urban food and nutrition security: WHO action plan for vulnerable groups. 8 p.**
food security and nutrition health and environment
political aspects; urban food; nutrition

Contains elements of a description of a WHO urban food and nutrition Action Plan aimed at supporting, protecting and promoting the consumption of vegetables and fruit. (WB)

Feacham, RG et al. **(1983). Sanitation and disease: health aspects of excreta and wastewater management. Wiley, New York.**
wastewater reuse health and environment
epidemiology; sanitation; water management; health

This volume provides a historical base for considering the possible negative effects of reusing sewage effluent for nutritional, recreational and environment enhancement in and near human settlements. It follows Feacham's seminal work in the field at the "Cholera Laboratories in Dhaka Bangladesh. (JS)

Floquet, Anne**. Potentials and perils on (sic) periurban agriculture in a West African coastal region. Symposium 'Rural Farming Systems Analysis: Environmental Perspectives'. Workshop E: farming and rural systems in zones of transition. Paper E/6 p. 446-456. University of Hohenheim, Germany**
horticulture health and environment
West Africa; Benin; periurban agriculture; environmental degradation; rural-urban migration

Market demands change quickly in West Africa as a result of fast-growing cities. The underlying paper describes the situation in Benin, where farmers from the south have largely failed to grasp the opportunity of the urban consumption market. Soil mining has led to a decrease in the production of staple food and fuelwood in the South of Benin and to soil depletion, with ensuing rural exodus. Based on six years of field research, changes in cropping and farming systems and socio-economic changes, in the light of a rapidly changing environment, are described in this paper. (WB)

Furedy, Christine**. (2001) Reducing health risks of Urban Organic Solid Waste Use. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The**

Netherlands.
health and environment waste recycling community development
India; health risk management, organic wastes, compost, informal practices, community-based composting, composting.

Health concerns received minimal attention at the beginning of the recent thrust to promote urban and periurban agriculture, but progress has been made recently in articulating the health issues, especially in developing countries. Some aspects of the risks of urban organic solid waste reuse are discussed in this paper. The focus in this article is the relation of health risk management to informal or community-based practices, with particular reference to composting and the use of decomposed organic wastes. Because the capacity of governments to intervene in most urban agriculture related activities is limited, it is argued that a gradual progress in self-regulation or self-limitation of risks is necessary and external assistance is needed for assistance with setting appropriate standards, promoting practical measures and stimulating research.

Flynn, Kathleen**. An overview of public health and urban agriculture: water, soil and crop contamination and emerging urban zoonoses. Cities Feeding People Series Report no. 30. 84 p.**
Supplier: International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
health and environment wastewater reuse

Furedy, Christine; Maclaren, Virginia; Whitney, Joseph **(1999). Reuse of waste for food production in Asian cities: health and economic perspectives..In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer .Welsh (eds), p. 136-144. ISBN 0_88936_882_1. CAD 35.00**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
waste recycling health and environment
organic waste reuse; health; aquaculture; economic impact; education

Asian communities have many practices involving the reuse of organic wastes in agriculture and aquaculture, even in urban areas. This paper discusses health and economic aspects of the reuse of municipal waste in South and Southeast Asia. Recent research in Bangkok, Bandung, Bangalore, Hanoi, Ho Chi Minh City, Jakarta, and Manila is used to suggest the potential for the linking organic waste reuse and urban agri-aquaculture. Important constraints on the reuse organic waste are contamination and the greater cost of making compost compared to chemical fertilizers. The paper suggests strategies for minimizing these constraints and improving the marketability of organic wastes. Contamination can be reduced by collecting waste separately and by separating organics at source. Market research is needed to promote the use of compost. Health risks can be reduced through education and the amendment of agricultural practices. (Abstract adapted from

original)

Gaynor, A. **(2001) Pesticide soil contamination: a case study from Perth Western Australia. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment
pesticides

The safety of food produced by urban agriculture depends on a number of factors. One of these factors is prior land uses, including the history of persistent toxic chemicals applied to an area. Using the case study of the Argentine Ant eradication programme carried out in Perth, Western Australia, from 1949 to 1988, this article examines the problems that can arise when urban agriculture is scattered throughout a metropolitan area, and carried out by people who often have little detailed knowledge of the history of land uses in the area. The article concludes with recommendations for health and local government workers, which could help to ensure that householders are aware of the potential health risks associated with food production in urban areas, and are able to act to minimise those risks.

Ghosh, Rohini and Premananda Bharati **(2001), Sociocultural, Maternal Factors and Mortality of Underfive Children of Two Ethnic Groups in a Peri-Urban Habitat in Kolkata, West-Bengal , India. Indian Statistical Institute, Kolkata. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**
health / pollution rural-urban linkages
periurban area; children's health; India; cultural aspects, Asia (South-Central)

The present study aims to investigate how sociocultural and maternal factors relate to childhood mortality differentials in two culturally different populations in a Peri-Urban situation at household or micro-level and to find out the factors that are associated with underfive mortality in the study area and suggest appropriate health interventions or programs.

Hardoy, Jorge E.; Satterthwaite, David **(1997). Health and environment and the urban poor. In: Gurinder S. Shahi, Barry S. Levy, and Todd Kjellström (Eds.) International Perspectives on Environment, Development and Health; Towards a Sustainable World. - pp123-162. New York: Springer Publishing Company Inc.**
health and environment

This paper looks at an array of health problems associated with urban environments in the South. The authors draw attention to the geography of inequality in the aspects of human and environmental health which have differential impacts according to age, sex, gender roles and migrant status. The authors argue that the

people most vulnerable to environmental hazards are those least able to avoid them. Of particular interest for urban agriculture is the focus on chemical and industrial pollutants in urban areas. The authors mark chemical pollutants as one of the four most pressing urban environmental concerns. They claim that reports from Third World cities of severe health problems arising from human contact with toxic or hazardous wastes are increasingly common. (Kathleen Flynn)

Hooft, K van 't**. (2000) Cisticercosis, a Complex Zoonotic Disease. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock health and environment

zoonoses; Bolivia; Cisticercosis

Cisticercosis is one of the most dangerous diseases caused by a parasite that passes from animals to human beings. It is most prevalent in developing countries, and is closely related to economic standard, culture, hygiene, and the way animals and people share the same living space. Major problems with this disease exist in Latin America, and in the non-Islamic parts of Africa and South East Asia, especially India. This article describes the case of cisticercosis that originates from pigs (Cisticercosis cellulosae) with reference to Bolivia, South America.

Huamain, Chen **(et al.) (1999). Heavy metal pollution in soils in China: status and countermeasures. In: Ambio vol. 28 (1999) no. 2 p. 130-134**
Supplier: Swedish University of Agricultural Sciences, Department of Ecology and Environment, PO Box 7072, S-750 07 Uppsala, Sweden

health and environment

heavy metals; pollution; soil contamination

Heavy metal pollution of soil greatly affects not only the yield and quality of crops, animal and human health, but also the quality of the whole environment. The current status and the effects of heavy-metal pollution in China are reviewed in this paper. Soil pollution by heavy metals from sewage irrigation and metal mining, smelting and processing activities was seen to be serious. Urban enterprises also contribute to heavy metal pollution of soils in China. The effects of soil pollution on plants, animals and human beings are discussed. Effective countermeasures for pollution control are also presented. (Kathleen Flynn)

International Food Policy Research Institute (IFPRI) **(2000). The life cycle of malnutrition: eradicating malnutrition: income growth or nutrition programs? International Food Policy Research Institute. 70 p.**

food security and nutrition health and environment

malnutrition; food policy; urbanisation; food security; gender; livestock; land tenure

This annual report of a CGIAR center is focussed on the role of good nutrition in economic growth and well-being. It finds that community-based nutrition programs

bring multiple benefits. It begins with the statement that Malnutrition is not a disease that runs its course. It is a process, with consequences that may extend not only into later life, but also to future generations. Currently about one in thee children under five in the developing world are malnourished, and one in two in eastern Africa. The potential gains of improved nutrition are identified as massive beginning with increased adult productivity, continuing through reduced health care costs, and promoting both social and civic well-being. Significantly, IFPRI finds that poverty and malnutrition are not congruent. More money may not lead to better food, care and health if good food is not available and accessible. Better nutrition is proven to raise incomes but higher income is not a guarantee of better nutrition and health. (JS)

Klein, Petra; Steen, Anniek **(1999). Urban agriculture: a review of the literature on the sociological and nutritional dimensions of urban agriculture in East Africa. 55 p. ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**
food security and nutrition community development health and environment
Kenya; Uganda; Tanzania;; food security; nutrition; social aspects; urban livelihoods; health hazards; home gardening

In the framework of a literature study, this paper reviews a number of publications looking at sociological and nutritional aspects of urban agriculture, mainly in Nairobi, Kampala and Dar es Salaam. (WB)

Lang, Tim **(1997). The public health impact of globalisation of food trade. In: Diet, nutrition and chronic disease: lessons from contrasting worlds / Prakas S Shetty and Klim McPherson (eds). London School of Hygiene and Tropical Medicine. ISBN 0-471-97133-2. Centre for Food Policy, Wolfson School of Health Sciences, Thames Valley University, London, UK**
health and environment
nutrition; food security

This article contains an analysis of the implications of the GATT agreement of 1994 on food security, agriculture, consumption patterns and public health. The argument demystifies assumed benefits of the liberalisation of markets and the inclusion of agriculture in trade liberalisation. (NB)

Lewis, Charles **(1979). Comment: healing in the urban environment: a person / plant viewpoint. In: APA Journal Vol. July 1979 p. 330-338.**
health and environment
home gardening; urban livelihoods; psychological factors; human well-being

Reports on the socio-economic benefits of gardening in low-income areas in North America. Also, the articles focuses on livelihood and factors influencing the human sense of well-being in which vegetation plays a crucial role, so the author argues. (WB)

Lines, Joe; Harpham, Trudy; Leake, Colin; Schofield, Chris**. Trends, priorities and policy directions in the control of vector-borne diseases in urban environments. In: Health Policy and Planning 9(2) pp113-129**
health and environment
health; disease control; policy; urban environment

This review describes how the physical and social changes associated with urbanisation have altered the transmission of vector-borne disease. It concentrates on the important mosquito-borne infections: malaria, dengue and filariasis. Dengue virus vectors breed in relatively clean water in man-made containers, while urban filariasis vectors breed in highly polluted water, and these mosquitoes have now been spread by human activity to almost every tropical city. The authors point out that with important exceptions, anopheline malaria vectors have not generally succeeded in adapting to urban life, but malaria can still be a problem where there are rural pockets in the middle of town. They specifically cite African cities as an area of potential risk because they tend to be relatively open, with patches of abandoned land and cultivation close to the centre. (Joe Lines)

Lock, Karen and Veenhuizen, R. van **(2001) Balancing the Positive and Negative Health Impacts of Urban Agriculture. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment
health impact assessment; policy

This is the editorial to this issue of the Urban Agriculture Magazine on Health. Next to an overview of the discussion - in which emphasis is given to the positive impact of urban agriculture on the health situation of urban citizens, and an overview of the article contributions, the authors give an introduction into Health Impact Assessment.

Lukman, Salifu**. Waste management issues: an integrated disposal strategy for the Kumasi metropolitan area. Waste Management Department, Kumasi Metropolitan Assembly, Ghana**
waste recycling wastewater reuse health and environment
Ghana; waste management; wastewater management; urban sanitation

Urban sanitation and waste management are given a priority by all district and municipal governments in Ghana. However, the waste management capacity of cities is deteriorating. This paper discusses the solid and liquid waste management system of Kumasi. Needs assessment and intervention schemes are presented. From there, proposals for strategies for sustainable services delivery and an integrated disposal strategy including a reality check are made. (NB)

Mantovani, A. **(2000) Veterinary Urban Hygiene in Developing Countries. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF,**

Leusden The Netherlands.
urban livestock health and environment
zoonoses; WHO; policy

The World Health Organization (WHO) and its branch, the Veterinary Public Health (VPH) initiated officially to develop its interests for the problems connected with urban areas in 1977, dedicating to the subject conspicuous energies. The subject (i.e. the veterinary action in urban areas) was denominated Veterinary Urban Hygiene (VUH). VUH has developed differently in the various countries, ranging from a maximum of activities (e.g. in Italy, in which the public veterinary services belong totally to the health administration, and perform all public veterinary responsibilities), to a minimum, in which few limited activities (generally some rabies control) are performed. This article gives an overview of zoonoses and the actions taken.

Mawoneke, Sthembile **(1998). Impact of the urban agriculture research study in Zimbabwe. ENDA Zimbabwe, Box 3492, Harare, Zimbabwe**
economic impact food security and nutrition health and environment
Zimbabwe; economic impact assessment; food security; off-plot cultivation; health hazards; heavy metals

Reports on the results of a household monitoring study aiming at determining the economic impact of urban agriculture on urban households in Harare, Zimbabwe, assessing the nutritional impact of agricultural produce on urban households; and identifying crop types and off-plot cultivation. Simultaneously, environmental research was conducted focusing on assessing the impact of urban agriculture on the urban environment. (WB)

Maxwell, Daniel G.; Armar-Klemesu, Margaret **(1998). The impact of urban agriculture on livelihood, food and nutrition security in Greater Accra. 30 p. Nutrition Unit, Noguchi Memorila Institute for Medical Research, University of Ghana, PO Box 25, Legon, Ghana**
food security and nutrition economic impact health and environment
food security; Ghana; Accra; nutrition; livelihoods; health; environment; land use systems; food contamination; gender; multi-disciplinary approach; institutional aspects; human resource development; farming systems

Part one of the paper summarises the major findings of the urban agriculture component of the overall study. The geographic, demographic, and socio-economic distribution of urban agriculture in Accra is presented. The impact of urban agriculture on food and livelihood security and nutritional status at household level and individual level are discussed as well as the environmental impacts and the impacts on health. An analysis is made of how city growth affects land use, property rights and livelihoods on the urban fringe. Finally, various other areas like human resource development, institutional strengthening, local partnerships gender are discussed. (NB)

McGranahan, G., P. Jacobi, J. Songsore, C. Surjadi and M. Kjellen **(2001), The**

Citizens at Risk: From Urban Sanitation to Sustainable Cities. Stockholm Environment Institute. Supplier: Earthscan Publications Ltd, 120 Pentonville Road, London, N1 9JN, UK

health / pollution city ecology

ecology; developing countries; urban ecology; pollution; urban areas; sustainable development; environmental policy, Africa (Central), Africa (Eastern), Africa (Northern), Africa (Southern), Africa (Western), America (Central), America (Southern)

Taking a comparative look at cities in Africa, Asia and Latin America, the book examines: the changing nature of urban environmental risks; the rules governing the distribution of such risks and their differential impact; and how the risks arise and who is responsible. The authors describe the most pressing urban environmental challenges, such as improving health conditions in deprived urban settlements, ensuring sustainable development in a globalising world, and achieving environmental justice along with the greening of development. They argue that current debates on sustainable development fail to come to terms with these challenges, and call for a more politically and ethically explicit approach.

Muchaal P**. (2001) Zoonoses of Dairy Cattle, with reference to Africa. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment urban livestock

West Africa; zoonoses; dairy;

Zoonoses are infections naturally transmitted between vertebrate animals and humans,either directly, or indirectly through consumption of contaminated foods.Traditional zoonotic diseases for which effective control measures and cures are available in affluent countries, are still a cause of morbidity and mortality in humans and animals in developing countries. Increasing urbanization, the growth of livestock production in close proximity to humans, the rising rate of HIV, inadequate hygienic practices, and cultural customs and beliefs exacerbate the transmission, persistence and impact of zoonotic diseases in these regions. This article is a literature review focusing on West Africa.

Mwangi, Alice Mboganie; Foeken, Dick **(1996). Urban agriculture food security and nutrition in low income areas in Nairobi. In: African Urban Quarterly vol. 11 no. 2-3 p. 170-179. Unit of Applied Nutrition, University of Nairobi, PO Box 30197, Nairobi, Kenya ; African Studies Centre, PO Box 9555, 2300 RB Leiden, Netherlands**

food security and nutrition health and environment

food security; Kenya; children's health

Addresses the issue to what extent farming activities by low income urban dwellers within the city boundaries of Nairobi play a role in the food security and nutritional condition of the households involved. A comparison is made between three low income groups, i.e. those who practise urban farming, those who do not, and finally a group involved in an urban farming project. The results show that as far as food

security is concerned, urban farming does play a role, but also that this is not translated into a better nutritional condition of the children. (WB - from the original abstracts)

Nugent, Rachel A **(2000). The impact of urban agriculture on the household and local economies. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 76-97. DSE, GTZ, CTA, SIDA**
economic impact food security and nutrition health and environment
household economy; local economy; employment; income generation; labour markets; gender; economic diversification; urban policies; macro-economic impacts

On basis of the case studies presented in the reader the article analyses the economic impact or urban agriculture on individual, household, city and macro-economic level. The paper explores the economic conditions and policies in urban areas that create the impetus for urban agriculture to exist and which affect its viability. The capacity of urban agriculture to provide jobs and income and value of production are analysed, which all are badly needed in fast growing cities. Conclusions are drawn on the economic relevance of urban agriculture based on both quantitative and qualitative knowledge. (NB)

Office for International Cooperation, Faculty of Veterinary Medicine (1996). Urbanisation: veterinary public health consequences. In: Equator: newsletter on veterinary aspects of international development cooperation Vol. 8 no. 5 p. 1-6. Office for International Cooperation, Faculty of Veterinary Medicine, Utrecht, The Netherlands
urban livestock health and environment
public health; health hazards

Reports on a symposium held at Utrecht, Netherlands, September 27, 1996. Issues addressed were: (1) veterinary public health; (2) production and consumption; (3) living in a healthy environment; and (4) animals as a source of diseases in human beings. (WB)

Parker, J Stephen **(1995). No more business as usual. Water and sanitation for all: a world priority no. 3. 96 p. International Water and Sanitation Centre (IRC), The Hague, The Netherlands**
Supplier: Ministry of Housing, Spatial Planning and the Environment, PO Box 30945, 2500 GC The Hague, The Netherlands
health and environment
water management; drinking water; public health; environmental pollution; political aspects

Addresses the water issue, so high on the international agenda. This publication highlights the fact that providing people with safe water is not so much a technical issue as a matter of political will. This publication builds further on an international Ministerial Conference on Drinking Water and Environmental Sanitation organised in

Noordwijk, Netherlands, in 1994, under the auspices of the Dutch Ministry of Housing, Spatial Planning and the Environment. The conference proceedings contained a series of six key background papers, and resulted in a Political Statement and Action Programme. The underlying publication is part of the series Water and Sanitation for All: A World Priority, containing 3 volumes, based on these conference proceedings. (WB)

Pederson, R.M.. and Robertson, A.**. (2001). Food Policies are essential for Healthy Cities. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment food security and nutrition
Europe; policy

Food production and its retail are increasingly perceived as presenting risks to society in Europe. Consumers are more and more concerned, no longer trust and have lost confidence in the food supply. In contrast food is essential for health. Policies are therefore needed to limit its risks and promote food's assets and re-store consumer confidence. Local food policies can demonstrate the assets, and not the liabilities, of urban and periurban food production and its retail. The benefits include improved physical and mental well-being. Social benefits could accrue from increased leisure opportunities, improved cohesion within the community and decreased social exclusion. Economic benefits arise from job creation, income generation and the development of enterprises for local food production and processing and its retail. More opportunities for education, recreation, tourism, and attracting new business could be created. Environmental benefits from improvements to water conservation and supply, air quality, carbon dioxide levels, bio-diversity, waste-management and energy-saving could result from local food policies.

Pickford, John **(et al.) (eds) (1996). Sustainability of water and sanitation systems: selected papers of the 21st WEEDC Conference, Kampala, Uganda, 1995. 153 p. ISBN 1_85339_339_8. Water, Engineering and Development Centre (WEDC) Supplier: Intermediate Technology Publications, 103/105 Southampton Row, London WC1B 4HH, UK**

wastewater reuse health and environment
sanitation

The conference theme was “The sustainability of water and sanitation systems in developing countries”. Most cases presented were of a practical nature. Case studies were grouped in four sections: (1) Management; (2) Water and the environment; (3) Rural water supply and sanitation; (4) Sanitation and waste. (WB)

Reed, David **(2001), Economic Change, Governance and Natural Resource Wealth - The Political Economy of Change in Southern Africa. London/Sterling: Earthscan Publications Ltd.**

health / pollution

natural resources; management; economic aspects; natural resource management, Africa (Southern)

As the debate regarding the benefits and costs of globalization evolves this book confronts the stark realities of how economic and political reforms in southern Africa have affected the poor and the environment. It further examines the crucial role of international development and business communities in creating effective institutions for long-term, sustainable propserity and social vitality.

The analysis and recommendations presented in this book will be immensely valuable to southern Africa specialists as well as to professionals in development, policy-makers, economists and academics interested in natural resource management elsewhere in the developing world.

Riches, Graham **(ed.) (1997). First world hunger: food security and welfare politics. London: Macmillan Press Ltd. and New York: St. Martin's Press.**

food security and nutrition health and environment

malnutrition; hunger; health; policy

Chapters by resident authors on Australia, Canada, New Zealand, the UK, and the USA, plus introductory and concluding chapters by Graham Riches. A well documented overview of the anomaly of hunger in wealthy countries.(JS)

Rock, M.T. **(2001) Pollution control in East Asia: lessons from newly industrializing economies**.

health / pollution city ecology

Asia (Eastern), environmental management

Why do some economies seem to excel at effective pollution management while others seem to miss the mark when responding to deteriorating urban environments? These studies of pollution management in East Asia s newly industrialized economies (NIE s) include succesfull government responses in Singapore and Taiwan, qualified results in China and Indonesia, and much more limited success in Thailand and Malaysia. In each example Michael Rock considers the starting point of the economy as it began its path toward industrialization in the post World War II period. He discussed the relevant historical and and political context, the pressures placed on the political system from domestic and international sources, and the influence of ongoing trends in East Asia for democratization end economic liberalization. Rock s text makes it clear that each economy found unique, innovative ways to link environmental protection to its own politicaland economic institutions. Thus, while public pressure from both home and abroad gave both strong impetus to succesful programmes in Taiwan, the development of policy in Singapore involved limited public review and a centralized, government led process. The result of Rock s research is a book that provides important lessons without being reductionist. The book offers insights to apply to pollution management in a diverse range of developing nations, but it avoids attempts for precise prescription, or universally appealing, normative answers.

Rodrigues, MS; Lopez-Real, JM **(1999). Urban organic wastes, urban health and**

sustainable urban and periurban agriculture: linking urban and rural by composting. In: Urban agriculture notes, http://www.cityfarmer.org/urbanwastes.html
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling health and environment rural-urban linkages
organic wastes; waste management; public health; periurban agriculture; horticulture

Looks at waste management systems, and at public health as a result of poor refuse disposal. The paper also examines the absorption capacity of both urban and periurban agriculture of this organic waste. (WB)

Ruel, Marie T; Levin, Carol **(2000). Assessing the potential for food-based strategies to reduce vitamin A & iron deficiencies. IFPRI, FCND Discussion Paper # 94 PP 53, 11 pp. references, 2 tables, Washington**
health and environment food security and nutrition
nutrition; micronutrients; malnutrition; health

This paper reviews ten recent projects and library sources regarding food-based strategies to improve vitamin A and iron intake in the diet. It discusses some of the lessons learned and the knowledge gaps. It sets research priorities. Food-based strategies are often described as sustainable because they empower individuals, households, and communities to take responsibility over the quality of their diet through production of nutrient rich foods and informed eating choice. It concludes that the area of food-based interventions has been increasingly active and successful over the past decade. The design and implementation of these strategies have significantly improved. This work is largely driven by NGOs and local institutions. The study concentrates on home gardens (six of ten cases cited). These strategies are particularly well fit to urban agriculture and agriculture fore refugees and displaced persons. (JS)

Satterthwaite, David **et al (1996). The environment for children: understanding and acting on the hazards that threaten children and their parents. UNICEF & Earthscan.; 284 p.**
health and environment
sustainable development; environmental aspects; primary health care; poverty

The book presents a review of the environmental hazards in human settlements and some ideas of how to address these problems. It seeks to make explicate the influence of social, economic and political factors on why such environmental hazards occur and who is most effected by them. It draws on UNICEF projects in Human Settlements and Forestry, Land Use, Sustainable Agriculture and Drylands. It is particularly focussed on (a) ill health and premature death caused by pathogens in the environment in which we live (particularly diarrhea, malaria and intestinal parasites and (b) the environmental crisis of hundreds of millions of people who lack access to natural resources on which their health and/or their livelihood depend. The wide selection of cases (i.e. Box 4.13 *Urban Food Production in Kenya)* tables, and figures provides a solid foundation for understanding and taking action on the

problems reviewed. (JS)

Shuval, HI **et al (1986). wastewater irrigation in developing countries: health effects and technical solutions. UNDP Project Management Report No. 6, New York ,. 325 p.**

wastewater reuse health and environment

irrigation; health; stabilisation ponds; economics

This is a fairly comprehensive overview. It tells the story beginning wit the 19th century in 14 developed countries and finishes with a summary of positives and negatives. It proposes effective and economic methods of control that re particularly suited to developing countries. A theoretical model is developed based on a review of credible epidemiological studies and reports, to assist in the prediction of degree of risk of disease to sewage farm workers, neighbors to the treatment plants and to the consumers of products associated with wastewater irrigation. This study provides a rational basis for the development of a sound economic approach to waste water irrigation in developing countries. Such an approach helps to conserve water and nutrient resources, promotes urban agriculture, and contributes to pollution control. It reduces the cost of inputs to urban and periurban farmers and reduces the cost of municipalities and other local jurisdictions in waste management. This report presents a concise introduction to the policy and technological aspects of recycling wastewater from urban areas for agricultural irrigation. The focus is on conserving resources, economic development and healthy cities. It is a non-technical summary of a 324-page report (World Bank Technical Paper # 51) that was the culmination of a thee-year global study of the latest developments in the field. Several eminent review panels have concluded that the principles presented in this paper provide a sound scientific and public health basis for planning wastewater irrigation projects. (JS adapted from author)

Smith, Olanrewaju B **(1999). Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation. 240 p. ISBN 0_88936_890_2. CAD 30.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9; Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

food security and nutrition health and environment

food security; ecological aspects; economic aspects; rural-urban interaction; research methodology

Seven case studies and research papers plus reports of working groups and plenary sessions of the workshop are presented covering the following themes: policy environment, rural urban interaction, food security, urban waste management and networking in urban agriculture. Case studies on Mali, Burkina Faso, Senegal, Togo,

and Benin were presented. Opportunities and constraints of the UA sector contributions to urban food security and sanitation are analysed. (NB)

Sonou M**. (2001) Periurban Irrigated Agriculture and Health Risks in Ghana. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment wastewater reuse

Ghana; reuse; irrigation;

Most vegetable farmers in the (peri)-urban areas of Kumasi and Accra consider irrigated horticulture as their primary sources of revenues. Currently, (peri)-urban irrigation provides all-year round vegetables and contributes to the improvement of the nutritional status of city inhabitants. The nearness of the markets means a large array of fresh products of good quality. However, water remains a qualitative and quantitative constraint. Because the cost of pipe borne water makes it unaffordable to farmers, the use of untreated wastewater for irrigation has become a widespread practice with its attendant health hazards.

Werna, Edmundo; Harpham, Trudy; Blue, Ilona; Goldstein, Greg **(1998). Healthy city projects in developing countries: an international approach to local problems. 148 p. ISBN 1_85383_455_6 (pbk). GBP 15.95**

Supplier: Earthscan Publications, 120 Pentonville Road, London N1 9JN, UK

health and environment city ecology

health care; primary health care; project development; urban development; health; urban management; urban policies; urban poor; pollution; poverty

Analyses the current state of Healthy City Projects in developing countries. This approach has been implemented by the World Health Organization (WHO) in the wake of the Ottawa Charter (1985) in which a holistic approach to public health care was developed based on the idea that living and environmental conditions are responsible for health. This is particularly acute in cities where so many people live and work together in close proximity. Originally established in 11 European cities, then spreading throughout Europe and then also in other regions of the world, the project is now active in at least 1,000 cities or towns. Core concepts in the Healthy City programme are: (1) Better health will come, not so much from curative care but from improved living conditions; (2) People must take the initiative to improve their own health and their own environments; (3) Health should be seen as an essential part of overall development within the community. A Healthy City project supports city health authorities and/or local government in the field of information and analysis, in particular monitoring of health status and analysis of requirements. In addition, support in policy and advocacy is of paramount importance, developing policies for individual sectors.

This book draws on a range of examples to illustrate how to design, implement and evaluate the integration of public health into urban management. It provides descriptions of the different project phases. Noteworthy is a list of interesting indicators for evaluation. A number of case studies is presented. There is much

attention to rapid appraisal techniques and to priority setting procedures. Community participation is highlighted as crucial. The book ends with an examination of factors influencing the transformation of a project cycle into a continuous process. Illustrations are scarce, but there are many boxes with the case studies. Rather for specialists than for a wide audience. (WB)

WHO Scientific Group **(1989). Health guidelines for the use of waste water in agriculture and aquaculture. World Health Organisation Technical reports series no. 776. WHO Scientific Group, World Health Organisation (WHO), Geneva, Switzerland**

wastewater reuse health and environment

wastewater management; wastewater reuse; aquaculture

Provides a comprehensive overview of health in relation to wastewater use in agriculture. The publication starts by covering the major aspects and current practices on reuse of waste water including: wastewater as a resource, environmental control issues, chemical pollutants, economic aspects, institutional aspects and sociocultural issues. The following chapters deal more specifically with health aspects: infections caused by pathogens; factors involved in disease transmission; epidemiological evidence; health promotion and planning; and implementing safeguards. Lastly the need for further research is discussed. (NB)

Winblad, Uno **(1997). Towards an ecological approach to sanitation. Publications on Water Resources no. 5. 13 p. Department for Natural Resources and the Environment, Swedish International Development Authority (SIDA), Birger Jarlsgatan 61, S-10525 Stockholm, Sweden**

waste recycling health and environment

waste management; sanitation; wastewater

Waste management and reuse is an important element in urban agriculture. This paper presents an ecological approach to sanitation and challenges the flush and discharge systems as these create problems with sewage disposal, water scarcity, ecosystem overload and waste water treatment. Central in the approach is how to achieve safe, non polluting sanitation for all habitants in the rapid growing cities, short of money, water and institutional capabilities. Principles (keep wastes separate, dehydrate, don't flush and don't waste fertiliser) plus practical examples are presented. (NB)

World Bank**? (199?). Urban agriculture: the big, unknown, polluting, and mobile compliment to rural agriculture, so very important for the urban poor. Agriculture technology notes. 4 p. World Bank?**

food security and nutrition health and environment

urban agriculture typology

A general overview of types of urban agriculture. Figures given and descriptions in

the typology of urban agriculture are useful. (WB)

World Health Organization (WHO), European Centre for Environment and Health **(1995). Contamination of food and drink. In: Concern for Europe's tomorrow: health and the environment in the WHO European region, p. 241-273. World Health Organisation (WHO), European Centre for Environment and Health**
health and environment
food contamination; pollution; health hazards; public health

Provides an overview of factors liable to contaminate food and lists food safety regulations, services and information systems in the European context. (WB)

World Health Organization (WHO) **(1995). Highlights of recent activities in the context of the world declaration and plan of action for nutrition. WHO/NUT/95.2. Nutrition Programme, World Health Organization, Geneva**
food security and nutrition health and environment
food security; political aspects

Contains a short description of the World Declaration and Plan of Action for Nutrition, the outcome of the International Conference on Nutrition (ICN) organised by FAO and WHO in 1992. The nine decade goals and nine action-oriented strategies of the World Declaration and Plan of Action for Nutrition are summarised in this document. (WB)

World Health Organization (WHO) **(1998). Book of abstracts: international healthy cities conference, Athens (Greece), 20-23 June 1998. 172 p. World Health Organisation (WHO) Regional Office for Europe, Scherfigsvej 8, 2100 Copenhagen, Denmark; Municipality of Athens**
health and environment
development projects; public health; Healthy Cities programme; case studies

Contains 175 short descriptions of projects carried out or monitored in the framework of the Healthy Cities movement. Sixty-three cities are reviewed, out of which 41 European and 22 non-European. An index provides access to the abstracts per country and city, but there is no subject index, unfortunately. Looking for specific subjects is, for that reason, difficult. Each abstract carries a name and address, but it is unclear if this belongs to the person responsible for that project, or the abstracter, or both. (WB)

World Health Organization (WHO) **1999. Contaminated soil in gardens: how to avoid harmful effects. Programme for Nutrition Policy, Infant Feeding and Food Security, World Health Organisation (WHO), Regional Office for Europe, Scherfigsvej 8, 2100 Copenhagen, Denmark**

health and environment
soil remediation; health; home gardening; soil contamination

Provides practical precautions to avoid potential negative or harmful impacts of contaminated soils in gardens. Normal garbage in landfills does not present a problem but industrial and chemical waste potentially present health hazards. Issues like what to do when soil is contaminated, how to reduce risks, the best way to garden and more are discussed. (NB)

1.6 Urban Agriculture and Gender

Both women and men play critical roles in urban agriculture.

(Picture: ETC)

Gender and Urban Agriculture: Emerging Trends and Areas for Future Research

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Over the last decade, literature on women[1] and urban agriculture has emerged revealing significant insights that arguably can change the future focus of the field at large. This overview presents a synthesis of lessons learned from recent studies that have begun to recognize and examine women as farmers in urban areas. The extent, nature, and role of urban agriculture vary considerably between and within countries, as well as throughout the urban hierarchy. Moreover, evidence tends to be scattered or speculative with little supportive data to substantiate general statements. As such, it is difficult to formulate a synthesis of trends that hold for every context, or even the majority of contexts.

Nevertheless, there are several broadly identifiable trends in recent literature on women and urban agriculture that warrant recognition and further exploration. First, studies now recognize women as urban farmers. Indeed, women play significant roles in urban food production and contribute to both urban household and market economies. Second, women benefit from urban agriculture activities that allow them to successfully combine their multiple roles in subsistence, production, and environmental management sectors. Third, researchers document the constraints hindering women's participation in urban agriculture activities. Obstacles exist at both sectoral and household levels. Fourth, studies identify women farmers' survival strategies and social activism in response to structural constraints and urban food issues. Together these trends have enriched the understanding of urban agriculture. Yet gaps persist in the literature, and a discussion of future trends and considerations for urban agriculture research in general is required.

Trends in Women and Urban Agriculture Research

(i) Women as urban farmers

Arguably the most significant trend in recent urban agriculture research is the acknowledgment of women as urban farmers. Women's participation in and contribution to urban agriculture has been masked in past studies by reference to a so-called "urban farmer". This supposedly gender-neutral term suggests an undifferentiated urban dweller who engages in agriculture yet is undoubtedly based on a masculinised norm. Recent studies document women's predominance in the African context (Cockram and Feldman, 1996; Smit, Ratta and Bernstein, 1996), and particularly in the Central African Republic (Alaruka and Choma, 1985), Kenya (Mwangi, 1995, Lee Smith and Memon, 1993, Mazingira Institute, 1987), Mozambique (Ayisi, 1995; Gentili, 1989; Loforte, 1987), Tanzania (Tripp, 1997; Mlozi,

[1] While the title "gender and urban agriculture" implies a focus on the social relations between men and women, the majority of work in this field tends to highlight only women's experiences with farming in cities. I thus refer to these texts as dealing with "women and urban agriculture" and discuss the need to explore "gender issues" in future urban agriculture research later in the introduction.

1995), Uganda (Maxwell, 1995; Maxwell, 1994; Maxwell and Zziwa, 1990), Zambia (Drescher, 1997; Drescher and Bos, 1993; Rakodi, 1988), and Zimbabwe (Chaipa and King, 1997; Mudimu, 1996; Mbiba, 1995; Mbiba, 1993). Research in Poland (Bellows, 1996), the Solomon Islands (Sommers, 1992), Thailand (Evers and Korff, 1996), and the United States (Hynes, 1996) also points to the dominance of women farmers in urban areas. Women urban dwellers play pivotal roles in subsistence and market gardening, animal husbandry, food processing, waste recycling and (re)use.

The predominance of urban women farmers in many contexts is attributed to two factors. First, women continue to bear primary responsibility for household sustenance and well-being (Mudimu, 1996:180), largely due to traditional cultural views and societal expectations (Chaipa and King, 1997). Everyday domestic tasks, including the provision of food, water, clothing, and healthcare, as well as the maintenance of a clean homestead, fall to female household members who are responsible for biological and social reproduction. Second, women tend to have lower educational status than men thus face less probability in finding suitable wage employment in the formal sector (Streiffeler, 1993:8). Since few job opportunities exist for women in urban areas it becomes imperative for women to seek other ways to fill in the gap between cash income and what is needed and available for household reproduction (Rakodi, 1985:56). In combination, these two factors mean that women must often continue in their traditional reproductive roles and secure household subsistence through strategies that do not rely on formal employment.

(ii) The benefits of urban agriculture for women farmers

Recent studies document the benefits of urban agriculture for women who are responsible for family food provision. Urban agriculture is predominantly considered a primary strategy employed by women to maintain livelihoods and protect household incomes through subsistence production. While the prime motivation of women urban farmers is to avert hunger by producing a variety of nutritional staple crops, home-grown food also frees up scarce cash that otherwise would go towards food purchases (Maxwell, 1994; Freeman, 1993:12-14). Urban agriculture can thus furnish “a significant contribution to [households], for whom small amounts of food . . . can make a crucial difference” (Sachs and Silk, 1987:3). When gardens flourish they can provide a sizeable portion of the household budget. Dramatic findings from a survey of eleven Latin American countries estimate that one and a half days spent cultivating an urban plot can save ten to thirty percent of the total food bill (Nugent, 1997:5). In Lusaka, approximately thirty-three percent of food consumed by poor households came from urban cultivation (Sanyal, 1987). In Harare urban farmers each cultivated on average five and a half 50kg bags of maize - enough to last a household four to six months (Mudimu, 1996:181) or incur savings of up to US$20-40 on food expenditures per month (Mudimu et al., 1998:1).

In addition to providing yields sufficient for some quantity of household sustenance, urban agriculture activities have the advantage of allowing women to work close to the homestead. This is important in light of domestic and child-rearing responsibilities for which women often have primary responsibility (Ratta, 1993). Urban agriculture is also relatively accessible to women in that it utilizes indigenous practices and low-cost inputs that are attainable and affordable for women with limited incomes, skills, and resources. For example, women back-load fuelwood from periurban areas in Ethiopia to satisfy energy needs for cooking and food processing (Haile, 1991) or collect and prepare wild vegetables to contribute to household nutrition in urban Lesotho (Mapetla, 1994). Studies show that urban agriculture is particularly

significant for women with larger families to support (Mudimu, 1996; Freeman, 1993:7; Rakodi, 1988; Alaruka and Choma, 1985), elderly women (Ethangatta, 1994; Rogerson, 1994), and women heads-of-households who tend to face considerable financial, resource, and time constraints (Nicholson et al., 1998; Mudimu, 1996; Maxwell, 1995; May and Rogerson, 1995; Mwangi, 1995; Egziabher, 1994; Maxwell, 1994; Mbiba, 1993; Lado, 1990; Mazingira Institute, 1987; Ninez, 1985).

Some researchers have found that women urban farmers do not limit their activities to the subsistence realm. Urban agriculture requires an investment of household resources, such as land, labour, and capital that can motivate women to go beyond food acquisition for domestic use. Urban food enterprises represent an avenue through which unskilled and uneducated women potentially can gain entry into the business milieu. Women, for example, sell fresh produce in market stalls in Maputo (Loforte, 1989), Harare (Horn, 1995), and Nairobi (Ethangatta, 1994), while women profit from urban dairying in Nigeria (Shehu and Hassan, 1995). Enterprises in Nairobi's informal sector, including food kiosks, restaurants and bars, and market stalls, are primarily run by women (Freeman, 1993:2). A similar trend is evident in Nigeria and Thailand, and women outnumber men as vendors in Indonesia, the Philippines, Senegal, and Jamaica (Tinker, 1998:6). Food produced by women urban farmers is often a major source of supply in these enterprises. These findings suggest that small-scale food businesses may be more accessible to those women already involved in urban agriculture production and processing for subsistence purposes.

In addition to reproductive and productive roles, women are environmental resource managers who (re)use and recycle materials to enhance crop and livestock yields to feed their households and communities. Women are caretakers of family health by maintaining sanitary conditions around the house and safely disposing of household wastes. Recent literature identifies linkages between waste management and women's participation in urban agriculture that facilitate both household food security and local environmental sustainability (Mehra, 1996; Furedy, 1990). In urban Mexico, for example, women have become principal managers of an organic waste recycling technology that produces nutrient-rich fertilizer and treats blackwater from household sewage systems for use on vegetable garden beds (Schmink, 1989). Paolisso and Gammage's (1996) research in Quito, Ecuador reveals that women undertake the majority of environmental management tasks in urban households, including the purification of drinking water and the recycling of domestic waste. Women are careful to reuse garbage and separate inorganic from organic refuse for the latter adds value to vital farming and husbandry activities. Assaad and Bruce (1997) detail the important role of young women in garbage collecting that contributes to and supports urban pig keeping in Egypt.

(iii) Constraints facing women urban farmers

Another trend in recent work on women and urban agriculture has been the documentation of sectoral and household level constraints to women's participation in urban food production. Perhaps the most overarching barrier to women urban farmers is the opposition to city farming activities by local authorities. Urban agriculture is often perceived as an artefact of rural life that simply does not belong within the city limits and poses a potential health nuisance or threat to urban dwellers. It is also thought to be of marginal importance to the urban economy (Maxwell, 1995) and is not considered a legitimate form of urban land use. As such, urban planners or policy makers do not plan for cultivation and husbandry activities nor are these activities supported by local authorities (Mudimu, 1996:180). Hostile or

unsupportive policy for urban agriculture may be particularly detrimental to women farmers who (in relation to men) tend to possess fewer skills that are valued in the marketplace and whose domestic responsibilities, including childcare, make it difficult to enter the formal workforce in order to adequately support their households. Repressive measures create barriers to women's access to urban space for cultivation (Mbiba, 1995; Freeman, 1991).

Women urban farmers also face local obstacles with respect to land, labour, agricultural inputs, and environmental conditions. First, many researchers have identified, in general terms, women's lack of access to land as a major constraint to urban agriculture activities (Maxwell et al., 1998; Smit et al., 1996; Maxwell, 1995; May and Rogerson, 1995; Maxwell, 1994; Drescher and Bos, 1993; Haile, 1991; Matlala, 1990). Women in many countries have been, and continue to be, barred from claiming ownership of land plots due to cultural traditions. Moreover, deflated economic status, and difficulties faced within the formal employment sector preclude women's ability to purchase land in their own right. Thus women tend to rent, borrow, or illegally use land for urban agriculture activities. Furthermore, for many women proximity to agricultural plots may be hindered by quality of homestead. Those who rent rooms in houses or reside in high-density areas may encounter few opportunities to farm neighbourhood land (Horn, 1995). Instead women resort to farming in locations that are some distance away from the homestead (Alaruka and Choma, 1985) and thus require increased time for commuting, leaving less time for other tasks and responsibilities. Those women forced to squat illegally on land face a greater probability of crop theft or confiscation and destruction by local authorities and private landholders, due to the lack of physical presence at the site (May and Rogerson, 1995). Hence, women tend to lose livelihood options in cities when faced with a loss of or poor access to land (Maxwell et al., 1998). In contrast to the trend of poor land access, Mbiba's (1995) study reveals women's roles as landlords and gatekeepers in the urban agriculture community in Harare. While women control and manage agricultural plots, men participate as contract labourers or assistants to female spouses in crop production. This finding points to the possibility of alternative scenarios in different contexts that deviate from trends revealed in recent literature on women and urban agriculture.

Second, women tend to invest their own labour in urban agriculture activities. It is documented that women spend longer amounts of time in the fields than men (Mudimu, 1996:190), commit substantial amounts of labour into dairy production, processing and marketing (Nicholson et al., 1998), and must fetch water, prepare meals, care for children, and so on, upon returning to the homestead (Dennery, 1995). Thus women must carry out household care and maintenance regardless of the time they devote to food production or other livelihood activities. This is particularly difficult for women heads-of-households who bear the sole responsibility for both reproductive and productive tasks (Egziabher, 1994).

Third, while women are most likely to invest labour in cultivation or husbandry activities, they are unlikely to have access to agricultural inputs (Cockram and Feldman, 1996). Women often do not have extra income with which to purchase seed and fertilizer. Hence, they must utilize those available resources that may be hazardous to their health, such as wastewater or solid waste. Credit is unobtainable without secure rights to land, which usually requires ownership. Women's decision-making power and ability to participate in agricultural activities may also be undermined by a lack of knowledge of inputs, such as pesticides and fertilizer, due to limited exposure to commercial urban agriculture (Dennery, 1995) or training and skills courses offered by institutions or non-governmental organizations. Women are also less likely

to benefit from research or extension services (Ratta, 1993; Mazingira Institute, 1987) that fail to consider gender specific differences regarding methods of plant production, crop species, and use of composts, manure and fertilizer (Drescher, 1997).

Fourth, environmental constraints hinder women's efforts in urban agriculture activities. Access to water, for example, is a key constraint to productive capacity and successful gardens are often limited to the rainy season. Otherwise, water is obtained at a high financial cost from informal street vendors or through illegal means (Nugent, 1997:5) such as tapping municipal water pipes. The productivity of land varies so that a surplus of produce is not guaranteed; this is especially the case in intensive continual work on urban plots which often occurs due to the need for subsistence produce or extra cash from marketing (Loforte, 1989). Continual urban development, and the resulting loss of environmental resources, means that women must search further and further away for products such as fuelwood (Haile, 1991), fodder, and wild vegetables (Mapetla, 1994) to support their families. Increasing urban pollution and environmental contamination result in serious problems that impede women's abilities to adequately feed their families. Food loaded with toxic contaminants sabotages the health of those it ought to nourish.

(iv) Women urban farmers' survival strategies and community activism

Recent studies identify women farmers' survival strategies and social activism in response to structural constraints and urban food issues. Millions of women urban farmers have managed to produce food in towns and cities without any official recognition or support. Women often gain access to rights-of-way and vacant land that they do not own to grow staple foods and raise small livestock near their dwellings. Elderly women in Nairobi grow beans, kale, cabbage, and bananas in the slum areas and along roadsides, while also keeping dairy cows to produce milk, during severe economic conditions (Ethangatta, 1994). In Mamelodi, South Africa, women banned from land-ownership illegally grow vegetables on vacant land scattered within the township or along riverbanks and mountainsides (Matlala, 1990). In Nairobi, women farmers spread the risk of crop theft, confiscation or destruction by cultivating multiple plots in different locations in the city (Freeman, 1993:10). Women's roles in environmental management become especially pertinent for those women who lack access to agricultural inputs such as fertilizer. Women are careful to recycle garbage and use organic refuse to add value to vital farming and husbandry activities (Assaad and Bruce, 1997).

As community activists, women farmers participate in governance, local politics, and community groups, linking social activism and urban food issues. For example, in Poland, women have buffered themselves from unfavourable policies that can result in uneven distribution or excessive prices of food (Bellows, 1998). Specifically, women rally around improving conditions for food provision as industrial pollution in the Silesia Region has given rise to food contamination (Bellows, 1996). The effectiveness of the women's "Tested Food for Silesia" program has created an environmental management model of immediate relevance, and has served to enhance the status and power of women farmers in the community. Similarly, the suburban farmlands of Mozambique have been the site of women's activism since the mid-1980s when the government initiated the Maputo Green Zones Project. It has since become a women's initiative (Ayisi, 1995) with ninety-five percent of the 11,500 cooperative members being women. These women have created a life in the public sphere, gained access to vegetables, grains and fruit produced by the cooperatives, and acquired skills and training (Marshall, 1987). Also, in the Gambia, government support for horticultural production has harnessed the community activism of women who have formed a periurban

farming cooperative. The cooperative was provided with a loan of 10,000 dalasi and managed to pay back the entire amount within nine weeks of the first harvest of chilli peppers (Barrett and Brown, 1988). The strength of women's social networks and cooperative efforts are noted as potential areas for successful development strategies in the urban agriculture sector.

Areas for Future Research

Trends in recent research reveal that urban agriculture is an adaptive strategy of women to protect household food security either through direct provision of a supplemental food source, as food reserve, or as a means of stretching other sources of income. Despite sectoral and local level obstacles, women urban farmers pursue cultivation and husbandry activities through their reproductive, productive, and environmental management roles. While the four trends detailed above have facilitated greater understanding of women's participation in urban agriculture activities, several important issues must be considered in future research. These include gender analysis, geographical scale, and difference.

Gender as an analytical category is meant to capture a complex set of social processes that are inextricably linked with power relations. Gender analysis involves the examination of men's and women's roles, responsibilities, and social status in relation to local cultural perceptions of masculinity and femininity that delineate access to opportunities and resources in a particular context (Hovorka, 1998). In reformulating gender as a theoretical category and an analytical tool, we can better explore the division of social experiences along gender lines that tend to give men and women different conceptions of themselves, their activities and beliefs, and the world around them (Harding, 1986:31). Those researchers who explore gender dynamics to this depth provide some of the most comprehensive, interesting, and thought-provoking pieces in the field of urban agriculture (Mianda, 1996; Mudimu, 1996; Mbiba, 1995; Maxwell, 1994; Lee-Smith and Memon, 1992; Rakodi, 1991; Rakodi, 1988).

Mianda (1996:91), for example, explores how sexual division of labour serves as the basis for gender relations in garden production in Kinshasa, Zaire (now Democratic Republic of Congo). She illustrates how women utilize strategy and tactics to gain advantage over their husbands and hence control over the garden enterprise. In order to get the approval of their husbands to initiate production, women stress the feminine nature of agriculture and its importance to family well-being (for which women are primarily responsible). Men often refuse to participate in such culturally defined feminine tasks for fear of being symbolically perceived as a woman. The resulting sexual division of labour establishes gardening as an entirely female activity. Women gardeners rely on this to control the entire process of production from price setting and negotiation to marketing. Furthermore, women hide portions of the profits from their husbands by storing monies in kitchen pots. Again the cultural perceptions of domesticity as women's domain dissuades men from handling cookware for fear of becoming the victims of sorcery. Women thus take advantage of cultural traditions that tend to marginalize them into particular social spheres. It is important therefore to consider what activity men can involve themselves in without loss of community status. It is also necessary to recognize the cultural factors that play a role in the interchange of labour and relations between men and women.

By understanding how gender hierarchies are constructed, legitimated, challenged, and maintained in specific contexts one can unearth the social relationships that structure a particular urban agriculture system. This is especially pertinent when exploring who in the

household actually controls produce or income generated from farming activities. Mbiba (1993) reveals that while women have control and decision-making power regarding cultivation, the husband's consent is still required due to his potential assistance with financing or dealing with local authorities. Shehu and Hassan (1995) note that dairying activities of female household members serve to balance household power relations by providing women with their own enterprise. Maxwell's (1994) study details the struggle over resources between men and women and their respective activities. Investigating issues of control and power relations shed light on how and why distinct urban agriculture activities are chosen by, or assigned to, particular household members.

Another important consideration for future research on women and urban agriculture is that of geographic scale. Rather than considering a particular scale in isolation, the application of gender analysis leads to the fundamental examination of social structures and institutions that create specific power dynamics at the local level (Rathgeber, 1990:494). Not only is it essential to analyse intra-household gender relations, it is also important to explore organizational, legal and political structures and ideas that reinforce gender differences and inequalities. As detailed above, for example, Mianda's (1996) study reveals the subtle gender relations that structure urban agriculture activities at the household level. The study illustrates how larger cultural traditions delineate masculine and feminine roles that form the basis of a power struggle in the household garden produce sector. Other authors also explore the linkages between micro- and macro-levels. Horn (1994) details the agricultural and urban developments that have resulted in the role of women as fresh produce vendors in Harare, Zimbabwe. Structural adjustment policies in particular have created differential problems for women as compared to men. Freidberg (1997; 1996) explores recent trade liberalizations in Burkina Faso that have prompted urban gardeners to adopt more entrepreneurial strategies in order to secure access to external markets and aid. Economic reforms have failed to create a market free of gender biases, leaving women gardeners in a disadvantaged position compared to men. Aside from a small number of examples, however, there are few cases where urban agriculture researchers peel back the layers to uncover the larger processes that influence relationships between men and women. Further work remains to be done, for example, to adequately examine how urban policy and/or economic markets at the macro-scale impact on the gender relations that structure local urban agriculture systems.

Finally, the issue of difference requires greater consideration in future urban agriculture research to highlight distinct systems that form along gender, race, ethnicity, class, and age lines. Some researchers have begun to emphasize differential experiences of women urban farmers, in particular the experiences of women heads-of-households, who tend to be amongst the poorest urban farmers and hence face significant constraints to food production. Others have noted experiences that differ across age and class lines. The recognition of context-specificity and distinct standpoints can provide greater scope and richness to research. It avoids a priori assumptions about a single determinant of gender relations in any particular culture or locale (Flax, 1990:46). Recognizing differences amongst urban agriculture practitioners also avoids the privileging of a universal experience that conflates the needs, interests, and experiences of persons into a single conceptualisation.

Conclusion

Most research to date presumes a positive impact of urban agriculture activities on household food security despite the paucity of conclusive evidence confirming this assumption. While there is insufficient data on the linkages between urban food production and basic household

needs, there exists even less evidence as to what urban agriculture means for women who tend to be the primary practitioners in many contexts. This point was first made by Rakodi (1985) and continues to hold true some one and a half decades later. There is little consensus on whether the promotion and support of urban agriculture practices is beneficial to women. Some researchers note that such activities do not address, and may in fact mask, larger issues of women's access to education, skills, or wage employment (Mbiba, 1995; Rakodi, 1985). Encouraging women to spend more time engaged in urban agriculture may impose additional burdens to those they already face.

The advocacy of urban agriculture as a development strategy necessarily targets women in many contexts as the agents of intervention without adequate consideration of how potentially successful endeavours may alter their existing circumstances. Schroeder (1993) points out that high-visibility interventions can be co-opted by men to capture female labour or rights to land and natural resources where women have previously asserted some autonomy over their economic activities. Hence in capitalizing on women's modest successes in urban agriculture activities, development strategies may exacerbate inequitable gender relations. It is important to analyse the benefits of urban agriculture to households, especially to women, compared to alternative economic and social opportunities that might be made available through other initiatives (Smit et al., 1996; Egziabher, 1994). Advocating urban agriculture as a viable development strategy without truly understanding the intricacies of such current systems may prove perilous.

The consideration of gender analysis, geographical scale, and difference can further the advancement of knowledge on urban agriculture systems. Such investigations must be paired with the collection of empirical data to substantiate claims regarding the productivity and sustainability of cultivation and husbandry activities in cities. These issues will become increasingly important in light of urbanization, demographic and environmental trends, and continuing concerns regarding social and economic development.

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Smit, Jac, Annu Ratta and Janis Bernstein. 1996. Urban agriculture: an opportunity for environmentally sustainable development in sub-Saharan Africa. *Post-UNCED Series*. Paper No. 11. The World Bank, Environmentally Sustainable Division and Africa Technical Department.

Streiffeler, Friedhelm. 1993. General Principles and Approaches for Sustainable Urban Greenbelts with Special Reference to Africa. Berlin.

Tinker, Irene. 1998. Feeding the megacities. *Urban Age* 5(3):4-7.

Tripp, Aili Mari. 1997. *Changing the Rules: The Politics of Liberalization and the Urban Informal Economy in Tanzania*. Berkeley & Los Angeles: University of California Press.

Alaruka, AA; Choma, NK **(1985). Les femmes de Kisangani et la pratique agricole. Annales de l'Institut Stiperietir Pedagoqiaue de Kisanaani. Paper 13 pp. Supplier: Annales de l'Institute Superier Pedagogique de Kisangani**

gender economic impacts

Africa, Central African Republic, periurban, income generation, women's employment, intervention strategy

The objective in this study is two-fold. First, to document the proportion of persons in Kisangani involved in urban agriculture, and to which social categories they belong. Second, to explore women's motivations for pursuing such activities. The study found that in the zones studied three out of five women cultivate food crops, many of which are married women. Also, women with children are more likely to participate in urban agriculture than those women who remain childless. Through urban agriculture, women are able to provide for their households. Many of the women are saleswomen, teachers, dressmakers, or are employed in various urban services. Problems facing women in both urban and peri urban areas include distance and transportation. The authors recommend that those organizations targeting women's issues, social affairs, and agriculture intervene more effectively so as to offer technical and material support to women involved in urban agriculture. (AH)

Ayisi, Ruth Ansah. **1995. Supporting women farmers in the Green Zones of Mozambique. In Seeds 2. Ed Ann Leonard. New York: The Feminist Press. 41-63.**

gender

women; agricultural cooperatives; Mozambique; human well-being

In many countries of the developing world, particularly those in Sub-Saharan Africa, women farmers must deal not only with the inherent difficulties of gender inequalities, poverty, and the vagaries of nature, but with the consequences of war and civil strife as well. This case study focuses on efforts to help women farmers to survive and prosper in the Green Zones (suburban farmland) of Mozambique, and they provide desperately needed foodstuffs for the local market. The Maputo Green zones project was initiated by the government after the failure of the 'people's farms' which were designed as a self-help approach, and it has since become a women's organization. The General Union of Cooperatives (GUC) was established in 1983 to better serve the needs of the cooperatives operating within the Green Zones. This chapter discusses how the individual cooperatives function, the role of the GUC, the development of agricultural production, training and education of cooperative members, funding and support, and the importance of

human development above economic development. The chapter concludes with an examination of one specific cooperative, the Beira Green Zones Project. (ah)

Barndt, Deborah **(1999). Women workers in the NAFTA food chain. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds). - p. 162-166 Chapters, 5 pp. 0_88936_882_1: CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Ottawa: IDRC. Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

gender

gender, food systems, globalisation, agribusiness

Efforts to develop sustainable urban food systems must take into account the role of women in the various stages of production, preparation and consumption of the food we eat. The Tomasita project explores women's shifting roles in the restructured global labour force, tracing the journey of a tomato from a Mexican field to a Canadian table. This essay focuses particularly on salaried workers in Mexican agribusiness. The Tomasita project also aims to connect women food workers in Mexico and Canada, in both regular and alternative food systems, through photo-stories, films, and video letters. Sharing these stories across borders helps women understand how they are part of a broader global process while they learn from each others' tales of survival and resistance. (NB) (Abstract adapted from original)

Bellows, Anne C **(1996). Where kitchen and laboratory meet: the 'tested food for Silesia' program In: Feminist political ecology: global issues and local experiences / Dianne Rocheleau, Barbara Thomas-Slayter, Esther Wangari (eds). - p. 249-270 Chapters, 20 pp. 0415120276: USD 25.99 London and New York: Routledge.**
Supplier: Routledge Customer Service, International Thomson Publishing Services Ltd, Cheriton House, North Way, Andover, Hampshire SP10 5BE, UK

gender

Poland; participatory approaches; gender issues; NGOs; public health; safe food

Silesia, in Poland, is part of the 'sulphur triangle' which suffers from a devastating pollution. In response to this, a group of Silesian women have organised themselves into an NGO aiming at reducing local environmental health risks stemming from polluted food. This article tells the tale of the Gliwice Circle of the Polish Ecological Club and its 'Tested Food for Silesia' project in the midst of political turmoil during the post-1989 upheaval, and how this group struggled to bring about more local food safety. (WB)

Caceres, D. and M. Arbomo, **Surviving on Little Land: Women's Struggle in Town and Country, In: ILEIA Newsletter for Low External Input and Sustainable Agriculture, 1994, December: Farming At Close Quarters, vol. 10, no. 4, pp. 8-9. Department of Rural Development, Faculty of Agronomy, National University of Cordoba, Argentina / Centro de Comunicacion Popular y Asesoramiento**

Legal (CECOPAL), Cordoba Argentina
gender urban horticulture
women's role; Argentina; home gardening

Socioeconomic policies implemented in recent decades in Argentina have led to division of land into small plots (minifundizacion) and expanding poverty belts around the big cities. Growing food in small gardens is seen as one way to help the poor feed their families. In this article, two case examples (one urban, one rural) are presented from Cordoba Province in Argentina.

Chaipa, I. and B. King. 1997**. Urban agriculture in Gweru: household nutrition, economic costs and benefits. IDRC Project No. 01015. Harare: Research, Development and Consultancy Division of ENDA-Zimbabwe.**
gender economic impacts
Zimbabwe; economic impacts, urban infrastructure,

The understanding of the actual value and potential of urban agriculture in feeding urban populations is an important first step in defining the future of urban agriculture in Zimbabwe. This report outlines the findings of a household monitoring exercise conducted in Gweru during the period September 1996 and April 1997. The study focused on the economic, health and nutrition impacts of urban agriculture, and identified crop types of on and off plot urban cultivation and activities during the cropping season. The study showed that women are the main participants in all the activities in urban cropping and vegetable production. Apart from women being economically disadvantaged, this could be due to the African cultural views of women as the principle actors in the provision and preparation of household food. The study concludes that urban agriculture benefits a significant portion of the household sin Gweru. Urban planners and policy makers should incorporate gender considerations in the layout design and planning of urban infrastructural services. To this end, more gender-focused research and workshops on gender sensitization ought to be carried out. (ah)

Chimbowu, Admos; Gumbo, Davison **(1993). Urban agriculture research in East and Southern Africa II: record, capacities and opportunities. Cities Feeding People Series report no. 4. 18 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
genderfood security and nutrition
Africa (Eastern); informal sector; urban policies; urban planning; economic aspects; waste management; urban zoning; environment

Most of the studies carried out were within the context of three broad paradigms: the planning paradigm, urban informal sector studies, and the spational and functional dimensions of urban agriculture. Most studies up to now have been baseline studies covering government policy, land tenure, women practitioners, poverty, homegardens, wastewater usage and urban planning. Aspects requiring further research are land use zoning, actual production levels, urban management and its relation to urban agriculture, marketing studies and studies on the interrelations between urban agriculture, water, waste and disaster. Concretely, studies on

decolonising urban management practices in Zimbabwe towards converging and symbiosis in urban economy and the use of agrochemicals in urban agriculture are suggested. (NB)

Dennery, Pascale **(1994). Inside urban agriculture: an exploration of farmer decision-making in Nairobi: a research proposal for a masters thesis. 18 p.**
R&D methodology food security and nutrition gender
Kenya; decision-making process; gender issues; family relationships; extended families

Provides the outline of a study undertaken to obtain insight in factors affecting farmers' decision-making processes: notably gender differences and resource allocation among different member of the household. Social relations, both inside and outside the family, are examined as to their influence on farmers' decisions. (WB)

This stury examines urban food producers and their households in Kibera, a large informal settlement of Nairobi. One of the main features of this study is the addition of a qualitative dimension to urban agriculture research in east Africa. Empirical evidence is provided on gender relations, labour relations and the multiple uses of produce at the individual, household and community level. The traditional division of agricultural labour was noted during fieldwork: men preparing the soil for planting, and women responsible for harvesting food for daily needs. Women decide how much produce to sell and what food to buy, in consultation with the spouse in order to provide a means of preserving marital harmony. Women's decision-making power may be undermined by factors such as size of plot, need for cash, and personal health. Women are also less likey than men to have knowledge on inputs, such as pesticides or use of sewage water, due to their limited exposure to commercially-oriented agriculture. The study also reveals that numerous labour issues are directly related to the prevailing gender ideology in Kenya. Female urban producers must carry out most of the care and maintenance of the household, regardless of the time they devote to food production or other livelihood activities. Thus, women tend to stay in the field longer than men, and are expected to fetch water and prepare meals upon returning to the house. In other cases, women's ability to control their own agricultural labour time is limited by responsibilties to others. (AH)

Cockram, Mary, and Shelley Feldman**. 1996. The beautiful city: gardens in third world cities. *African Urban Quarterly* 11(2&3):202-208.**
gender
social aspects women’s employment; vacant lands; gender roles

International comparisons of research on the agronomic, social and policy aspects of urban agriculture share the conclusion that urban food production is an important component of household survival strategies. Most urban farmers are poorly educated women with families who possess only a few of the skills that are valued in the marketplace. Such women are among those most likely to invest their labour, but few other inputs, in urban agricultural production. These urban farmers

creatively gain access to rights-of-way and use vacant land which they usually do not own to grow staple foods and raise small livestock near their dwellings. Hostile government policy and access to water are key constraints to their productive capacity. These conditions help explain why successful gardens are often limited to the rainy season. Yet, urban agriculture, which flourishes during difficult economic times, provides between 10 percent and 30 percent of the household budget. The paper concludes that urban farmers, like their rural counterparts, engage in work that is gender stereotyped. Since subsistence production is perceived to be part of women's responsibility for feeding the family, it is hardly surprising that women are the dominant participants in this art of urban survival. (Author abstract)

Dennery, Pascale **(1995). Inside Urban Agriculture: An Exploration of Food Producer Decision Making in a Nairobi Slum (M.Sc. Thesis) M.Sc. Thesis from Wageningen Agricultural University. The Netherlands. The Netherlands: Wageningen Agricultural University**

gender

informal settlement, gender relations, gender roles, decision making, labour, women's role, power relations

This study examines urban food producers and their households in Kibera, a large informal settlement of Nairobi. One of the main features of this study is the addition of a qualitative dimension to urban agriculture research in east Africa. Empirical evidence is provided on gender relations, labour relations, and the multiple uses of produce at the individual, household and community level. The traditional division of agricultural labour was noted during fieldwork: men preparing the soil for planting, and women responsible for harvesting food for daily needs. Women decide how much produce to sell and what food to buy, in consultation with the spouse in order to provide a means of preserving marital harmony. Women's decision-making power may be undermined by factors such as size of plot, need for cash, and personal health. Women are also less likely than men to have knowledge on inputs, such as pesticides or use of sewage water, due to their limited exposure to commercially-oriented agriculture. The study also reveals that numerous labour issues are directly related to the prevailing gender ideology in Kenya. Female urban producers must carry out most of the care and maintenance of the household, regardless of the time they devote to food production or other livelihood activities. Thus, women tend to stay in the field longer than men, and are expected to fetch water and prepare meals upon returning to the house. In other cases, women's ability to control their own agricultural labour time is limited by responsibilities to others. (AH)

Dima, S.J. and A.A. Ogunmokun **(2001), An Overview of Socio-Economics and Gender Aspects in Urban and Peri-Urban Agriculture: The Potential of the City of Windhoek, Namibia. Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001**

Supplier: Department of Agricultural Economics and Extension, University of Namibia.

gender economic impact

socio-economic aspects; gender issues; urban agriculture; periurban agriculture;

Namibia, Africa (Southern)

Urban and peri-urban agriculture can be defined as the process of producing agricultural commodities within demarcated urban and edges of urban areas. Because of colonial and post-colonial local authority laws, rules and regulations, urban agriculture has been practised illegally, discreetly and without technical support by local authorities or the relevant ministries of agriculture. This paper provides an overview of the resources available, and the technologies used for urban and peri-urban horticulture in Namibia. This is followed by a survey of the recent literature on urban and peri-urban agriculture in Africa with a view to assess its extent and contribution in terms of food production, employment creation, improvement in nutrition status, income generation, innovation creation and adaption and appropriate technologies development. This is followed by a case study of urban and peri-urban horticulture in the city of Windhoek.

Drescher, Axel W. **(1997). Management strategies in African homegardens and the need for extension approaches Paper presented at the International Conference on Sustainable Urban Food Systems. Ryerson Polytechnic University. Toronto,Canada. 22-25 May 1997. Papers**

gender horticulture food security and nutrition

Africa, Zambia, household survey, food security, management strategy, women's role, gender differences, intervention strategy, extension services

The relationship between urban food production, food security and urban environments has been largely neglected. This paper focuses on results from a household garden survey conducted during 1992 and 1993. The main objective of the survey was to clarify the role of household gardens for household food security in Zambia and to identify differences and problems in management strategies and their effects on production in different areas. The results reveal that the main actors in urban agriculture are often women. In all compounds studied in Lusaka, women were to a greater extent involved in cropping and gardening than men. Gender analysis is used to reveal differences between men's and women's urban agriculture techniques with respect to alternative methods of plant production, crop species, and use of fertilizer, manure and compost. The paper argues that gender specific differences in agricultural activities need to be paid more attention by extension services in urban and periurban areas. (AH)

Drescher, Axel W. **1999. Urban microfarming in central southern Africa: a case study of Lusaka, Zambia. *African Urban Quarterly* 11(2&3 May-August 1996):229-248.**

gender

Zambia; gender rolesaccess to land; access to water; urban food

The relationship between urban food production, food security and the urban environment has been largely neglected in the past. In Lusaka, Zambia as in many other tropical urban centres, gardening and cropping receive very little support from local authorities. Indeed, city councils often prohibit these activities. Production of staple foods prevails in the west season, and vegetable production in the dry. Both

activities largely depend on access to resources like water and land. Within the high- and medium-density squatter quarters, vulnerability in terms of food security differs. In the Zambian case, it was found that dry-season cultivation is not practiced by the most vulnerable households but rather by those which have access to essential resources for this activity. In Lusaka, garden size decreases with increasing population density. The walking distance to sources of water is much further in the high-density areas, making microfarming more difficult there. Access to both land and water is lowest in the high-density, low-income compounds in Lusaka. Microfarming obviously contribute to household food security in the city both directly by providing food and indirectly by generating income. There are significant differences between the role of women and men in urban household food security. Women are the major actors in urban microfarming but face many obstacles with respect to income generation and access to resources and markets. There is urgent need for appropriate support of urban agriculture in the future. (Author abstract)

Drescher, Axel W.; Bos, F **(1993). Report on fieldwork on homegardening in Northwestern Province (Zambia) In: Household Food Security, Nutrition and Health Monitoring Report. 1993 reports. Lusaka, Zambia: Central Statistical Office**
Supplier: Central Statistical Office. Lusaka, Zambia.
gender food security and nutrition
Africa, Zambia, garden cultivation, gender differences, periurban, rural, intervention strategy

This study describes home garden activities and the main problems experienced in maintaining home gardens. Research is conducted in relation to household food security issues, as well as ecological function of home gardens within the land use system. It compares gardening in urban, periurban and rural areas of Zambia. One of the main objectives of this study is to determine differences between male and female gardeners. Findings reveal that more male gardeners are found in periurban and rural areas than in urban areas and access to land in these areas more difficult for women than men. In urban areas, women have longer walking distances to water sources due to the fact that people often cannot chose the garden site. Female household labour is most important in urban home gardens, while male labour is key in rural areas and periurban areas have a mix of female-male labour. Strengthening the role of women is noted as a recommendation for policy makers in the future. (AH)

Dima, S.J.. and A.A. Ogunmokun, **An Overview of Socio-Economics and Gender Aspects in Urban and Peri-Urban Agriculture: The Potential of the City of Windhoek, Namibia. Department of Agricultural Economics and Extension, University of Namibia, 2001. Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001**
gender economic impact
socio-economic aspects; gender issues; urban agriculture; periurban

agriculture;Namibia

Urban and peri-urban agriculture can be defined as the process of producing agricultural commodities within demarcated urban and edges of urban areas. Because of colonial and post-colonial local authority laws, rules and regulations, urban agriculture has been practised illegally, discreetly and without technical support by local authorities or the relevant ministries of agriculture. This paper provides an overview of the resources available, and the technologies used for urban and peri-urban horticulture in Namibia. This is followed by a survey of the recent literature on urban and peri-urban agriculture in Africa with a view to assess its extent and contribution in terms of food production, employment creation, improvement in nutrition status, income generation, innovation creation and adaption and appropriate technologies development. This is followed by a case study of urban and peri-urban horticulture in the city of Windhoek.

Egziabher, AG **(1994). Urban farming, cooperatives, and the urban poor in Addis Ababa In: Cities Feeding People. Egziabher et al. Ottawa: IDRC, 1994. 85-104 Chapters 19 pp. 088936706X: CAD 25.00 International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Ottawa: IDRC Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

gender

Africa, Zambia, household survey, garden cultivation, women's role, food security, household analysis, intervention strategy

This paper focuses on urban agriculture in Lusaka and is based on a household garden survey conducted during 1992 and 1993. The main objective of this survey was to explore the role of household gardens in the context of household food security in Zambia. The findings reveal that women are more involved in agriculture and gardening in all compounds of Lusaka than men. In many ways women play an important role in the food supply of households: through their productive labour, their decisions on production, consumption and division of food, and through their income. A household gardening model was developed to enable a better understanding of urban gardening activities in the social and environmental context. The model can assist in highlighting and clarifying some of the factors influencing urban agriculture. The household itself is based in the centre of the model, with various internal and external factors determining the vulnerability of the household. The study reveals that gardening contributes to food security directly by providing food and indirectly by creating income respectively saving expenditures in the urban environment. Strengthening the role of women is listed as a potential recommendation for policy-makers for potential development of the urban agriculture sector to address household food insecurity. (AH)

Engel, Marijke van den (ed) **(1990). Women and the urban habitat. Vena Newsletter vol. 2 (1990) no. 1 Issues, 51 pp. Research and Documentation Centre Women and Autonomy (VENA), University of Leiden, PO Box 9555, 2300 RB Leiden, The Netherlands**

gender
urban livelihoods

A newsletter issue focusing on the role of women in urban environments and the implications for development. Some aspects dealt with: housing, employment, women's organisations, housing finance. Also given is a list of bibliographic references related to this theme. (WB)

Esterik, Penny (van) **(1999). Gender and sustainable food systems: a feminist critique. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds). - p. 157-161. Chapters, 5 pp. 0_88936_882_1: CAD 35.00 International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Ottawa: IDRC**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
gender food security and nutrition
gender, food systems, food security

This paper explores conceptual and practical linkages between women and food and suggests how feminist analysis may further our understanding of food security. Women's special relationship with food is culturally constructed and not a product of a natural division of labour. Women's identity and sense of self are often based on their ability to feed their families and others; food insecurity denies them this right. Food socialization and body image are also strongly gendered. The paper concludes with a working definition of feminist principles and a call for the development of a model of feminist food praxis. Food praxis refers to the practical ""mastery"" of routines of producing, preparing, and consuming food. The paper proposes 10 points to guide further research and action. These include acknowledging women as gatekeepers of the food system, placing priority on the elimination of hunger, using multiple research methods, recognizing how political forces control people's access to food, emphasizing the temporal complexity of food routines, and providing a critically reflexive guide to advocacy action. (NB) (Abstract adapted from original)

Ethangatta, Linda K **(1994). Households headed by elderly women in the slums of Kawangware and Kibagare in the city of Nairobi: poverty and environmental concerns Paper presented at the International Seminar on Gender, Urbanization and Environment. Nairobi, Kenya. 13-16 June 1994. Proceedings. Mazingira Institute Nairobi, Kenya: Mazingira Institute**
Supplier: Mazingira Institute, PO Box 14550, Nairobi, Kenya.
gender
Africa, Kenya, informal settlement, elderly women, nutrition, vegetable production, livestock, income generation, subsistence production, environmental degradation

The aim of the study is to determine the social-cultural, health-related factors and economic characteristics of elderly Nairobi women that may impact their nutritional status. The study is based on data collected from two hundred and one elderly

women from slums of Kawangware and Kibagare, and the low income areas of Dagoreti and Waithaka in Nairobi. The findings reveal that women in low income areas use their land for growing food crops such as beans, kale, cabbage, and bananas. Some of these women also had a dairy cow that produced milk for their own consumption or for sale to neighbours. The marketing of fruit and vegetables was also cited by women as a income-generating activity in both slum and low income areas. Elderly women in the slum areas turned to growing vegetables on the edges of roads and any other open spaces due to economic hardships. This activity created further environmental degradation due to the uprooting of natural vegetation and potential soil erosion in these spaces. The author concludes that there is an urgent need to provide basic means of raising incomes and standards of living for families headed by elderly women. In turn, better living conditions will improve the environmental conditions of slums and low income areas. (AH)

Evers, Hans-Dieter and Ruediger Korff**. 1996. Subsistence production in Bangkok.** ***Development: Seeds of Change*** **4:50-55.**
gender economic impacts
subsistence production, household farming, Thailand

This article focuses on the production-consumption pattern, usually referred to as a subsistence economy. Activities are carried out by unpaid labour, mostly female, to produce goods and services for household consumption. Activities include the growing of food and its processing, which takes place outside the market economy. The article argues that subsistence production can be distinguished on two levels. First, everyday reproduction of labour power within the household; and second, subsistence production organized on a more extensive scale via cooperation of several households or groups. The authors contend that individuals within households employ strategies to use the available labour power in the most efficient way. Examples detail the gender division of household labor in this context. (ah)

Feix, Andrea**. 1997. Advisory services for municipal authorities: small-scale agricultural projects.** ***Agriculture and Rural Development*** **2/97:55-57.**
gender, urban livestock, urban horticulture
gender, resettlement, livestock production, vegetable production, beekeeping, Paraguay

This article details a project in the medium-sized town of Concepcion, Paraguay, that seeks to enable poor families to improve their diet and increase their income by promoting small livestock and vegetable production. The project focuses on the resettlement of flood victims, mostly headed by women, who developed various "productive" projects, including poultry. The project proved problematic given high initial outlay and the degree of attention required by this activity. A collective vegetable garden and bee-keeping have proved more successful. Projects are detailed in the article. (ah)

Freeman, Donald B. **(1993). Survival strategies or business training ground? The**

significance of urban agriculture for the advancement of women in African cities. African Studies Review 36:3 (1993) pp. 1-22. Papers, 22 pp.
gender
Africa, Kenya, household survey, women's role, women's strategies, entrepreneurship

This paper suggests that, contrary to findings in other research, urban agriculture is not a stop-gap activity, nor a means to become wealthy. The motivations of the urban cultivators appear not to be influenced by what planners, researchers or urban administrators feel ought to be the correct attitude toward urban farming. This paper analyzes interview data collected in Nairobi, Kenya in 1987 as part of a survey of active women cultivators. The paper first looks at the stated motives of women cultivators, and is then supplemented by information gathered through detailed case studies of three individual women involved in urban farming. The most common motivation of women cultivators was the need to avert hunger, but also important was the availability of home-grown food so as to free-up scarce cash earned by family members. The paper concludes that female cultivators face major impediments to meaningful advancement in Nairobi. Women are, in turn, dependent on the low-wage, formal manufacturing and service sectors for a market for their produce, and their activities are necessarily seasonal in the absence of the means to irrigate crops. The importance of this group as role models for other Third World women, the paper concludes, greatly outweighs their actual numbers. (AH)

Freeman, Donald B. **1991. A City of Farmers: Informal Urban Agriculture in the Open Spaces of Nairobi, Kenya. Montreal: McGill-Queen's University Press.**
gender
open spaces, informal sector, women's role, Kenya
The objective of this study is to shed light on urban agriculture, as an important but little understood component of the informal sector in Nairobi. The author addresses and emphasizes the significance of women in this activity. A chapter entitled "the role of women cultivators" details the evolution of women's roles in agriculture from rural areas to the urban context. Gender differences in urban agriculture practices are highlighted through statistical information on educational status, migration patterns, geographical distribution of farming practices, plot sizes, age structure, occupational and economic status, theft of crops, waste disposal and marketing and sale of crops. (ah)

Freidberg, Susanne. 1996. *Making a Living: A Social History of Market-Gardeng Work in the Regional Economy of Bobo-Dioulasso, Burkina Faso*. Ph.D. Dissertation. Berkeley: Department of Geography, University of California Berkeley.
gender, economic impact
market gardening, livelihood strategies, marketing, Burkina Faso
This dissertation traces the twentieth century social and environmental history of the market-gardening sector around Bobo-Dioulass, Burkina Faso. Intensive vegetable cultivation has become one of the most important sectors in the regional economy. Gender and age-based divisions of labour have resulted in relation to

both production and marketing. Hardship and uncertainty has aggravated tensions within the households and peri-urban village communities involved in market gardening. It has also affected relations between and among producers, wholesalers and retails. In the wake of recent trade liberalizations, gardeners are adopting more entrepreneurial strategies in order to secure access to external markets and aid. These livelihood strategies both reflect and inform the changing meaning of market-gardening work. (ah)

Freidberg, Susanne **(1999). Tradeswomen and businessmen: the social relations of contract gardening in southwestern Burkina Faso. Journal of African Rural and Urban Studies (1999). Paper**

gender

Africa, Burkina Faso, food exports, horticultural production, contract farming, gender roles, local trade, women traders, rural-urban linkages, historical linkages

This article examines the prospects for the expansion of export-oriented contract horticulture in southwestern Burkina Faso, specifically in the area surrounding the city of Bobo-Dioulasso. It sets out the main arguments for why any discussion of West African contract farming must take account of the gender roles and moral codes which have historically informed relations between peasants and different members of the urban merchant community. The day-to-day provisioning and commercialization depends on the services of itinerant and local traders, many of whom are, especially in fresh produce commerce, are women. The crucial role of women traders, contrasted with that of male politicians and entrepreneurs, has created a distinctive culture of contract farming. The case study presented demonstrates how women traders have made the most of limited career opportunities by placing the flexibility and durability of their commercial relations above season-to-season profits. In the interest of building trades they could pass to their daughters, women wholesalers set standards of trust and commitment that contractors find hard to match. The presence of a well-established, gender-based regional trade network poses a potential obstacles to profitable contract horticulture schemes because this network is essential to the economic security and occupational identify of both women traders and village gardeners in the Bobo-Dioulasso ""garden belt"". (AH)

Freidberg, Susanne **(1997). Contacts, contracts and green bean schemes: liberalisation and agro-entrepreneurship in Burkina Faso. The Journal of Modern African Studies 35:1 (1997) pp. 101-128. Papers, 29 pp.**

gender

Africa, Burkina Faso, rural-urban linkages, entrepreneurship, women traders, gender bias, historical linkages

This paper recounts the career histories and current ventures of numerous ‘agro-entrepreneurs' operating in southwestern Burkina Faso, specifically in the area surrounding the city of Bobo-Dioulasso. It shows that while they are finding both new opportunities and perils in high-value export horticulture, ‘agro- entrepreneurs' are also running up against obstacles to agricultural accumulation familiar to past

generations. The author contends that the ongoing economic reforms will not dramatically transform the historical-structural conditions of African entrepreneurship. In relation to women traders, economic reforms have not created a market that is more free of prejudices and old-boyism than commerce under socialism or colonialism. The norms, practices, and sites of economic activity are structured by numerous factors including by relations of gender, class, and so forth, in historically specific ways. (AH)

Furedy, Christine **(1990). Women and solid wastes in poor communities. In: Proceedings of the 16th WEDC Conference Infrastructure for Low-Income Communities / Michael Smith (ed.), p. 25-27. Water, Engineering and Development Centre (WEDC)**

waste recycling gender

waste management; women's role; solid wastes

Deals with the use of waste materials by women to meet basic needs and generate income and work. As the author argues, this informal system of waste gathering goes well beyond household needs and represents important savings for poor households. An analysis as to gender is made of the composition of these waste picker groups. Areas for further research on this issue are suggested. In the field of solid waste management, one cannot deny the crucial role played by women in this low, polluted, yet crucial work. (WB)

Gabel, Stephanie **(2001) Methodoligal reflections on using participatory and action oriented research with women farmers in Harare. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology food security and nutrition gender

Zimbabwe; survival strategies; policy; gender; equity; participatory approaches

This paper presents the methods used for a case study in Harare, Zimbabwe in the role that people play in food provisioning within their household and, second, their use of urban cultivation on open spaces as both a household survival strategy and a food provisioning. Another aspect of the research was focused on policy and governance issues related to urban agriculture, taking special note of local level policies and decision making in regard to: gender sensitivity, equity and public participation. The methodology describes various participatory approaches that were used during the research.

Garnett, Tara**. 1996. Growing Food in Cities: A Report to Highlight and Promote the Benefits of Urban Agriculture in the UK. United Kingdom: National Food Alliance and Safe Alliance.**

gender, community development,

community initiatives, food production, empowerment, United Kingdom

This report presents analysis and a wide variety of case studies, which illustrate that urban agriculture can yield a range of practical benefits. Women are briefly

highlighted in relation to combating discrimination. In the UK, urban agriculture allotment has traditionally been a male domain. Women tend to be more involved in food growing projects, rather than traditional allotment gardening, and are often responsible for initiating the projects. Five case studies are identified as those initiated by women in the UK. The author contends that by giving women experience at the beginning of the food chain, food-growing projects can help broaden women's awareness of their actual and potential abilities. (ah)

Gentili, Anna Maria**. Donne e Lavoro: Il movemento cooperativo delle zonas verdes di Maputo. *Africa* 44(1):1-24. (*in Italian*)**

gender, economic impacts

cooperatives, green spaces, Mozambique

This research focuses on the contribution of women's agricultural work to the reproduction of urban families in Maputo, Mozambique. The subsistence *machambas* (small fields) in the suburban districts (of which two are considered) of Maputo have always been an essential support to the survival of the family, especially in those situations where men's salaries were not adequate. Cooperatives have attracted such women producers, belonging to the less privileged sectors of the population because they guaranteed land and some means and factors of production. (ah)

Gentili, Anna Maria**. Da Lourenco Marques a Maputo: la transformazione delle aree agricole suburbane. *Africa* 40(2):183-219 (*in Italian*)**

gender, land use planning

periurban agriculture, access to land, cooperative organisation, Mozambique

This article focuses on the transformation of the suburban farming areas around Maputo, Mozambique. Land ownership and control issues have resulted in conflict between diverse parties and interests. New fears of renewed expropriation have increased among women in the suburban agricultural zones who still need access to land for growing food for family consumption. Agricultural cooperatives are in large part formed by women who, by age and social stratum, have no alternative means of support. The strong participation of women in cooperative development has significantly contributed to transforming their social status. The author contends that major technical and educational support is needed for cooperative members. (ah)

Gowon, Rahila P**. 1999. Women's participation in small-scale irrigation farming in Jos-Bukuru area, Nigeria. In *Urban and Peri-Urban Agriculture in Africa*, edited by David Grossman, Leo M. van den Berg, and Hyacinth I. Ajaegbu. Aldershot, United Kingdom: Ashgate. 147-162.**

gender

irrigation, women, Nigeria,

This chapter discusses the participation of women in irrigation farming, ranging from land preparation to the marketing of products harvested, in the Jos Plateau, Nigeria. The author reveals that women have a low presence, and indeed are nearly absent, in this activity. The market-oriented nature of irrigation farming requires substantial capital input and specialized skills. Women's weak economic base and reproductive responsibilities deters their general productivity and their

overall involvement in this activity. Women's participation can be enhanced through provision of credit facilities, land reforms, agricultural skills training, and membership in farmers' associations. (ah)

Hasna, MK **(1998). NGO gender capacity in urban agriculture: case studies from Harare (Zimbabwe), Kampala (Uganda) and Accra (Ghana). Cities Feeding People Series no. 21. Reports, webpages. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9. Ottawa: IDRC Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
gender
Africa, Ghana, Uganda, Zimbabwe, gender issues, research agenda, non governmental organisation, gender analysis

This study examines the marginalization of gender issues within urban agriculture research agendas. Data was collected from field visits to the cities of Accra, Kampala and Harare. It provides an overview and analysis of the nature and extent of NGO policies and strategies regarding the integration of gender into urban agriculture research. It is found that many NGOs are working with ‘women in development' approaches. A proper understanding and scope of ‘gender analysis' within these organizations is needed. Participatory learning partnerships should be developed amongst relevant groups, organizations and institutions to share gender sensitive research findings and create provisions for effective gender-focused policy interventions. (AH)

Horn, Nancy. **1995. Market women, development, and structural adjustment in Harare, Zimbabwe. *Africa Rural and Urban Studies* 2(1):17-42**.
gender, urban horticulture
women traders, women’s strategies, Zimbabwe
This article discusses women fresh produce vendors in Harare within a larger context of "responsible development" and structural adjustment policies in Zimbabwe. Analysis includes brief references to linkages between market women and urban horticultural crop production. For example, in urban areas, women's task of food provision is more difficult because housing plots are generally not large enough to grow gardens. Many women opt to become fresh produce vendors for it allows them to provision their families. Vendors purchase produce from urban neighbourhoods where green vegetables are grown in gardens on larger compounds. (ah)

Hovorka, Alice J. **(1998). Gender resources for urban agriculture research: methodology, directory and annotated bibliography. Cities Feeding People Series no. 26. Reports, webpages, 90 pp. International Development Research Centre, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9. Ottawa: IDRC Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
gender
gender analysis, methodologies, annotated bibliography, resource persons

Although there is a growing interest in the factor gender in development research, there is also a general lack of understanding of how this type of analysis can be applied. Purpose of the underlying publication is to provide researchers with simple and systematic methodological tools for practical application of gender analysis within urban agriculture. It has been developed primarily for the Cities Feeding People team members, but can be applied by anyone doing a similar type of research. The methodology covers all stages of a research project: (1) proposal; (2) data collection, interpretation and analysis; (3) monitoring and evaluation. Still, it is not intended as a blueprint, but rather gives guidelines. Included are a directory of gender resource persons for urban agriculture research and an annotated bibliography on gender and urban agriculture. A very useful publication, both with regard to research & development methodology and for practical information. (WB)

Hovorka, Alice J. **(2001) Gender Considerations for Urban Agriculture Research. In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

gender R&D Methodology

urban-peri urban, income generation, women's employment, intervention strategy

The incorporation of gender considerations in urban agriculture research is increasing, and indeed, there have been advances over the last decade in our understanding of both men's and women's experiences with farming in cities around the world. There is a move away from the so-called "urban farmer", an undifferentiated, masculine, normalised urban dweller who engages in agriculture. Instead, there is greater recognition that people's experiences with urban agriculture cannot be easily standardised and that gender neutrality does not necessarily capture the breadth of such experiences. Many researchers have begun to emphasize differences amongst urban farmers, thus highlighting the distinct agriculture systems that form along gender, race, ethnicity, class, age, etc. lines. Gender analysis allows us to disaggregate data on urban agriculture and to explore why certain processes and structures generate different opportunities and constraints for different people. This article gives a comprehensive overview

Hovorka, Alice J.., **Gender and Urban Agriculture: Emerging Trends and Areas for Future Research**

gender

women's role; gender issues; urban agriculture

Over the last decade, literature on women and urban agriculture has emerged revealing significant insights that arguably can change the future focus of the field at large. This overview presents a synthesis of lessons learned from recent studies that have begun to recognize and examine women as farmers in urban areas. The extent, nature and role of urban agriculture vary considerably between and within countries, as well as throughout the urban hierarchy. Moreover, evidence tends to be scattered or speculative with little supportive data to substantiate general statements. As such, it is difficult to formulate a synthesis of trends that hold for every context, or even the majority of contexts.

Nevertheless, there are several broadly identifiable trends in recent literature on women and urban agriculture that warrant recognition and furhter explanation. First, studies now recognize women as urban farmers. Indeed, women play significant roles in urban food production and contribute both urban household and market economies. Second, women benefit from urban agriculture activities that allow them to successfully combine their multiple roles in subsistence, production and environmental management sectors. Third, researchers document the constraints hindering women's participation in urban agriculture activities. Obstacles exist at both sectoral and household levels. Fourth, studies identify women farmers' survival strategies and social activism in response to structural constraints and urban food issues. Together these trends have enriched the understanding of urban agriculture. Yet gaps persist in the literature, and a discussion of future trends and considerations for urban agriculture research in general is required.

Hynes, Patricia H **(1996). Why so many women? In: A Patch of Eden: America's Inner-City Gardeners. Ed. H. Patricia Hynes. Vermont: Chelsea Green Publishing Company, 1996. Chapters. 0930031806: USD 18.95. Vermont: Chelsea Green Publishing Company**

gender community development

household economy, women's role, garden cultivation, socioeconomic differentiation, subsistence production, food supply, historical perspective

In this chapter, the author considers whether there is a larger, broader history of women and gardens which underlies the community garden movement. What meaning - personal, social, and political - have gardens held for women of different classes and ethnicities? The practice of gardening has been stratified by wealth and by gender. Millions of subsistence, kitchen, and medicinal gardens planted and tended by women have been central to household economy, village health and local biodiversity. The garden has been a source of natural beauty for the urban and rural poor. Yet the value of this work, is generally not counted in the economy because it is unpaid and not market-based, nor is it recorded in environmental history because it is considered insignificant work of many ""ordinary"" women. Women's contribution through gardening to the world's food supply is chronically underestimated. The author draws a parallel between inner cities in the United States with the Third World: the urban community garden has the potential to feed households and generate local cottage industry, restore a measure of community life, and recycle organic wastes. (AH)

Hynes, H.P., **(1996) A Patch of Eden: America's Inner City Gardens. Chelsea Green Publishing Company.**

gender community development

household economy, women's role, garden cultivation, socioeconomic differentiation, subsistence production, food supply, historical perspective

Stories of succesful, real life, inner-city garden projects in the formidable big city environments of New York, Philadelphia, Chicago and San Francisco. (from website)

Ishani, Z. and D. Lamba (2001), **Applications of Methods and Instruments in Urban Agriculture Research: Experiences from Kenya and Tanzania**
gender
Kenya; Tanzania

The paper deals with methodology applied in two studies of urban agriculture in Kenya and Tanzania, conducted by, and in collaboration with Mazingira Institute. The first study titled "Urban Food Production and the Cooking Fuel Situation in Urban Kenya" was published by the Institute in 1987. The second study on " Gender and Urban Agriculture and its Implication for Family Welfare and the Environment in Dar Es Salaam, Tanzania." was completed in 2000 (not published). The Kenyan study comprised six cities and towns covering the various agro-climatic zones. It analysed the patterns of food and fuel production and consumption by the urban households in Kenya by considering the socio-economic characteristics of the sample population, crop production, livestock production and fuel. In addition, it raised issues for consideration by policy makers. The Tanzanian study " Tanzania - Gender and Urban Agriculture: Cattle Raising and its Implication for Family Welfare and the Environment in Dar es Salaam, Tanzania" was at a city level. It analysed the gender roles in cattle raising in the district of Kinondoni in Dar Es Salaam.

Jacobi, Petra, Jörg Amend and Suzan Kiango**. Urban agriculture in Dar es Salaam: providing for an indispensable part of diet. In *Growing Cities, Growing food: Urban Agriculture on the Policy Agenda*, edited by Nico Bakker, Marielle Dubbeling, Sabine Gündel, Ulrich sabel-Koschella, and Henk de Zeeuw. Germany: Deutsche stiftung für internationale Entwicklung. 257-184.**
gender, food security and nutrition
women's role, subsistence production, men's roles, market production, Tanzania

This case study provides an overview of urban agriculture in Dar es Salaam. It specifically details the types of activities, namely home production and community gardens, present in urban and peri-urban areas. It also delves into issues of food security, health, nutrition, household economy, urban environment, and city policy. The authors highlight gender issues and reveal that while both men and women farm, their participation is differentiated by field locale. They also reveal that there is a strong link between socio-economic family status, objective of production and involvement of women. While men dominate market production, women predominate in subsistence food production. Location, magnitude of enterprise and orientation of production reflect gender differences in urban agriculture in Dar es Salaam. (ah)

Kreinecker, Petra **(2000). La Paz: urban agriculture in harsh ecological conditions. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 391-411. DSE, GTZ, CTA, SIDA**
gender food security and nutrition
food security; food policy; land use systems; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; migration; nutrition; microclimate; Bolivia; appropriate technology

The climate in La Paz enhances the development of adapted techniques for urban

agriculture. Officials tend to not seen urban agriculture though in fact it is everywhere. Urban agriculture is a survival strategy for socially marginalized people as urban agriculture fits well in their economy based on social relations. Several urban farming systems can be found of which private home gardens and communal gardens are more important. Land titles are unclear and little capital is used. Farmers are organised in informal and formal organisations and networks. Women play a central role in farming and urban farming contributes to women's independence. Urban agriculture contributes little to food energy supply but increase the diversity of food consumption. Many factors hamper the development of urban agriculture among others the ecological conditions, cultural heterogeneity and land tenure situation. A future strategy needs to emphasise existing structures and socially accepted Andean varieties to improve the situation of marginalized people. (NB)

Krug, Karen L **(1999). Canadian rural women reconstructing agriculture In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds). - p. 167-173 Chapters, 7 pp. 0_88936_882_1: CAD 35.00 International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Ottawa: IDRC Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

gender

gender, food systems, land tenure, Canada, rural-urban linkages

The paper considers Canadian farm women's perceptions of the barriers to sustainable agriculture in relation to the general categories of the economic system, declining rural communities, environmental degradation, health issues, and stress. It then examines Canadian farm women's visions of how agriculture ought to be and their general perspectives on how the desirable alternatives might be achieved. The focus then shifts to a discussion of how and why urban and rural people must cooperate to achieve a sustainable food system. The paper concludes with a summary of the suggestions made by Canadian farm women for agricultural reforms to strengthen both rural and urban sustainable agricultural systems. These include emphasizing local food production and distribution over export and import systems, ensuring security of land tenure, reducing or eliminating land speculation, building national constituencies to foster urban-rural connections, and increasing rural populations through smaller scale local production and government support. (NB) (Abstract adapted from original)

Kusakabe, Kyoko, Chan Monnyrath, Chea Sopheap and Theng Chan Chham, **(2001) Social Capital of Women Micro-Vendors in Phnom Penh (Cambodia) Markets: A Study of Vendors' Association.**
Asian Institute of Technology / Urban Sector Group, Women's Economic and Legal Rights Project (USG/WELR). Bangkok: United Nations Urban Management Programme, Regional Office for Asia and the Pacific. UMP-Asia Occasional Papers no. 53

gender

Cambodia; women's role

In Cambodia, because of the long history of civil strife, it is said that mutual trust has been destroyed, and that because of their negative experience with "cooperatives", there is a stigma on organizing and on working together and sharing information together. Efforts to revive social capital and attempts and initiatives to organize people are taking place in Cambodia. One of such initiatives is the micro-vendors' association in Phnom Penh markets. With the support of a local NGO Urban Sector Group (USG) and The Asia Foundation, micro-vendors in public market places are forming an association under the Women's Economic and Legal Rights Project (WELR). This study examines how being a member of the vendors' association influenced their sense of mutual trust and confidence in making changes in the society, and how such trust in turn influence their gender norms and ideologies and how they see their own positions in the households. The study examines how this collective process and balance is struck in the micro-vendors' association in Phnom Penh. Through their collective action against the authorities, are they able to overcome the existing economic and social subordination? Or are they encouraging them to conform to the existing norms through building social capital?

Lee-Smith, Diana; Memon, Pyar Ali **(1993). Urban agriculture in Kenya. Canadian Journal of African Studies 27:1 (1993) pp. 25-42. Papers, 18 pp.**

gender food security and nutrition R&D methodology

Africa, Kenya, urban theory, urban policies, urban development, women's role, subsistence production, urban poor, food security

This article analyzes the characteristics of urban agriculture in Kenya within a wider conceptual and socioeconomic context and is based on a survey by the Mazingira Institute (Lee-Smith et al., 1987). This article emphasizes the significance of incorporating a food component, namely crops and livestock, into urban theory, and raises questions of policy for sustainable urban development. The authors claim that the situation in urban areas with respect to urban farming must be understood as part of a wider food crisis, exacerbated by the fact that women's work and subsistence production are largely ignored, and the situation therefore remains misunderstood. The article notes women's roles and participation in urban agriculture. Extension services need to be made more available in urban areas, and specifically, they need to be directed to poor urban women. The article concludes by stating that the fact that urban farmers are mainly, but not exclusively, women producing for their own families' consumption, is no reason to discount the conceptual significance of these activities or the value of their primary economic production. (AH)

Loforte, Ana Maria**. 1989. A persistencia dos valores 'Tradicionais' nas Comunidades Urbanas e Ethnicidade. *Trabalhos de Arqueologia e Anthropologia* 6:21-27.**

gender,

periurban agriculture, farming systems, Mozambique

This paper stems from research conducted in the district of Mahlazine on the periphery of Maputo, Mozambique. The research focuses on suburban agricultural

activity, largely done by women. It reveals that eight percent of families have *machambas* (small fields) close enough for daily work. A further ten percent of families have *machambas* at a distance of twelve to fifteen kilometres. Some of the women have market stalls where they sell a portion of their produce. Productivity of the land varies form area to area, so that not all families produce a surplus. (ah)

Loforte, Ana Maria**. 1987. Migrantes e sua Relaçao com o Meo Rural. *Trabalhos de Arqueologia e Antropologia* 4:55-60.**
gender, economic impacts
migration, survival strategies, periurban agriculture, Mozambique

This paper explores the economic situation and the social networks of migrant families in Mahlazine District, Maputo, Mozambique. Reasons for migration are generally based on economic principles and are part of a collective strategy. the author contends that migrants continue to rely on rural survival skills. These skills involve more than simple agricultural activities; rural-based values that focus on family, ethnicity and religion are predominant among new urban residents. Residents in the so-called "cement city" in Maputo generally do not have gardens. However, in the city's suburban neighbourhoods, women continue to be involved almost exclusively in agricultural labour. (ah)

Made, Pat **(2000). A field of her own: women and land rights in Zimbabwe. In: No paradise yet: the world's women face the new century / J. Mirsky and M. Radlett (eds). p. 81-100. London: Panos/Zed.**
gender
access to land; land tenure; Southern Africa; Zimbabwe

Land tenure, a prime issue for women in urban and rural agriculture, is addressed here from the point of view of women farmers Harare. More than 70 percent of Zimbabwe's agricultural work force is women; an equal share of urban agriculture is managed by women. Women cannot inherit land either from their fathers or husbands. The author concludes that economic development will be slow, with only half the population empowered by legal access to land. (JS)

Mapetla, M; Phororo H; Prasad G **(1994). Urbanization, gender and environment: the role of wild vegetables. Paper presented at the International Seminar on Gender, Urbanization and Environment. Nairobi, Kenya. 13-16 June 1994. Proceedings. Nairobi, Kenya: Mazingira Institute**
Supplier: Mazingira Institute, PO Box 14550, Nairobi, Kenya
genderfood security and nutrition
Africa, Lesotho, resource use, wild vegetables, nutrition, income generation, gender issues, cultural aspects, urbanisation, women's role, social networks, rural-urban linkages

Although many people in Lesotho move to towns in search of better job opportunities, they miss out on access to natural wild food resources. It is argued in this paper that such resources can be adapted to the urban environment and wild vegetables could contribute to nutrition and cash income of urban dwellers.

Gathering, preparing and eating are related to gender and culture. Earlier studies have shown that collecting and preparing wild vegetables is a strategy for rural women to provide a balanced diet for their families. Urbanization in Lesotho has affected women's access to natural resources like edible wild plants. Settlements now occupy former agricultural land and wild foods become scarce in peri urban areas due to over harvesting. Urban women have to spend much more time to find enough wild plants for a meal. The study reveals that only a few people collect wild plants, and children are no longer taught about edible plants due, in part, to schools highlighting westernized curriculums which do not foster the value of indigenous plants. For many people in towns, wild foods have low status and they would rather buy cultivated vegetables from the market. Towns have created markets but only rarely are wild vegetables sold. Women from the countryside sell the wild vegetables through informal networks in town. A promotion strategy for wild vegetable focusing on knowledge, attitude, value and nutrition is suggested. Outward rather than inward growth of urban areas is also recommended by the authors. It is argued that gardens within urban housing sites in Lesotho are agriculturally more productive than fields in rural areas, and agricultural production does not decrease when fields are converted into housing sites with gardens in the present urban expansion pattern. (AH)

Marshall, Judith**. 1987. Life on the frontline: Mozambique diary. *Southern Africa Report* 3(1):7-10.**
gender,

cooperatives, women, livelihood strategies, privatisation, Mozambique

This article briefly highlights the cooperatives in the Green Zones of Maputo as an example of popular efforts by people to survive and organize in Mozambique. Ninety-five percent of 11,500 cooperative members are women. Many of these women have been able to create a life in the 'public' sphere, have gained access to all of the vegetables, grains and fruit that the cooperatives produce, and have had training in various livelihood skills. The Green Zone Cooperatives now find their land and markets under attack due to privatization. Urban businessmen or bureaucrats are claiming title to family land, and private producers are strong competitors to cooperatives who were once the only vegetable producers for Maputo. Cooperatives are seeking other markets and funding through NGOs for trucks that can keep them competitive. (ah)

Matlala, Padi **(1990). Mamelodi's amazing maize growers. New Ground 1:1 (September 1990) 30-31. Reports, 2 pp.**
gender
Africa, South Africa, cooperative organization, women's organization, elderly women, access to land, subsistence production, income generation

This short article describes the urban agriculture activities of the elderly and unemployed women of Mamelodi, South Africa. The women were inspired by the Mamelodi Street Committees that sprung up between 1985 and 1987. These committees had a profound impact on the way of life in the township, enabling residents to take greater control of their lives. The women organised themselves into working groups of four to five, and took over most of the unused land scattered

throughout the township, as well as along the riverside and mountainside. Rain-fed food crops provide food for their households and are also sold for much-needed cash. The women face an uncertain future due to land and property development issues. (AH)

Maxwell, Daniel G. **(1993?). Land access and household logic: urban Farming in Kampala. Research Paper. Kampala, Uganda: Makerere Institute of Social Research, (1993?). 35 p.**

R&D methodology gender

Uganda; land tenure; household economy

This report goes beyond Maxwell's previous work and other research on urban farming in Kampala which tended to treat households as internally homogeneous units, except for income differences. This paper thus dives into breaking down the functioning of the urban farming households to understand its logic. (JN)

Maxwell, Daniel G. **(1994). The household logic of urban farming in Kampala. In: Cities Feeding People. Egziabher et al. Ottawa: IDRC, 1994, 47-65. Chapters, 19 pp. 088936706X: CAD 25.00 International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9. Ottawa: IDRC Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

gender

Africa, Uganda, literature review, gender analysis, access to land, household strategies, entrepreneurship, food security, women heads-of-households

The objective of this paper is to evaluate the various claims made about urban agriculture in Kampala, Uganda. This includes reviewing the limited literature on the importance of this activity in Kampala; attempting to assess direct evidence on nutritional status; examining the means of access to land; and understanding the logic of various households involved in urban food production. Gender is applied to examinations of land access and household logic. The paper contends that commercial producers may be either men or women, and male and female household members may collaborate in business ventures. In production for food security, it is common for senior women in the household to gain access to land through borrowing, renting, squatting, or purchasing of use rights. Urban agriculture contributes to household food security, and allows women to use cash income on items other than the purchase of food. Urban agriculture often becomes a survival strategy for low-income female-headed households, widows, and families suddenly abandoned by a primary wage earner. (AH)

Maxwell, Daniel G.**, 1998. Urban agriculture: unplanned responses to the economic crisis. In *Developing Uganda*. Eds Holger Bernt Hansen and Michael Twaddle. Athens: Ohio University.**

gender, economic impacts, food security and nutrition

women's role, men's roles, household strategies, cultural aspects, Uganda

This study challenges previous perceptions about the practice of urban agriculture, as well as the extent to which it can be understood or characterized as a household strategy. Findings reveal that farming in Kampala spans a continuum from survival strategy for some to large-scale, lucrative investment of capital for a few. Contemporary women face economic circumstances, which leave them responsible for household food provision, often without the means to do so.

Urban women use this activity to achieve some degree of food security for their households beyond cash incomes and markets; under some circumstances this activity also provides a source of income. Men and women have different rationales for farming: men often explain farming in terms of a cultural imperative for women whereas women express it in much more pragmatic terms. Hence the logic of urban farming varies with the circumstances of the men and women who engage in it.

Maxwell, Daniel G. **(1995). Alternative food security strategy: a household analysis of urban agriculture in Kampala. World Development 23:10 (1995) pp. 1669-1681. Papers, 13 pp.**

gender

Africa, Uganda, household relations, gender relations, household analysis, access to land, food security, nutrition, women's role, women heads-of-households, urban policies, intervention strategy

The author contends that little is understood about the forces behind urban farming or its impact at the household level. Intra-household dynamics and gender relations, as well as declining wages and economic informalisation, are all important to an understanding of urban farming. The paper presents an overview of the household analysis of urban farming, as based on research carried out in Kampala, Uganda, between November 1992 and October 1993. This includes a discussion of intra household dynamics, access to land, and a comparison of food security and nutritional status in farming and non- farming households. Underlying the evidence gathered is the fact that urban farming is almost completely under the control of women, who bear primary responsibility for provision of food. Discussion also centres on the implications of urban farming, and possible policy alternatives. The author suggests that programs promoting urban farming should give priority to low-income, female-headed households due to equity reasons. Such programs could be established through women's organizations, such as informal savings and credit groups, and should be closely monitored, both in terms of the direct effect on women's income, and in terms of food security and child nutritional status. (AH)

Maxwell, Daniel G. **(1999). Internal struggles over resources, external struggles for survival: urban women and subsistence household production. Urban Agriculture Notes http://www.cityfarmer.org/danmax.html Webpages, 14 p. Noguchi Memorial Institute, University of Ghana, PO Box 25, Legon, Ghana. Vancouver: City Farmer**

gender

Africa; Uganda; household strategies; income generation; subsistence production;

gender analysis; gender roles; gender relations; power relations; women heads-of-households; urban policies; household resources; intervention strategy

Presents data on Kampala in an attempt to examine and understand semi-subsistence urban farming and the way in which the practice has been incorporated into the economic strategies of urban households and individuals. The paper argues that in contemporary Africa farming spans a continuum from a survival strategy for some to a large scale high return investment for a few. For the most part it should be considered as a deliberate crisis response of urban women to provide for themselves and their household a source of food which is not dependent on cash money or volatile markets. The paper explores patterns of engagement in farming, the use of food and division of labour. Furthermore, the paper discusses reasons for farming and divisions of household responsibilities before drawing conclusions. (NB)

Mazingira Institute**. 1987. Urban Food Production and the Cooking Fuel Situation in Urban Kenya. Nairobi: Mazingira Institute.**

gender, extension

food production, women heads-of-households,municipal policies, extension services, subsistence production, Kenya

This study analyzes the patterns of food and fuel production and subsistence consumption by urban households, based on a stratified random sample of urban households in six representative towns in Kenya. Survey data collected from October 1984 to July 1985 indicates that the majority of urban farmers are women. Women heads-of-households are especially reliant on subsistence food production for the survival of themselves and their children. The study raises the issue of women farmers for consideration by policy and decision-makers at national and municipal level. Urban extension programs need to be specifically targeted to women farmers if they are to effectively reach the majority, with allotment programs ensuring fair proportional access to women, particularly poor, women-headed households. (ah)

Mbaye, Alain, and Paule Moustier

. 2000. Market-oriented urban agricultural production in Dakar. Urban agriculture and sustainable cities. In *Growing Cities, Growing food: Urban Agriculture on the Policy Agenda*, edited by Nico Bakker, Marielle Dubbeling, Sabine Gündel, Ulrich sabel-Koschella, and Henk de Zeeuw. Germany: Deutsche stiftung für internationale Entwicklung. 235-156.

gender

commercial agriculture, men's roles, women's role, women's organization, Senegal

This case study provides an overview of urban agriculture in Dakar. It specifically details the range of production systems found in the area, and points to the contribution of these systems to urban household supply, health, the environment, and the domestic economy. The authors note that men are more often involved in commercial urban agriculture given high start-up costs. Moreover, more men than women are in charge of horticultural and livestock farms in and around Dakar.

They highlight the *Fedri* group as an interesting case of women voluntarily investing in urban agriculture for both domestic and export markets. (ah)

Mbiba, Beacon M **(1995). Urban Agriculture in Zimbabwe: Implications for Urban Management and Policy. Chapters. 1856288579: USD 59.95 (hardcover). Aldershot, England: Avebury**

gender food security and nutrition

Africa, Zimbabwe, women's employment, adolescents, gender roles, socioeconomic differentiation, gender relations, access to land, decision making, power relations, men's roles, women's role, men's strategies, women's strategies

This book addresses the phenomenon of urban agriculture in Zimbabwe. While it acknowledges that the activity is a significant source of food and income for the urban poor, the book draws attention to the development conflicts raised by the activity. It attempts to place urban agriculture within the context of urban economy, the environment, institutional concerns, gender and urban poverty. Evidence presented confirms the role of urban agriculture for employment of women and children. A review of gender dimensions of informal urban cultivation highlights the needs, problems and experiences of women's double burdens of production and reproduction. Men's social and economic motivation for urban cultivation activities are also noted. Issues of 'gate-keeping', women landlordism, and decision-making are discussed in terms of gender dynamics. It is noted that women are not a homogenous group, thus there is a need to revise generalizations of poor women, and extend research issues to high income groups. The author contends that urban cultivation should only form one part of a strategy designed to improve the position of urban women for it does not tackle the problems of women's access to education, skills, wage and self-employment. Based on ongoing research the book demonstrates that there is a potential for urban agriculture as part of the urban economy, but that the urban poor, including women- headed households, are not major beneficiaries of the activity. (AH)

Mbiba, Beacon**. 1995. Classification and description of urban agriculture in Harare. *Development Southern Africa* 12(1):75-86.**

gender, economic impacts

institutional aspects, policy development, women's role, Zimbabwe

This study aims at placing urban agriculture within the context of the urban economy, management and development. it also extends to gender and institutional concerns and links this phenomenon to broader issues of housing supply and the fiscal base of local authorities. The study examines those persons engaged in urban agriculture, the official policy on this activity, and the cultivators' views on relevant policy. Research confirms the dominance of women in urban agriculture. Women contribute to economic subsistence in ways not captured by national accounting techniques, and they hold a significant amount of decision-making authority in terms of how agricultural produce is used. (ah)

Memon, Pyar Ali; Lee-Smith, Diana**, (1993) Urban agriculture in Kenya. Mazingira Institute, Nairobi, Kenya. In: CJAS/RCEA (January 1993) p. 25-42**

gender, food security and nutrition, R&D methodology

food security; surveys; Kenya, urban theory, urban policies, urban development, women's role, subsistence production, urban poor

Presents the results of a survey among urban farmers in Kenyan cities by the Mazingira Institute. The study concludes, once more, that subsistence production in towns and cities has been neglected in economic and spatial planning to the point of being outlawed Still, the economic value of urban subsistence farming is both significant at the national level and crucial to the poor themselves. (WB)

Mianda, Gertrude **(1996). Women and garden produce of Kinshasa: the difficult quest for autonomy. In: Women, Work, and Gender Relations in Developing Countries. Eds. Parvin Ghorayshi and Claire Belanger. Westport Connecticut: Greenwood Press, 1996. 91-101. Chapters, 20 pp. 0313297975: USD 59.95 (hardcover). Westport Connecticut: Greenwood Press**

gender

Africa, Zaire, garden cultivation, women's role, gender relations, power relations, income generation, women's strategies, labour

This chapter focuses on women and the organization of garden production in Kinshasa, Zaire. Gender relations are viewed as power relations whereby garden production becomes a game of power relations between women producers and husbands. Women undertake garden production to acquire economic independence from their husbands, as well as to meet the financial needs of their families. Through various strategies and tactics, women manipulate the sexual division of labour, despite its constraints, for their own benefit. They gain advantage over their husbands for initiating the production. In order to claim total autonomy, women gardeners establish control over the management, marketing and revenue derived from production. They thus modify, both at the level of garden production and at all levels of power related to this production, the traditional image of women. (AH)

Mudimu, Godfrey D **(1996). Urban agricultural activities and women's strategies in sustaining family livelihoods in Harare, Zimbabwe. Singapore Journal of Tropical Geography 17:2 (1996) pp. 179-194. Papers, 16 pp.**

gender

Africa, Zimbabwe, women's role, urban planning, women's employment, gender bias, access to land, gender relations, power relations, socioeconomic differentiation, household strategies, income generation, subsistence production, urban policies

Though a widespread practice, urban agriculture is not planned for or supported by urban planners and managers as a legitimate form of urban land use in Harare, Zimbabwe. As women are the main participants in urban agriculture, their activities come into direct conflict with planning provisions for urban space. This study examines the role of women in urban agriculture and views and perceptions of the use of urban space for agricultural activities in Harare. The large presence of women cultivators is indicative of women's reduced opportunities for formal employment in urban areas and the perceived notion of women having primary responsibility for

providing family sustenance. While women were the predominant ""owners"" of the plots, the men in the fields were primarily cultivating land on behalf of their spouses or as hired hands. A significant proportion of female respondents were heads-of-households, and urban agriculture is practised by women of all socioeconomic-economic classes. Those women in professional occupations tended to hire contract workers for their plots. Data collected also supports the fact that larger households are more likely to be under pressure to supplement their food sources and incomes via urban agriculture as a survival strategy. Urban agriculture offers women the opportunity to enhance their economic power within the household, although not without negotiating with their spouses, and the ability to provide food for family consumption. The study identifies two immediate issues requiring the attention of policy makers. First, the potential increased competition for land, as reduced employment opportunities push more men to pursue urban agriculture activities, may pose a threat to women's future access to land. Second, current urban planning concepts must be reviewed so that a clear policy on urban agriculture is formulated so that it will support women's struggle for sustaining family livelihoods in the urban economy. (AH)

Ninez, Vera. 1985. Working at half-potential: constructive analysis of home garden programmes in the Lima slums with suggestions for an alternative approach. *Food and Nutrition Bulletin* 7(3):6-14.

gender

home gardening, women heads-of-households, community aspects, women's role, men's roles, Peru

This article explores traditional gardening and garden development projects in Lima, Peru. It details the socio-economic and nutritional background of low-income target populations served by small-scale food production development projects; discusses "native" food production; analyzes a series of past and contemporary programmes; and offers concrete suggestions to guide future programme design. In the course of establishing themselves in Lima, many female heads-of-households have opted to start small gardens, in light of household responsibilities. In the study, thirty-two of forty producers were housewives with small children and no gainful employment outside the home. One main difference between male and female gardeners in Lima is that men often capitalize on their backyard enterprises while women aim to produce food for household consumption. The author contends that the reason most overlooked in the failure of community garden programmes is the artificial nature of the main vehicle used to put them into operation: the mothers' clubs which are remnants of Peace Corps work in Peru and have no roots in the community structure. One key factor in the success of another gardening project is that women are able to plant foods relevant to the daily diet and not easily obtained otherwise. (ah)

Ofei-Aboagye, E **(1996). gender critique on urban agriculture: food security and nutritional status in greater Accra (Ghana). Report for IDRC Project No. 96-0013 003149. Reports. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9. Ottawa: IDRC**
Supplier: International Development Research Centre (IDRC), Publications

Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
gender food security and nutrition
Africa, Ghana, gender issues, research agenda, development projects, gender analysis, methodologies, food security, nutrition

This proposal review is based on an IDRC study on food security and nutritional status in Greater Accra, Ghana, and highlights key issues in gender considerations for research on urban agriculture. It focuses on the reviewer's expectations regarding objectives of the study and suggestions for improvement along gender lines. The reviewer notes that resources of land, water, credit, information and other inputs need to be considered from a gender perspective. Gender proportions of poverty and its influencing factors should inform the design of conceptual framework and proposed methodology (with qualitative methods facilitating particularly rich gender enquiry). The reviewer contends that the participation of a female leader researcher does not necessarily guarantee incorporation of a gender perspective. Use and involvement of policy makers, the National Council on Women and Development, women's organizations and the media are critical at various stages of the research. (AJH)

Peters, Kim **(1999). Community-based waste management for environmental management and income generation in low-income areas: a case study of Nairobi, Kenya. Urban Agriculture Notes. http://www.cityfarmer.org/NairobiCompost.html. 36 p. Mazingira Institute, Nairobi, Kenya**
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling community development gender
waste management; composting; Kenya; gender; organisation; environmental aspects; rural-urban linkages

The paper focuses on community based waste management in Nairobi, Kenya. Women groups started composting organic waste as a means of improving community environmental conditions and generating income through the sale of compost. Through this composting, significant environmental improvements have been achieved including health, agricultural opportunities, improved drainage. It is recommended that local authorities should focus on regulation and co-ordination while NGOs could provide advice and training for local authorities. (NB)

Rakodi, Carole **(1988). Urban agriculture: research questions and Zambian evidence. The Journal of Modern African Studies 26:3 (1988) pp.495-515. Papers, 21 pp.**
gender food security and nutrition
Africa, Zambia, gender roles, labour, food production, decision making, income generation, subsistence production, research issues, urban policies

This article explores the forgotten or ignored area of food crop cultivation in urban areas in the 1980s. The author contends that the first stage in studying any neglected area is to review existing evidence and policy, in this case from Zambia, to

reveal gaps and suggest avenues for further enquiry, policy formulation, and experimentation. The author situates urban agriculture within a wider framework of the gender division of labour, specifically the economic activities of women. Food production in Zambian cities is predominantly a women's activity, determined by the size of household, income per capita, stability of urban residence, and the availability of land for cultivation around the house and/or within reasonable walking distance. A strategy to increase the household production of fruit and vegetables for consumption and sale must be examined in the context of household decision-making, and especially the labour time available to women. Women's response to opportunities to grow more food will depend on the extent to which they make decisions about cultivation, the use or sale of produce, and the distribution of benefits within the household. More detailed evidence from urban agriculture projects and wider implications of such a policy must be assessed before more widespread cultivation is advocated. This includes assessing the benefits to households, and especially to women, compared to alternative economic opportunities which might be made available by other initiatives. (AH)

Rakodi, Carole **(1987). Urban agriculture: research questions and Zambian evidence. Papers in Planning Research No. 109. Cardiff, Wales: Department of Town Planning, University of Wales Institute of Science and Technology. 77 p.**
gender
Zambia; women; economics; access to land; household economy

This is one of the studies on urban agriculture to be undertaken in eastern Africa in the mid-1980s. It focuses on the economic activities of women in urban farming. A shorter version of this unpublished report was published in *Journal of Modern African Studies* 26, no. 3 (1988): 495-515. (JN)

Rakodi, Carole **(1985). Self-reliance or survival? Food production in African cities with particular reference to Zambia. African Urban Studies 21(1985) pp. 53-63. Papers, 10 pp.**
gender
Africa, Zambia, research issues, women's role, household strategies

This paper focuses on urban agriculture, based on a review of Zambian evidence and policy, and is set within a context of wider research issues. The author details the relationship between gardening, women and economic activity. The potential of urban agriculture and its implications for urban land allocation and development are discussed, with specific attention paid to women as urban agriculture practitioners. Research needs to focus on the well-being of populations citywide and at the household level. The role of women in household survival strategies is especially important and more information is required. (AH)

Ratta, Annu **(1993). City women farm for food and cash. International Ag-Sieve vol. 6 (1993) no. 2 p. 1-2 articles, webpages**

gender
women's role, gender bias, income generation, subsistence production, extension services

This brief article outlines women's involvement in urban agriculture and highlights barriers and solutions to such activities. Farming is a viable alternative to wage labour for women and allows women to work close to home. Women's role is not limited to food production but includes processing food for home and market. These activities are rarely reflected in official statistics nor are they recognized as a contribution to the family budget. Thus women do not fully benefit from research or extension services. (AH)

Shehu, DJ; Hassan, WA **(1995). Women in dairying in the African savannah: their contribution to agro-pastoral household income in the dry northwest of Nigeria Nomadic Peoples. 36/37 (1995) pp. 53-63. Papers, 10 pp.**
gender
Africa, Nigeria, rural-urban linkages, dairy cattle, dairy production, dairy processing, income generation, social networks, power relations, gender relations, women's role, market women, intervention strategy

This article considers some aspects of the productive work of Fulbe women in Nigeria, and examines the ways in which their contribution to the household income through the sale of dairy produce has sustained Fulbe communities. Women, through the processing and the daily sale of their products in the urban market contribute the cash for the day to day expenses of the family unit. The daily trips to the urban markets also make them important channels of information for their small rural community. Dairying is no longer carried out on a purely subsistence basis. Women have made inroads into the cash economy especially through the urban markets. Women have thus managed to obtain important leverage through dairying in three ways. First, it serves to balance power relations between male and female household members. Second, it also provides links for women to the larger urban and rural community. Third, it generates leverage for women through their attempts to integrate livestock and dairy economies of the rural areas with urban markets. Modernisation of women's dairying activities, through simple and appropriate mechanization and refrigeration and improved processing techniques for production and supply of fresh milk, would potentially allow a larger populace to benefit. (AH)

Sheldon, Kathleen **(1999). Machambas in the City : Urban Women, and Agricultural Work in Mozambique. Contemporary Challenges in Portuguese-Speaking Worlds. p. 121-140 Paris: Éditions Karthala, 22-24 Bd Arago, 75013-Paris.**
gender
Africa, Mozambique, historical perspective, rural-urban linkages, garden cultivation, women's role, subsistence production, women's organization, intervention strategy

Women in southern and eastern African cities commonly devote time and energy to cultivating an urban garden. This is an often observed but little analyzed activity; it makes an important contribution to family nutrition and sometimes income, but has

been neglected in studies of urban informal activities, food supplies to urban areas, household labor, and development. This paper investigates the past and present agricultural work done by urban women in Mozambique, and shows that the inclusion of this area of female endeavor improves our understanding of the process of urbanization. This paper documents the history of women's urban agricultural work during the colonial era, findings that alter ideas that this work is only related to periods of economic crisis. Another intriguing aspect was the discovery that the majority of women who worked full time in the garment or cashew factories also invested time and energy in urban family agriculture. This work was not only the province of women who were otherwise unemployed and had the time to devote to growing food for their families; it was also a common recourse for women working for a wage during a time of food scarcity. The adaptation of women's rural labor to the urban setting, even for women with full-time waged jobs, speaks eloquently of the rural impact on African city life. Website: www.cean.u_bordeaux.fr/lusotopie (Original abstract)

Slater, R. **(2001), Understanding women's involvement in urban agriculture in Cape Town: A social development perspective. In: *Urban Agriculture Magazine, no 5*, Appropriate Methodologies for Urban Agriculture, pp. 17-18, December 2001, RUAF, Leusden The Netherlands**.

gender, R&D methodology

South Africa

Urban agriculture research in Southern and Eastern Africa has concentrated largely on the use of questionnaires and surveys, usually with a view to understanding the economic benefits accruing to those who practice urban agriculture. For researchers, the focus has been on identifying and analysing the contribution of urban agriculture to income generation, subsistence and food security or on considering its environmental and planning implications. In Cape Town, however, the economic benefits of urban agriculture are limited. In 1989 an investigation found that, where practised, urban agriculture contributed less than one per cent of household income. Questions remain of what are the dynamics behind urban agricultural activity in this context? Why do people living in low-income settlements in Cape Town invest time and money in agriculture in the absence of economic benefits? To try and answer this question an alternative analytical and methodological approach was developed and applied during 10 months of interviewing in three townships in Cape Town. The approach relied on an understanding of how people came to live in Cape Town and the impact of apartheid on opportunities to find work and a place to live. During 1996, 169 people were interviewed in Langa, Khayelitsha and Lower Crossroads settlements and the life histories of fourteen women were recorded. Through the use of an alternative framework, urban agriculture was found to be important in a number of ways.

Talukder A., Pee, S. de, Taher, A., Hall, A., Moench-Pfanner, R., Bloem, M.W. **(2001) Improving food and nutrition security through homestead gardening in rural, urban and periurban areas in Bangladesh. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban**

Agriculture, December 2001, RUAF, Leusden The Netherlands.
R&D Methodology food security and nutrition gender
Bangladesh; home gardening; gender; children

Malnutrition is a serious public health problem in Bangladesh, and can have serious impacts on the population as malnutrition retards child growth, increases the risk and duration of illness, reduces work output, and slows social and mental development. Improving nutritional status, including micronutrient status, can lead to increased productivity, increased child survival and growth, and reduced maternal morbidity and mortality. Interventions for improving nutrition can address deficiencies of specific nutrients. However, when the goal is to address deficiencies of more nutrients simultaneously and to target the population throughout the lifecycle interventions such as dietary diversification are more appropriate. Homestead gardening activities are centered on women because they are usually the ones who take care of the homestead garden. These activities empower the women and can increase their income. This combination of empowerment and increased income can result in better use of household resources and improved caring practices. Therefore, homestead food production also addresses a priority area of poverty alleviation and overall development of communities. This article describes the important characteristics of HKI's Homestead Gardening Program in Bangladesh (1990-2001) as well as how it is being monitored and evaluated.

Tinker, Irene **(1997). Street foods: urban food and employment in developing countries. Oxford University Press, New York. 243 p.**
food security and nutrition R&D methodology gender
poverty; gender;safe food; informal sector; street food

This book presents the first empirical study of sellers of foods on urban streets. It recounts the efforts of an action-research project to improve the income of street food vendors and the safety of the food they sell in the Philippines, Thailand, Indonesia, Bangladesh, Egypt, Nigeria and Senegal. Details of the street food trade provide robust comparative data on the vendors and the informal sector. The study includes and analysis of income and gender. The Book is thorough in its analysis of what is urban and how street food functions as a system interfaced with other urban systems, in a variety of economies and cultures. Street food is found to be an essential link in the informal economic sector, nutrition and urban agriculture. (JS)

Upreti, Bishnu Raj, **(2000), Resource-Use Negotiation as an Alternate Strategy for Sustainable Water-Resource Management: Experience from Nepal. Department of Social Sciences, Wageningen University. In: *The Journal of Agricultural Education and Extension*, 2000, vol. 7, no. 1**
gender,
Nepal; women's role; natural resource management; water management; extension

This paper aims to examine the strategies, mechanisms and practices of local level water use negotiation. The paper reveals that local people have their own strategies, mechanisms and approaches to utilise available limited natural resources. The case of water-use negotiation was studied using direct observation, group discussion and

interview methods. The paper explores the effect of norms, values, beliefs, knowledge, power, communication and facilitation, feelings of ownership on resources use negotiation and water-resource management processes in Nepal. Women are the crucial actors and dynamic negotiators of community level resource use conflict. The role of development organisations is identified as facilitators to resolve conflict instead of leading the negotiation. The dominant extension approach in Nepal is not able to address resource use conflict. It needs an approach that acknowledges conflict as a part of social process and that promotes the facilitation of negotiation and adaptation.

Urban agriculture. 1998. *WE International* 44/45 (Spring/Summer).
gender
community gardens, urban agriculture, Cuba, Poland

This special edition of WE International covers a broad range of topics on gender and urban agriculture. It includes short articles from Deborah Moffett and Mary Lou Morgan, Dee Kramer, Mariana Canidad Cruz and Yalila Murciano (translated by Nancy Allen), Cathleen Kneen, Amina Miller, Anne Bellows, and Susan Giordano, Chick Tam and Rachel Mabie. Topics include food and consumer issues, experiences of urban agriculture in Cuba and Poland, biotechnology, community gardening, and women's participation in city gardens.

2. Forms of Urban Agriculture

2.1 Urban Livestock

Livestock in the city.

(Picture: Henk de Zeeuw)

Urban farming and animal production, a synthesis

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Introduction

Animal production is and has been part of urban agriculture in many growing cities. It occurs in a multitude of forms, each with its own problems and opportunities. Any attempt to summarise the information from the literature and personal experience implies a categorisation. We choose, therefore, to divide the literature on urban livestock into five major categories. Each of the five categories of reports has a distinct approach in terms of level and scope of analysis, and they are discussed here more or less in order of increasing level of aggregation, i.e., from animal and family level to the level of the city or of urban agriculture in general.

The first category focuses on case studies and anecdotal stories of how a particular family or small community is happy with their rabbits, backyard chickens, guinea pigs, or occasional goat or cow.

The second category works on the same level with a handbook-type of approach that provides technical directions regarding methods of keeping these animals, of feeding them, etc.

The third and fourth categories both work at a higher level of system analysis. They encompass practical approaches discussing average (virtual) animals and/or their (virtual) owners / keepers together with negative and positive effects on large neighbourhoods or entire cities. The concerns at this level relate to issues such as food supply, public health, social resilience of the city, use of public money on this form of urban activity etc.

The third category itself tends to come from government offices with a strong disciplinary and/or sector focus embedded in a reductionist and linear way of thought. It tends to either focus on advantages or disadvantages (the either/or approach!) while seemingly favouring interdisciplinary or sector “solutions for problems”. For example, it would suggest building a laboratory or prohibiting a particular kind of animal considered to be a problem for human health due to a particular disease.

The fourth category looks at issues of urban agriculture in general. It tends to provide an outsider look from the perspective of architects, planners and/or local NGOs themselves. They have essentially a positive approach while mentioning advantages and disadvantages rather superficially.

The fifth and last category consists of some rather academic papers that describe in detail structure and components of what urban livestock is and what it could be. A good grasp of all issues in and around urban livestock requires a look at papers from all these categories; otherwise one would inevitably end up with a lopsided idea in one way or another.

What seems to be lacking is a sixth category of papers that ties all approaches together. An attempt at such a synthesis is made in this bibliography, in a number of recent proceedings, and in a special study by the FAO. This review will first list some history and background to livestock keeping in urban areas. It will then explain the issues at different levels of analysis and review, in some greater detail, the issues and approaches brought forth in the different

categories of reports. It concludes by tying all this together into a synthesis that gives directions for work in development, research and teaching.

Animal production in and around cities: some background

Livestock keeping has been part and parcel of human settlements since the start of civilisation but the variety of form is staggering. A brief outline of the variation and method / level of analysis is given here before proceeding to a review of the information listed in the different literature categories of this bibliography.

Animals have served in rites for sacrificial purposes, they can help to upgrade food waste from kitchens and/or agro-industry, they are a form of informal saving and a status-symbol, and last but not least, they serve for the production of different forms of food.

Over the ages, however, human settlements have become larger and the association with animals remained but the nature of the interactions changed. The story goes that one of the Medici queens forbade the trading of animal products on the main bridge in Florence because she did not like the smell (A. Scappini, pers. comm., 2000). That bridge is now the centre of trade in gold and jewellery. The German economist Von Thunen showed some 150 years ago how the dairy and vegetables were produced in or near the city, how cropping was done at a somewhat greater distance and how extensive animal production took place at a much larger distance. That model still seems to be quite useful and it is generally observed in many tropical countries, even when it does not explain all local differences, partly because more roads and other market structures make distances smaller.

Other factors of change are that certain functions of animals disappear: for example, animal draught in cities due to increased availability of oil. Increased use of oil is also related to the fact that the scale of operation increases and Phelan reports that the dairy cattle were expelled from Copenhagen at the end of the 19th century. Prior to that they had been largely fed on spent brewery grains from the beer manufacture but the proximity of people and factory combined with different life expectations to make animal production in the city unpopular.

Similar expulsions of livestock production took place recently in Singapore, even to some extent in densely populated in countries like the Netherlands, and over the past half century in so-called dairy colonies such as the Aarey milk colony near Bombay some 50 years ago, or in the Kuku milk colony near Khartoum.

At present there are plans to move pig production out of places such as Ho Chi Minh City and one possible evolution of pig production in the Netherlands is the move to industrial parks. However, to date, there are still many cities where animals are part of urban life and urban agriculture. The question is not whether they should leave or not, but why and how they should continue (or leave). The gist of this review is not a yes –an approach that focuses on local solutions to local problems.

Complexity in urban livestock systems: perception and scale

The variety of ways and purposes of keeping animals is almost endless: one only needs to look at the titles in the bibliography. The variation is even larger when one starts to notice the different perceptions that one can have to establish the usefulness and problems of these different forms. One report talks about the income raised by a small single-parent family in a slum through urban livestock, another thinks in terms of large enterprises with tens of thousands of chickens owned by a rich investor.

Such diversity can easily lead to misunderstanding and unnecessary arguments because different people have different things and conditions in mind when they talk or write about urban livestock. This is a typical case of what are nowadays called issues of “complexity”, i.e., of problems that are highly interconnected and where different people have different perceptions regarding the definitions and (side)-effects of such a system. One way to cope with such a variation is to simplify the issues, which partly depends on the question one has in mind.

A useful simplification of the discussion regarding the variety of periurban livestock systems looks at major groups of stakeholders (who are involved); what are their perceptions about problems and opportunities of urban livestock (dung is a problem unless it can be used in a garden or for biogas generation); what are the types of urban context (what sort of city are we talking about); and what is the level of analysis in space and time (do we talk about problems and changes that occur at my home this week, or do we discuss changes that take place over several years and over the whole region).

Hardly any of the reports makes an explicit attempt at describing the level of analysis and the stakeholders, even though the approach that they take is rather obvious from taking a first look at the report. From what we have read one can notice a large variation: without trying to be comprehensive one could suggest the following patterns and scales of analysis:

Stakeholders are consumers (ranging from home consumption to purchases from supermarkets), producers (backyard / semi-commercial / commercial), neighbours and neighbouring communities, administrators (veterinarians, public health servants, slum-kings and urban government);

Levels of analysis in space range from family and animal to city level, to regional and even (inter)national level (backyard chickens are produced locally and commercial broilers have to be flown in);

Levels of analysis in time range from time-spans of a day (how to survive tomorrow), a year (how to overcome the next dry season), to 10 or more years (how to supply the city with sufficient animal protein in 2020);

Linear and non-linear approaches are exemplified by “either – or” *versus* ”and – and”; as well as “direct” *versus* ”indirect” production (the animal is useful or not *versus* the animal is useful in one aspect and not in another; if the animal produces no protein for the local population she is useless in view of the dung problem *versus* even if she produces no protein she can still be essential; the contribution of animals to food production is only small on a city basis *versus* small changes in one place can have dramatic effects elsewhere);

Perceptions about functions of animals range from rather linear ones, animals as pets, animals as saving account or money-spinner, to animals as producers of meat and eggs, to the rather broad and non-linear ones such as the function of animals in local resilience of the neighbourhood, and emancipation of women's groups. The idea that matter and mind is separate is also apparent in this approach. This idea is to be redrafted, because it should be clear that mental quiet can only be achieved when the minimal physical requirements are met (and vice versa);

Professional background in which generally reductionist-trained experts will tend to split the problem into disciplinary problems without looking at the whole (e.g., low production of an individual animal is not so problematic to a farmer if that implies a high income; biological performance of an animal is all that counts).

The following sections summarise the conclusions from the different categories of literature. Essentially they reorganise the information that was summed up in this paragraph.

Five categories of reports on livestock in urban conditions

As said before, it is necessary to simplify and categorise information if one wants to be able to separate the forest from the trees. The type of classification determines, however, the result of the analysis. Therefore, readers should use their own judgement in reading all this: it is just a convenient way to organise the otherwise so variable literature.

Category I: Anecdotal information from family and animal level

This category of reports basically focuses on case studies and anecdotal stories of how a particular family or small community copes with the keeping of animals, how it is happy and or unhappy with its rabbits, backyard chickens, guinea pigs, an occasionally with a goat or a cow. It is the kind of information that is essential to keep policy makers and people from categorising, to help them keep their feet on the ground, to understand local variation and to appreciate the wealth of indigenous technical information that is available in local communities. It also depicts the degree of interconnectedness of systems at that level even though some of this literature might do better on that aspect.

A typical example of physical interconnectedness is given in the study of urban livestock in Mexico City. Women take the day-old tortillas to sell them as animal feed at the farm where they buy their milk. And the dung of the cows goes to other people that have small vegetable plots. More socio-economic aspects examples are that women can (re)gain status and independence by having a few animals, while for certain religions it is simply impossible to think that one could live without animals, whether cows in India, pigs in South India or goats and sheep in the Id festival of the Moslems.

Only participatory approaches and a preparedness to be open for other perceptions of reality can help academics and policy makers to start understanding these intricacies. These will make them more careful about intervening and it should make them realise the value of local participation in setting agendas for sometimes important changes (e.g. due to serious dung effluent problems, issues of local resilience). A serious drawback present in the literature on case studies is that they discuss only one condition, i.e. one remains unaware of the context-dependency of the anecdotal evidence. One remains blind, therefore, to the fact that what works in one place might not be useful somewhere else and one can remain stuck in a objectivist mode of thought (see category V).

Category II: publications on how to keep animals in urban conditions

A large collection of quite useful materials exists that explain how one can keep animals. Whether this is in urban conditions or not is of no concern to these authors. They tend to focus on small-scale methods of animal husbandry that also apply to cities. The same objectivist approach underlies these publications and if the recommendations do not fit local conditions one can either dump the book or even better: use local insight to see how and whether the book solution should be modified. Many such books are available, ranging from manuals on rabbit rearing, to the small-scale processing and marketing of animal produce, to the production of duckweed in fishponds and practical hints on how to install and use biogas pits to make more intensive use of dung and excreta. These are very valuable materials full of ideas and practical approaches, but they need to be screened for local suitability.

Category III: city level view of animal production specialists and administrators

Reports in this category address issues at the level of the suburb, but more often at the level of the whole city and/or even nation. By their very nature they have to part from individual cases and they are supposed to generalise. However, by doing so, they tend to be moulded into ways of thought that may not always fit local conditions. It is strange that health officials of the Middle East use health standards from California while conditions and local preferences differ considerably, to say the least.

Moreover, many of these reports are written based on a reductionist academic approach that subdivides the world of animal production into issues of nutrition, breeding, and health while reality may not work along these lines. Farmers' reality is more likely to operate along the lines of local status, short-term income, complaints or praise from a neighbour, love for an animal etc. In other words, many of these reports talk about (virtual) animals and/or their (virtual) owners / keepers. They address legitimate issues that affect whole neighbourhoods or cities but which have little bearing on day-to-day life of individuals. A measure to control average dung-effluent problems punishes the big guilty fellows who dump large amounts perhaps less than the smaller fellows who live almost in the animal shed and who take meticulous care that the place stays clean.

General measures kill and de-motivate local initiatives if they are not by and large in line with local reality. Clear examples are available from world literature where a measure to increase urban health was counter-effective because it did not fit local reality. That is the concern about objectivism in the anecdotal reports from which positive experiences should be translated only with proper consideration of other conditions. The reports in category III refer, however, to a number of serious issues: public health, hygiene, food-safety, excreta effluents, and animal health.

One would have to be cautious to decide on these grounds that livestock is to be banned from the city because collateral damage would be done to social stability, equity. Also, one would have to devise new ways of using and/or recycling the feeds and other resources that are now used for animal production. In particular one would have to look at ways to remedy the problem without throwing the baby with the bathwater. In addition, one might also attempt solutions to the problems outside veterinary medicine, for example a discussion with city planners and social workers, or based on discussions with local stakeholders.

Category IV: city level views of architects and social workers (to name a few)

The category looks at issues of urban agriculture in general, mostly in proceedings of conferences and workshops such as UNDP and Bakker et al. It tends to provide an outsider look by architects, planners and/or local large NGOs themselves. The more recent publications are influenced by concepts of habitat, or of ecological approaches to urban planning. They essentially have a positive approach to urban agriculture in general and they do not mind that animals are part of that picture.

These publications provide the balance and overall picture that animal specialists will need to get their feet back to the ground, although they lack the experience that animal production specialists can provide. Statements such as "animals can provide free meat" were not encountered in the literature resources as such, but they might stem from people who are ignorant about what an animal is or can be to them. Major functions of animals for draught power and large-scale cleaning of waste from agro-industry in cities are on the wane, but why not include some of those in the design of eco-cities and industrial parks.

Category V: the ”overview and insight” of academics and visionaries

A number of papers have attempted either in-depth analysis of particular cases, notably the work such as by Sumberg et al., Mexico, Salvador, Quito. They focus on insight and they illustrate and document very well the large variation in issues, and stakeholders also to some extent as they change over time. Apart from the rather superficial but useful overviews such as in the previous category (IV) there is a more integrative paper by Ann Waters Bayer that needs to be mentioned. It finds a balance between social and biophysical aspects of animal production at several levels of urban systems. It is supplemented by a recent report of the FAO /AGA division that summarises and synthesises the information of case studies mainly from category III. There is still little reported on the analysis of ecological aspects of urban livestock. This would address issues such as:

- Different patterns along which cities will develop /or crash over the next decade or two;
- How can one avoid that a large-scale system inherently results in eutrophication and pollution, a problem that is basically the same for animal and industrial production?
- Which mixes of crops, animals and people (include businesses) are stable, resilient and practical for promotion (in analogy with the approach to business parks)?
- How should societies handle the issue of public perception regarding consumption patterns?
- To what extent should public funds and/or tax rebates be used to stimulate industrial forms of livestock production to satisfy some virtual demand?
- Do politicians have the courage to popularise the idea that sustainable development includes ecological consumption patterns that adjust demand to “what is on offer”?

Concluding comments

The reports on urban livestock keeping illustrate quite clearly the range of forms and contexts in which livestock plays a role. Very few of the reports attempt a synthesis and one major suggestion from this brief review is therefore to go for integration rather than for detail at this point. Another suggestion is to arrange the discussion according to the level and the perceptions of the stakeholders, their time and space scales, and the professional background of the authors. Last but not least there is a suggestion to achieve synthesis through the application of some system theory in the larger picture of the emergence of mega-cities and market change that is to be expected, against the background of a few questions regarding the directions of change for sustainable development.

Arias E. **(2000) Integrated teaching linking veterinary medical-animal husbandry students to urban agriculture in Mexico City. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock
urban livestock; Mexico

An educational model in integrated education was constructed and directed to second-year students to analyse vegetable and animal by-products for animal feed in urban livestock production. The model was also useful to orient students towards parasitology and clinical work. The use of this model in Mexico City, and the problems encountered are presented.

Ayeh, E **(1994). Rabbits: small animals for small spaces. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 25. HPI Cameroon program, PO Box 467, Bamenda, Cameroon**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
urban livestock
animal production; Cameroon; rabbits; small-scale agriculture

Rabbits are productive and easy-to-keep animals that can recycle grasses and crop wastes into high-quality protein. Backyard rabbit-keeping requires little space and few external inputs. As Ateh Eugene explains, for these reasons and more, Heifer Project International (HPI) is promoting rabbit-keeping in Cameroon. (ILEIA)

Ba Diao, M. **. L'élevage laitier en zone périurbaine de Dakar: situation et perspectives. Agriculture périurbaine en Afrique subsaharienne p. 149-159**
food security and nutrition urban livestock
Senegal; dairy products; public health; periurban agriculture

Senegal faces a considerable dairy product shortfall. Domestic consumption is for 50% covered by imports, primarily of powdered milk. Private or semi-public initiatives, based on importing exotic animals, have been launched, but nevertheless intensive dairy farming is still at its infancy. It is difficult to acquire inputs required, particular animal feed besides the marketing system and technical management pose problems. The socio-economic environment in the dairy sector makes dairy farming costly and thus hard to practise on small scale farms. (NB - abstract adapted form original)

Bastianelli, D. ; Arbelot, B.; Guérin, Hubert **Développement et organisation des filiéres avicoles autour de Dakar. II. Organisation d'un service d'appui et de controle sur la qualité des aliments de bétail Agriculture périurbaine en Afrique subsaharienne, p. 167-172**
food security and nutrition urban livestock
poultry farming; periurban agriculture; Senegal;

The project aimed at supporting the creation of a poultry feed production and raw material quality control service in the Dakar region. The urban poultry sector is characterised by a recent rapid expansion and a some what lacking structure. Other features are a larger market, more open to industrial poultry products, easier access to supplies etc. Eventually there might occur problems regarding noise and manure disposal. This influence as described decreases in Dakar the further one moves from the city. Further development of the sector requires good availability of inputs and services. However this would require a minimum of coherence and organisation, which are lacking. As quality control in the animal feed market is sometimes inadequate producers prefer to cut costs rather than to improve the quality. The key bottlenecks can only be addressed by strong political will. However in some of the

areas like organisation of interest groups farmers can organise themselves. Addressing the quality of poultry feed should imply taking into account the entire production system. (NB - abstract adapted from original)

Bastianelli, D. **(2001) Methods to Promote Healthier Animal Production: Examples in Periurban Poultry Production Around Dakar. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology urban livestock
Senegal; poultry; contamination; diseases

Animal diseases in periurban intensive poultry production are associated economical hazard for the producers. There is also health hazard for the consumer, with evidences of foodborne diseases du to poultry meat in Dakar. Most contamination and diseases originate in the inappropriate practices and buildings, as well as in the lack of regulations and controls. The objectives of the actions led by ISRA and CIRAD in Dakar are i- to develop a avian pathology laboratory to support the production sector, ii- to animate a network on epidemiological information (RESESAV) and iii- to study the contamination of poultry products through the production chain in order to identify critical points.

The involvement of veterinarians and field technicians in this effort is considerable. It is the basis for al the actions of the network : they sensitize the farmers to the importance of prevention, they use the laboratory to help for diagnosis and provide a feedback on disease nature and severity which allow a general epidemiological survey and they facilitate access to the field for the experiments.

The development of tools and actions for the control of diseases in poultry production appears to be a “virtuous cycle” because the presence of a reliable laboratory encourages veterinarians to provide sound diagnosis and the farmers to adopt a more rational management of health in their flock, which in turn stimulates the activity of the laboratory.

Bellows, Anne C., Robinson, V., Guthrie, J., Meyer, T., Peric, T. and Hamm, Michael W. **(2000) urban livestock Agriculture in State of New Jersey. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock community development
United States

In old (for the U.S.) established industrial cities of New Jersey, one can often still see the sturdy working class neighbourhoods of early 20th century Italian and German immigrants surviving today with out-buildings for chickens and rabbits securely in place. For the most part, these populations have moved up the economic scale and out. New immigrants replace them, bringing their own rural and urban agriculture traditions, including livestock raising. Personal experience and anecdotal information from residents tell a story of the diverse nature and the importance in food security

for urban dwellers in the U.S. Urban livestock agriculture for household consumption exists in the “hemispheric North” largely as undocumented (unpaid) labour, food production, and land use. The craft and traditions of growing food generally, and ULA specifically, appear to be disappearing, even as they may flourish on a small scale. This article focuses on the United States, with particular reference to the densely populated eastern state of New Jersey. It outlines some of the barriers to and opportunities for urban livestock agriculture with an emphasis on household-scale production in urban centers in the U.S.

Bentinck J. **(2000) Delhi's Urban Growth and the Stray-Cattle Controversy. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock rural-urban linkages
India; urbanisation;

The streets of urban India are characterised by the presence of animals: cattle, bullocks with carts, monkeys, dogs, elephants, and occasionally some scavenging pigs. Cows are certainly the most visible fauna. The presence of dairy farming in the city is explained here by the way that villages and its people become urbanised. It may look that this is an undisputed part of city life, but the case of Delhi shows that it is surrounded by controversy, which calls for creative policy action.

Best, John**. Homestead livestock and household livelihood in Sarawak: innovations versus improvements. In: Community Development Journal (volume unknown)**
urban livestock
Malaysia; animal husbandry; livestock keeping; farming systems research

Describes a rice-based farming system in Malaysia with additional perennial cash crops and a homestead livestock component. The article analyses the role of the household economy and assesses the scope for improvement of household livestock production, looking at: animal feeds; labour; husbandry skills; marketing; finance; and distribution of technical information. (WB)

Cardinale E., Porphyre, V., Bastianelli, D. . **(2001) Methods to promote healthier animal production: examples in periurbanpoultry production around Dakar. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology urban livestock
epidemiology; poultry; networks; veterinarian; diseases; urban agriculture; methods

Animal diseases in periurban intensive poultry production mean economic problem for the producers. There is also health risk involved for the consumer. For instance the evidences of foodborne diseases in poultry meat in Dakar. Most contamination and diseases are due to inappropriate practices and buildings, and indirectly to a

lack of regulations and controls.

Actions led by ISRA and CIRAD in Dakar are aimed at developing an avian pathology laboratory to support the production sector and at developing; research into the contamination of poultry products through the production chain; and facilitating a network on epidemiological information (RESESAV). The involvement of veterinarians and field technicians in this effort is considerable. The development of tools and actions for the control of diseases in poultry production appears to be a “virtuous cycle” because the presence of a reliable laboratory encourages veterinarians to provide sound diagnosis and the farmers to adopt a more rational management of health in their flock, which in turn stimulates the activity of the laboratory.

City Farmer, Canada's Office of Urban Agriculture **(1999). New York: bees bring taste of honey to inner city. Urban Agriculture Notes http://www.cityfarmer.org/beesNY.html. 2 p.**
Supplier: City Farmer, Canada's Office of Urban Agriculture
urban livestock
beekeeping;; United States

Describes an experiment with beekeeping on rooftops in New York, USA. (NB)

Drechsel, P.., Abaidoo, R.C., Amoah, P. and Cofie, O.O.. **(2000) Increasing use of poultry manure in Ghana: Is farmers’ race consumers’ fate? In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock waste recycling
Ghana; manures; waste; reuse

Livestock production is a vital part of urban and peri-agriculture in Kumasi, where many farmers benefit from large amounts of cheap manure. However, with increasing competition for this resource the manure is seldom stored long enough to prevent the contamination of food and water with pathogens as farm gate and market analyses show. Interventions to prevent the spread of infection should focus first of all on the consumer household. Farmers’ access to clean irrigation water can only be secured if their own practices do not contribute to water pollution. The authors describe the importance to farmers and the problems faced by the City authorities.

Ehui, S.K., Benin, S. and Gebreselassie, Nega. (2000). Factors affecting urban demand for live sheep: The case of Addis Ababa, Ethiopia. Socio-economics and Policy Research Working Paper 31. ILRI (International Livestock Research Institute), Nairobi, Kenya. 32 pp.
urban livestock
marketing; urban livestock; sheep; Ethiopia

A solid but rather linear and empicical approach to the analysis and prediction of trends in marketing of live sheep around Addis Ababa. It states that the share of small ruminant meat, especially sheep, in the demand and consumption of meat in general grows. Therefore it assumes that infromation about consumer expenditure behaviour and demand parameters for live sheep will be valuable for several interst groups in the sheep industry. Using the Heckman two-stage approach, this study shows that sheep prices and household income, as well as socio-demographic factors, including household size and composition, significantly affect the likelihood of buying live sheep and expenditures on live sheep. Projections of live sheep demand and supply in Addis Ababa in 2010 and 20202 show that sheep producers in Addis Ababa alone will be able to meet up only 27% of the demand.

Foeken, Dick and Owuor, S.O.. **(2000) Livestock in a middle-sized East-African town: Nakuru. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock waste recycling
Kenya

In 1999, a general survey among a representative sample of almost 600 households was held in the Kenyan town of Nakuru. During the survey, basic information was collected on urban farming practices by the Nakuru population, with the aim to obtain a general overview of urban agriculture in this town. Part of the survey covered several aspects of livestock keeping. This article is based on a larger report by the same authors entitled *Urban farmers in an East African town: the case of Nakuru, Kenya*.

Food and Agriculture Organization (FAO) **(1997). Livestock and the environment: meeting the challenge. 12 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy; the United States Agency for International Development; World Bank**
urban livestock
livestock keeping; environmental aspects; mixed farming; land use; access to land; smallholders

This report, and the accompanying booklet, lists findings of a multi-donor study co-ordinated by the FAO on livestock-environment interactions conducted between 1994 and 1996. Issue at stake is how to find a balance between a fast growing global demand for food and the need to sustain the natural resource base of land, water, air and biological diversity. Livestock production is the world's largest land user and may soon be its most important agricultural activity in terms of economic output. The ensuing animal waste problems are equally huge and weigh heavily on the environment. The study served as a starting point for deeper insight in this politically sensitive and complex subject. In the framework of the study, a number of activities have been launched dealing with information gathering and exchange

focusing on environmental hotspots, and with the provision of decision-making support. It is hoped that in this way, livestock-environment issues will be systematically incorporated in local and national plans, and into bilateral and international development programmes and projects. (WB)

Gertel, Jörg; Samir, Said **(2000). Cairo: urban agriculture and visions for a 'modern' city. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 209-234. DSE, GTZ, CTA, SIDA**

city ecology urban livestock land use planning

urban livestock; food security; food policy; asset strategy; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Egypt

Forms of urban agriculture in Cairo are related to its extremely high population pressure and the government policy, especially with regards to food subsidies. Green open space is scarce. Small-scale animal husbandry, such as chicken raising, is interesting as it provides for expensive proteins and can be practised in confined areas. In certain cases organic waste is used as cheap fodder to feed the animals. Most people engaging in urban agriculture are poor and production is mainly for subsistence purposes. A second element is that animals are important assets. The image of food produced in Cairo is not very positive and there are indications of health risks associated with urban farming. Scientist and authorities consider urban agriculture an oxymoron as they associate urban with modern and agriculture with rural and backward. It is believed that urban farming tarnishes the image of Cairo with negative implications for the modernisation of Cairo. Nevertheless to a section of the urban poor small-scale animal husbandry is of critical importance and is an important strategy to cope with food security in Cairo. (NB

Ghirotti, M. **(1999). Making better use of animal resources in a rapidly urbanizing world: a professional challenge. World Animal Review 92, p 2-14**

urban livestock

livestock; animal production; farming systems;urbanisation; traditional farming; intensive farming; animal housing; animal diseases; pests of animals; abattoirs; urban areas; environmental impact; draught animals; pet animals; wild animals; disease transmission

This very balanced article takes a positive but cautious look at the place of livestock in urban agriculture. It acknowledges the problems associated with various classes of livestock in such conditions, e.g. disease and nuisance. However, it also stresses the possible benefits of livestock, and it discusses how standard thinking in government offices may have to be reversed to better utilize the potential of this kind of enterprise, not in the least for the poor, and for women and children. Worth reading in detail!

Guérin, Hubert; Faye, B. **Spécificité de la problématique périurbaine pour les sytèmes d'élevage. Agriculture périurbaine en Afrique subsaharienne p. 43-49**

urban livestock
animal production; poultry; dairy; pigs; food supply

Short cycle animal production (milk, poultry) has a growing share in urban food supply. There is room for improving the production technically and economically. As regards dairy production many technical references are available but their applications limited. A lot of new initiatives emerge to improve traditional systems and to create small and medium scale production units. They need to be made more viable. Collective access to input and output markets can pave the way for technical change for breeders' groups. Poultry production is the most dynamic sector. Pig production needs to modernise and fish production is increasing in periurban areas. In some countries professional organisations become autonomous. Their viability depends on support for research, organisation of marketing a.o. This sector requires a lot of inputs is very open to the market and its overall efficiency is demanding at the technical and organisational level. As the production units are often located in urban areas, they often pose sanitary problems. The hygiene of marketed products is subject to caution. Production needs to meet adequate conditions for safety of producers, consumers and the urban environment. The dynamics of periurban units can favour exchange of know-how with rural units as regards intensification of production and product technology. (NB - abstract adapted from original)

Haan, Cees de; Steinfeld, Henning; Blackburn, Harvey **(1997). Livestock and the environment: finding a balance. 115 p. Food and Agriculture Organization of the United Nations (FAO); United States Agency for International Development; World Bank**

urban livestock
livestock keeping; environmental aspects; mixed farming; land use; access to land; smallholders

This report, and the accompanying booklet, lists findings of a multi-donor study co-ordinated by the FAO on livestock-environment interactions conducted between 1994 and 1996. Issue at stake is how to find a balance between a fast growing global demand for food and the need to sustain the natural resource base of land, water, air and biological diversity. Livestock production is the world's largest land user and may soon be its most important agricultural activity in terms of economic output. The ensuing animal waste problems are equally huge and weigh heavily on the environment. The study served as a starting point for deeper insight in this politically sensitive and complex subject. In the framework of the study, a number of activities have been launched dealing with information gathering and exchange focusing on environmental hotspots, and with the provision of decision-making support. It is hoped that in this way, livestock-environment issues will be systematically incorporated in local and national plans, and into bilateral and international development programmes and projects. (WB)

Hooft, K van ’t**. (2000) Cisticercosis, a Complex Zoonotic Disease. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden**

The Netherlands.
urban livestock health and environment
zoonoses; Bolivia; Cisticercosis

Cisticercosis is one of the most dangerous diseases caused by a parasite that passes from animals to human beings. It is most prevalent in developing countries, and is closely related to economic standard, culture, hygiene, and the way animals and people share the same living space. Major problems with this disease exist in Latin America, and in the non-Islamic parts of Africa and South East Asia, especially India. This article describes the case of cisticercosis that originates from pigs (Cisticercosis cellulosae) with reference to Bolivia, South America.

Jahn, Gundula **(1996). Die Bedeutung der Dienstleistungsbereiche fuer die periurbane Haltung kleiner Wiederkaeuer am Beispiel Marouas, Kamerun. 75 p.**
urban livestock services
Cameroon; urban livestock; ruminants; agricultural service provision

Explores the importance of provision of services like agricultural advise, veterinary support and supply of inputs on the potential for improvement for keeping small ruminants. An inventory is made of available services and this is compared to the productivity of the herds of different household categories keeping sheep. (NB)

Jahn, Gundula **(1997). Chancen und Risiken der kleinbauerlichen urbanen Tierhaltung. On: http://www.cityfarmer.org/gtzanimal.html#GTZanimal. German Agency for Technical Cooperation (GTZ), PO Box 5180, D-65726 Eschborn 1, Germany**
urban livestock
livestock keeping; animal husbandry; participatory approaches; institutional support

Looks at the potential of urban livestock keeping, but also at problems and risks in connection with it, such as transmittable diseases. The author examines how support to urban livestock keeping by poor urban dwellers can be institutionalised. In order to guarantee involvement of all stakeholders concerned problem analysis and solving should be approached in a participatory manner. (WB)

Karbo, N; Bruce, J; Okantah, SA**. A survey on periurban dairy in Northern Ghana. 9 p. Animal Research Institute, POB 52, Nyankpala-Tamale, Ghana**
urban livestock
dairy production; Ghana; livestock

Based on a survey to characterise the periurban dairy production system in Northern Ghana. Cattle were raised for milk, manure and cash. Milk produced was partly sold and partly consumed by the household. Forty-four percent of the interviewed indicated that they gave supplementary feed to their cattle. All cows calving in the wet season were milked. Estimated average milk production per herd per day is 6.6

litres in the wet season and 1.7 litres in the dry season. (NB - adapted from original abstract))

Little, Peter D. **The dairy commodity system of the Kismayo region, Somalia: rural and urban dimensions. 13 p. Institute for Development Anthropology, 99 Collier street, POB 2207, Binghampton, NY 13092, USA**
urban livestock rural-urban linkages
Somalia; livestock; marketing; dairy production

The paper discusses the dairy commodity system in the Kismayo region in Somalia with an emphasis on marketing aspects rather than on the production dimensions of the system. (NB)

Losada, Hermenegildo **(et al.) (1999). Suburban livestock rearing by smallholders in the backyards of Xochimilco in the south-east of Mexico City as an important strategy for sustainable urban agriculture. Urban Agriculture Notes. http://www.cityfarmer.org/livestock.html, 8 p. Animal Production Systems Area, Department of the Biology of Reproduction, Universidad Autónoma Metropolitana, Iztapalapa, Mexico**
Supplier: City Farmer, Canada's Office of Urban Agriculture
urban livestock
livestock; Mexico; Mexico City; family farms; household wastes; poultry; pigs; backyard farming

Characterises poultry and pig keeping in the backyards in the vicinity of the house in the suburban area of Xochimilco, Mexico City. Motives for rearing animals are mainly subsistence and money saving for emergency expenses. In the case of pig raising this was also done to supplement the household budget. The feeding on the animals was based on household waste, stale tortilla, alfalfa and other feeds. The number of pigs kept ranges from 1-5 and the number of chickens from 1-50. (NB)

Losada, Hermenegildo **(et al.). Urban agriculture and livestock in the City of Mexico: an option for a sustainable future. Urban Agriculture Notes http://www.cityfarmer.org/mexico.html. Animal Production Systems Area, Department of Biology of Reproduction, Division of Biological and Health Sciences, Universidad Autónoma Metropolitana, Iztapalapa, Mexico**
Supplier: City Farmer, Canada's Office of Urban Agriculture
urban livestock city ecology
Mexico; livestock; crop production; reuse of waste; environment; family production

Presents research findings on urban agriculture of a team of the Autonomous Metropolitan University at Iztapalapa in Mexico. Three forms are distinguished and within these forms, animal production and arable production are discussed as well as the different perceptions of producers and authorities towards the phenomenon of urban agricultural production. Characteristics common to all three types are the use

of recycled materials and the involvement of all family members in the activities. (NB)

Mantovani, A. **(2000) Veterinary Urban Hygiene in Developing Countries. In: *Urban Agriculture Magazine, no 2*, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock health and environment
zoonoses; WHO; policy

The World Health Organization (WHO) and its branch, the Veterinary Public Health (VPH) initiated officially to develop its interests for the problems connected with urban areas in 1977, dedicating to the subject conspicuous energies. The subject (i.e. the veterinary action in urban areas) was denominated Veterinary Urban Hygiene (VUH). VUH has developed differently in the various countries, ranging from a maximum of activities (e.g. in Italy, in which the public veterinary services belong totally to the health administration, and perform all public veterinary responsibilities), to a minimum, in which few limited activities (generally some rabies control) are performed. This article gives an overview of zoonoses and the actions taken.

Mbiba, Beacon M **(1994). The cattle of Chitungwiza: conflicts on the rural-urban fringe. In: *ILEIA Newsletter vol. 10 no. 4* (December 1994) p. 22-23. Mexico City: DDF. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
urban livestock rural-urban linkages
animal production; home gardening; livestock farmers; rural development; urban environment; Zimbabwe

Expanding cities are engulfing farmland without providing alternative land for the displaced rural people, often peasants without land title. Herders continue to use the unbuilt spaces, the "city commons", but many residents do not appreciate the presence of cattle. Beacon Mbiba looks at this potentially conflictual situation in urban Zimbabwe. (ILEIA)

McCroskey, Robert A **(1999). Rabbit raising in cities. Urban Agriculture Notes http://www.cityfarmer.org/rabbits.html. 2 p.**
Supplier: City Farmer, Canada's Office of Urban Agriculture
urban livestock
rabbits; Nigeria; Cuba; Hungary

In reply to the question whether there are studies mentioning rabbit raising in urban areas, three examples on rabbit raising are provided, from Nigeria, Cuba and Hungary. (NB)

Meares Cohen, Alison **(1996). Can Mrs. O'Leary's cow come home? Heifer Project International, Chicago. 34 p.**
urban livestock
youth; environment; food security

This report concerns an effort in America's 'second city' to bring the benefits of small livestock production to city youth and women. The benefits found were: health, agricultural literacy, community cohesion, enhanced environment, income, and pleasure. (JS)

Meares Cohen, Alison **(1997). Cows in the city or urban agriculture. The Exchange no. 86 (Jan-March). 2 p. Heifer Project International, PO Box 808, Little Rock, Arkansas 72203, USA**
urban livestock
livestock keeping

Provides an overview of urban agriculture activities in the world with a focus on raising animals in cities. (WB)

Meares Cohen, Alison **(1999). Heifer Project International announces: urban animal agriculture initiatives in Chicago. Urban Agriculture Notes http://www.cityfarmer.org/animalag.html. 2 p. Heifer Project International, PO Box 808, Little Rock, Arkansas 72203, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture
urban livestock
United States

An introduction to the work of Heifer Project International (HPI) in urban livestock in Chicago. (NB)

Meares Cohen, Alison **(1999). People at the Centre of Urban livestock Projects. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 90-94. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
urban livestock community development
food security; environment; employment

Promoting urban agriculture is an important means ensuring sustainability of regional community food security and human settlements. Too often the focus is exclusively on technology and agricultural production methods. In its urban animal-agriculture initiative in Chicago, Heifer Project International promotes a method of participatory

development that enables low-income neighbourhood groups to reach beyond the goals of beautification and environmental improvement and become a vehicle for social and economic development in their communities. The elements of that model include the interdependence of the landscape and lifescape, full participation of intended beneficiaries, values-based planning, and “passing on the gift" When approached as a vehicle for community development, urban agriculture can bring multiple benefits: economic benefits, by providing opportunities to earn income; educational benefits, by teaching technical and job skills; environmental benefits, and, finally, empowerment. It is at the crossroads of these goals that urban agriculture projects can thrive and influence the character of human settlements. (Abstract adapted from original)

Muchaal P**. (2001) Zoonoses of Dairy Cattle, with reference to Africa. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment urban livestock

West Africa; zoonoses; dairy;

Zoonoses are infections naturally transmitted between vertebrate animals and humans,either directly, or indirectly through consumption of contaminated foods.Traditional zoonotic diseases for which effective control measures and cures are available in affluent countries, are still a cause of morbidity and mortality in humans and animals in developing countries. Increasing urbanization, the growth of livestock production in close proximity to humans, the rising rate of HIV, inadequate hygienic practices, and cultural customs and beliefs exacerbate the transmission, persistence and impact of zoonotic diseases in these regions. This article is a literature review focusing on West Africa.

Nauheimer, Holger **(et al.) (1995). Livestock production and human welfare: 8th International Conference of Institutions of Tropical Veterinary Medicine. In: Agriculture + Rural Development p. 1-4. 4 p. Deutsche Stiftung fuer Internationale Entwicklung (DSE)**

urban livestock

livestock keeping; periurban agriculture; public health; environmental aspects

One of the 5 workshop themes was on periurban livestock production and development. Recommendations were formulated on the inclusion of urban livestock production in overall agricultural policies and on examining the impact of periurban livestock production on the environment and public health. (WB)

Nunan, Fiona **(2000) Livestock and livelihoods in Hubli-Dharwad, India. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock rural-urban linkages

India; dairy; buffalo; policy

Small urban dairies and roaming pigs are a common sight in Hubli-Dharwad, India and make an important contribution to household livelihoods and urban food supplies. Policy measures, however, are threatening the legality of keeping livestock in urban areas and, therefore, livestock owners' livelihoods. This article gives more insight in this discussion.

Office for International Cooperation, Faculty of Veterinary Medicine **(1996). Urbanisation: veterinary public health consequences. In: Equator: newsletter on veterinary aspects of international development cooperation Vol. 8 no. 5 p. 1-6. Office for International Cooperation, Faculty of Veterinary Medicine, Utrecht, The Netherlands**

urban livestock health and environment

public health; health hazards

Reports on a symposium held at Utrecht, Netherlands, September 27, 1996. Issues addressed were: (1) veterinary public health; (2) production and consumption; (3) living in a healthy environment; and (4) animals as a source of diseases in human beings. (WB)

Orskov, B **(1994). Landless livestock keepers. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 24. Rowett Research Institute, Greenburn Road, Bucksburn, Aberdeen AB2 9SB, UK**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

urban livestock

animal production; land ownership; landless; livestock farmers; rural development; small-scale agriculture; Sri Lanka

What is a landless livestock keeper? Near cities there are industrial dairy or fattening units with next to no land but with high capital input and doubtful sustainability, as manure disposal creates problems. But here Bob Orskov writes about a much larger group: the landless poor who keep animals in cities or intensive cropping areas. (ILEIA)

Panigrahi, S **(1994). Parallels in dairy and poultry development strategies and issues relating to urbanisation in the Eastern India region. (Unpublished paper). Natural Resources Institute, Chatham Maritime, UK. 48 p.**

urban livestock

India; livestock; poultry; urbanisation; food security; gender; environment; marketing; research

This paper begins with the outlook that the high nutritional value, the range of secondary products, the relative ease of production and marketing, and the potential of reuse of urban waste make livestock of particular relevance for urban/periurban

agriculture in India. Research needs are identified as safe food, nutritive value of periurban feed resources, and environmental pollution. Women are seen as particularly important in urban livestock and poultry production. Specific cities and organizations are cited, some as best practice. (JS)

Pantuliano, Sara **(2000) The Beja urban economy –understanding and responding to an evolving reality. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock

Sudan; pastoralism; migration

The article briefly describes the migration of Beja pastoralist labour to Port Sudan from Halaib Province (NE Sudan). It reviews the different livestock holdings that the Beja have once in town and shows that, although most urban-based pastoralists live in great poverty, some manage to successfully exploit urban opportunities whilst continuing to engage in rural-based livelihood strategies. The article also analyses the failure of development agencies working in the region to tailor their programmes to the situation of urban pastoralists and concludes by offering some initial reflections for development planners and policy makers on opportunities for harnessing rural-urban linkages.

Peters D., Thi Tinh N., (NIAH), Than Thuy T**.(2000) Improved Feed for Pig raising in Vietnam. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock R&D methodology

Vietnam

Sweetpotato vines are an important feed stuff in sweetpotato-based pig feed systems. Two constraints to using vines as a feed source are the heavy labor requirements for preparation and difficulties with storage. Vietnamese farmers, mostly women, spend an average of one to two hours each day preparing sweetpotato vines to feed to one or two pigs. As the number of pigs increases, even more time is spent on chopping vines. Moreover, after sweetptotato roots are harvested, a large amount of vines need to be processed in order to be stored as feed for later when vines are no longer available in the field. In the Red River Delta area close to the capital city of Hanoi, farmers cultivate sweetpotato, inter-cropped with corn, exclusively for vine production as pig feed. The pigs are grown mainly for urban meat consumption in Hanoi. The article informs us about two sequential on-farm trials, which were carried out to reduce demand for women's labor and improve pig growth efficiency using fermented sweetpotato vines.

Poynter G. and Fielding, D **(2000) Urban livestock in Kumasi, Ghana, Survey findings. In: *Urban Agriculture Magazine, no 2*, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock
Ghana; food production; chickens

Income generation and household food production were the main reasons given for livestock keeping in urban Kumasi, Ghana, as determined by a survey carried out there in 1999 by the authors. The survey was undertaken to identify: There has been much qualitative discussion of urban livestock keeping in recent years but little quantification. This survey was a contribution towards correcting this situation.

Prudencio Boehrt, Julio **(ed.) (1997). Agricultura urbana en americana latina: memoria. 252 p. Agricultura Urbana Investigaciones Latino Americana (AGUILA), c/o ETC Andes, La Paz, Bolivia. Casilla 9355, La Paz, Bolivia**
hydroponics wastewater reuse urban livestock
Latin America; workshops

The outcome of a seminar on urban agriculture, held in La Paz in 1995, these proceedings are subdivided in a number of themes for which the situation in Latin America is analysed: (1) hydroponics; (2) waste recycling; (3) homegardens and communal gardens; (4) small livestock rearing. (WB)

Salih, Mohamed; Mohamed, A **(1985). Pastoralists in town: some recent trends in pastoralism in the north west of Omdurman district. Pastoral development network paper no. 920b (August 1985). 21 p. Overseas Development Institute, Agricultural Administration Unit**
urban livestock
Khartoum; Sudan; pastoralism; animal husbandry; commercial livestock keeping

Using the results of a survey this paper examines the place pastoralists occupy within the modern Sudanese economy. It questions the vision in which ecology is considered as the most important determining factor in the production and rather adopts the view, in spite of the effects of desertification, that political and economic aspects are of primal importance in shaping the future of pastoralism. Sedentary pastoralists in Khartoum have become more dependent on purchased fodder and water and this has led to the commercialisation of pastoral production. (WB)

Santandreu, A.., Castro G. and Ronca, F. **(2000) Urban Pig Farming in Irregular Settlements in Uruguay. In: *Urban Agriculture Magazine, no 2*, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock waste management
Uruguay; waste; poverty;

One of the survival strategies developed by the residents of urban settlements in Montevideo, Uruguay, is the collection and sorting of household solid waste (organic and inorganic), which constitutes one of the most widespread activities. While inorganic waste is sorted and sold to the local recycling industry, in most cases

organic waste is used as animal feed, mostly for pigs.

Pig farming is a widespread practice in the Department of Montevideo, both in rural and in urban areas. Among urban solid waste sorters, pig breeders constitute a distinct group. This explains the high incidence of health (transmission of diseases from animals to people) and environmental impacts (people living next to pigsties, inadequate final disposal of waste, food preparing systems) that are worsened in the case of pig farming in urban and periurban areas.

The Municipality of Montevideo has developed several strategies aimed at regularizing the status of waste sorters – pig breeders and improving the conditions in which the collection and sorting of food is carried out.

Sanyal, Biswapriya **(1986). Urban cultivation in East Africa. UNU Paris, 75 p.**

horticulture urban livestock city ecology

home gardening; surveys; urban livestock; urban forestry; urban management; geography

This is a groundbreaking report, predecessor to a doctoral dissertation defining the role of agriculture in East African cities, focus on Lusaka. It has an economic slant with excellent micro-geography. (JS)

Scott, James; Okali, Christine **(1993). Livestock production in periurban urban and densely settled rural areas in sub-Saharan africa: a bibliography. Natural Resources Institute (NRI), Central Avenue, Chatham Maritime, Kent ME4 4TB, UK**

urban livestock

urban livestock; livestock production; bibliographies; sub-Saharan Africa; periurban agriculture

Contains 45 annotated references ranging from studies of particular livestock enterprises and comparative studies of the involvement of different pastoral groups in markets to historical and systems studies of urban centres and their hinterlands. Aim was to identify research needs of particular types of livestock systems. (WB)

Seré, Carlos; Neidhardt, Rainer **(1994). Stadt-Land-Integration im Rahmen periurbaner Tierproduktion. In: Entwicklung + Ländlicher Raum vol. 28 no. 2 p. 10-14**

rural-urban linkages urban livestock services

periurban livestock production; food processing; marketing

Addresses rural-urban linkages as a result of periurban animal husbandry. Contrarily to animal production in developed countries, animal husbandry near cities is very dependent on city waste as a source of animal feed. The nearness of the city allows for a low level of processing of the produce (packaging, quality control, transport, distribution) keeping sales prices low. This paper highlights the close links that exist

between the city and its rural hinterland. A number of interesting case studies are presented from West Africa; Lahore, Pakistan; Montevideo, Uruguay; and Lima, Peru. (WB)

Smit, Jac **(1992). Profit from raising rabbits in the city. Developing Countries Farm Radio Network package no. 26, script 2. 5 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada M5G 2C2**

urban livestock economic impact

rabbits

A radio script for dissemination in a large number of developing countries, explaining how to raise rabbits in the city. Contains practical information about uses, housing, feeding and breeding. (WB)

Spiaggi, E.P.; Biasatti, N.R.; Marc ,L.B. **(2000) Minilivestock in cities: vermiculture as biotechnology for organic waste processing and its transformation into fertilisers for its use in UA. In: *Urban Agriculture Magazine, no 2*, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock wastewater reuse

Argentina; vermiculture; compost

The issue on the treatment and final disposition of garbage constitutes a challenge to be faced during the next decades in which an answer to the expectations on minimising the environmental impact of human activities will have to be given. The organic separation of garbage at present seems to be the most accessible in the application of compatible practices with environmental criteria on re-utilisation, in different ways. Vermiculture is an answer, because of its high organic waste degradation capacity, while at the same time providing by-products of immediate use and commercialisation. An experience of organic waste re-cycling for red-earthworm production (Eisenia foetida) and vermicompost used as fertiliser in family and community farms in Rosario, Argentina is presented.

Sumberg, James **(1996). Livestock production in periurban areas of Africa: an analysis of Dar es Salaam, Mwanza and Shinyanga, Tanzania. 79 p. Overseas Development Group, School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK**

urban livestock R&D methodology rural-urban linkages

animal husbandry; periurban livestock production; political aspects; food security

Describes and characterises livestock production in and around urban areas in Tanzania, focusing specifically on dairy, broiler and egg production. Contains a bibliography with nearly 450 references. The enclosed paper critically examines the large number of publications extolling virtues of urban agriculture for urban food security and poverty reduction. The authors stress the importance of rural-urban

linkages in resource and output markets. At the same time, they issue a warning against attaching an exaggerated weight to the contribution of urban farming to food security of the majority of urban dwellers. Very detailed, very sound and very complete. (WB)

Tegegne A., Tadesse, M., Mekasha, Y. and Yami, A. **(2000) Market-oriented Urban and Periurban Dairy Production Systems in Ethiopia. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock rural-urban linkages R&D methodology
Ethiopia; farming systems; dairy; markets

The case study was designed to characterise the market-oriented urban and periurban dairy production systems in the Addis Ababa milk shed in Ethiopia. Seven sub-systems identified include traditional crop/livestock farms in rural areas, intensified dairy/crop livestock farms in rural areas, crop/livestock farms with intensive cropping in the Addis Ababa milk shed, specialized dairy farms, periurban producers in secondary towns, intra-urban dairy farms in Addis Ababa and urban dairy producers in secondary towns. It appears that cash income from sales of milk and milk products and/or young stock and breeding animals and utilisation of available resources such as capital, land, labor, etc are the most important reasons for keeping dairy animals. However, as the level of intensification increases, factors such as management skills, labour force, feeding resources and systems, genetic improvement, control of diseases and parasites, udder health and mastitis, calf mortality, reproductive problems, waste management, quality control, processing and marketing and other socio-economic considerations are becoming important in influencing these urban and periurban dairy production systems.

Thys, E., D. Berkvens, A. Mfoukou-Ntsakala, N. Speybroeck **(2001), The Use of Classification and Regression Trees in the Analysis of Socio-Environmental Issues in an Urban Livestock System. Prince Leopold Institute of Tropical Medicine, Department of Tropical Animal Health, Antwerp / Unite de Recherche ssur les Systemes de Production Agricole (URSPA), Brazzaville. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**

urban livestock R&D methodology
Congo; management; farming systems; manures; urban areas; livestock, Africa (Central)

The classification and regression tree (CART) is a non-parametric approach to classifying statistical data that can select those variables and their interactions that are most important in determining an outcome or dependent variable. If an outcome is continuous, CART produces regression trees; if the variable is categorical, CART produces classification trees.

This methodology is illustrated with data from a single-visit multiple-object survey, implemented in the 7 urban districts of Brazzaville. Classification trees were built for

2 categorical variables, namely "management system" and "marketing location". Furthermore, regression trees were constructed for the density of small ruminants, a continuous target variable.

The results indicate that the following variables were important in being linked to the management system: most owners with less than 5 small ruminants allow their animals to roam, except if they are traders, whereas owners with more than 5 animals face problems with their neighbourhood when they keep their animals outside and are in need of workforce. Whether the owner is living at the fringes or in the central districts of the town, this has no influence on the management system. The marketing location could not be related to any relevant variable. Finally, the regression tree constructed for the density of small ruminants, shows that this variable is related to manure management: the higher the density, the more the owners are concerned with selling the manure of their animals.

Touré Fall S., Salam Fall, A., Cisse, Ibrahima **(2000) Urban livestock systems in the Niayes zones in Senegal . In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock rural-urban linkages
urban livestock; production systems; Niayes, Senegal

In association with horticulture, livestock is one of the major activities well implemented in the urban agriculture system of the Niayes zone in Senegal. The area involves the main agricultural cities which generate more than two third of vegetable and fruit productions in Senegal. A low number of different species of domesticated animals live in the Niayes zone. A great diversity is observed in speculations but also huge potentialities that can be exploited in the Niayes. In association with livestock, urban agriculture is well implemented in towns even if multiple constraints make its sustainability questionable.Different types of waste recycling through animal feeding systems and, in feedback, organic matter utilization for improvement of soil status and animal traction are main ways of Livestock and horticulture integration in the system. Institutional constraints are observed that call for actions to improve economical environment.

Tremante L. P.**(2000) Livestock in Nineteenth Century New York City. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock economic impact
United States

Commercial agriculture existed in two forms in nineteenth century New York City: livestock husbandry and horticultural productions. Both are similar in that they emerged as viable forms of production soon after the year 1800. Both also depended for their existence on location, the availability of low-cost immigrant labor and urban waste products. Yet by the end of the century, urban livestock production had slipped into decline while urban horticulture continued to thrive. The article discusses the question: "why did commercial livestock production live such a short

life in New York City?".

Waters-Bayer, Ann **(2000) Learning to Live with Livestock in Town. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**
urban livestock
livestock

Government services concerned with livestock production for urban populations have given most attention to large-scale livestock rearing in the urban periphery. Small-scale rearing of animals by families living inside the cities is usually ignored and often forbidden. However, such urban livestock keeping is much more widespread than most city authorities would care to admit. In this article (which is an updated version of an article published in 1995) he author discusses the growth in urban livestock keeping in recent years, classifies various types of urban livestock systems, outlines functions of livestock, and indicates some of the problems caused by these systems.

Waters-Bayer, Ann **(1995). Living with livestock in town: urban animal husbandry and human welfare. 9 p. ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**
urban livestock
animal husbandry; livestock; small-scale agriculture; social welfare

Small-scale raising of animals by families inside cities is often ignored or even forbidden. However, urban livestock keeping is more widespread than most city authorities would like to admit. It consists mainly of low-input production of poultry, small ruminants, pigs, rabbits, guinea pigs or milk buffalo or cattle, usually indigenous breeds. With deteriorating economic conditions and rapid urbanisation, small-scale urban farming, including animal husbandry, is being practised by a growing number of families in all income groups in the tropics. An indication of growth trends, a classification of the various types of livestock systems and an outline of the functions of livestock for urban dwellers and for cities as a whole are presented as well as problems associated with urban livestock. Lastly, suggestions for action to improve animal husbandry and human welfare in cities to be taken by government and development agencies are provided. (NB - abstract adapted from original)

Whitfield, Lin**. City farms: livestock in urban communities. In: Community Development Journal (volume unknown)**
urban livestock community development
animal husbandry; allotment gardens; community initiatives; United Kingdom

Describes the role of City Farms, community projects centred around farm animals and gardening, situated on areas of derelict land in the centre and on the edges of

towns and cities in the UK. Many different groups of people benefiting from these farms, these farms fulfil an important social role. Many educational activities are organised around these farms. Often, the City Farms offer facilities for allotment gardening with a communal land management approach. Challenge in the organisation of the City farms is to become as self-financing as possible, by employing volunteers and receiving donations. (WB)

2.2 Urban Horticulture

Urban horticulture in greenhouses.

(Picture: Henk de Zeeuw)

Urban and periurban horticulture in Africa and Asia: characterisation of the systems and issues of sustainability

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Definitions

Urban and periurban horticulture (UPH) refers to: (i) the production of a range of vegetables, aromatic plants, medicinal plants, flowers, ornamental plants, fruit trees and mushrooms, (ii) grown mainly in intensive production systems with high levels of inputs, (iii) located in the city or at its close periphery where there is competition for access to land between agricultural and other human activities (Moustier, 1999), (iv) the products of which are consumed in the city. This paper will study two aspects of the horticultural sector: marketing and production, essentially of vegetables, based on data from Africa and South-East Asia.

Marketing of urban and periurban horticultural products

Main supply system to the cities

The horticultural urban market is supplied by products from different areas: rural, periurban and urban, which can be located within the national territory or in foreign countries. There is a complementarity between the various origins, which may change over time. The periurban and urban productions account for a very large part of the supply of vegetable urban market, e.g. in the capital city of Hanoi (2.7 millions inhabitants). In this city, 80% of the vegetables are from the Province of Hanoi from a production area covering 7,095 ha, i.e. 118,628 tons (Mai Thi Phuong Anh, 2000). In Brazzaville, 65% of the marketed vegetables come from the urban gardens (Moustier, 1999).

The distribution between the different production areas fluctuates with the vegetable species. Soils, access to water, development of insects and diseases, climatic conditions, yields, costs of production, and most importantly the shelf life of the vegetables influence the location of vegetable production. The latter condition explains why, in most of the urban markets, leafy vegetables are from urban and periurban areas. In Brazzaville, the urban gardens supply 80% of the urban market; in Bangui, 100% ; in Bissau and Antananarivo, 90% (Moustier & David, 1997); in Dar-es-Salaam, 90% (Sabel-Koschella, 1998). Some leafy vegetables are well adapted to a hot and wet season. The very short shelf life of cut flowers such as roses and chrysanthemums also explains the development of this horticultural crop around Hanoi where they are grown in an area of 1,000 ha.

The season also influences the distribution of the supply of the urban market between rural and urban areas. In Bangui, the share of tomatoes from rural areas increases from 40% to 50% in the wet season. In Bissau, the share of tomatoes from urban areas increases from 10% to 20% in the wet season (David, 1992). Urban horticultural areas may also supply the urban market more regularly than rural areas. In Nouakchott, UPH supplies the urban market for nine months each year whereas the rural areas provide vegetables to the city for three months (Margiotta, 1997). Around Hanoi, choysum and leafy mustard are grown all year

round. In Dar-es-Salaam, amaranth is also grown throughout the year. This tendency is increased by the urban and periurban farmers' need to derive a year-round income from various high-value crops. This bias towards UPH may be due to production constraints and access to transportation infrastructure during the rainy seasons or to socio-economic causes. In some countries where flooding areas expand every year, however, it is easier to find available areas to grow vegetable in rural areas (Phnom Penh, Dacca).

Consumer demand

Even where consumption is low, consumer demand is the driving force behind urban and periurban production. In developing countries, consumption of vegetables is generally lower than the FAO recommendation of 75 kg/year/inhabitant (205 g/day/capita). The importance attached to vegetable consumption depends on the population group. Over the period 1994-1998, consumption in Vietnam was higher in urban areas (182 g/capita/day) than in rural areas (122 g/capita/day), but lower than in mountainous areas (196 g/capita/day) (Nguyen Thi Lam, Ha Huy Khoi, 1999). In Bangladesh, the consumption of vegetable was higher in urban areas than in rural areas (Ali, 2000).

Table 1: Monthly per capita consumption of vegetables (kg) in Bangladesh (From Ali, M. (ed.) 2000)

Household	Total vegetables	Leafy vegetables	Potato	Banana, papaya & eggplant	All others vegetable
Urban	6.20	1.42	1.67	0.82	2.29
Rural	5.13	1.08	1.13	0.80	2.12

Urban consumption is related to size of households, incomes and socio-cultural characteristics (Bricas, 1998). In Africa, most frequently consumed vegetables are tomato, onion and leafy vegetables. On the other hand, in Brazzaville for instance, the importance of vegetables varies from one socio-economic group to another.

Table 2: Most frequently consumed vegetables per socio-economic group in Brazzaville (Congo), ranked by importance (From Moustier, P. (Ed.) 1999)

Socio-economics groups	
Congolese households	Cassava leaves, cherry tomato, pakchoy, roselle, gnetum, dry kidney bean
Non-Congolese African households	Potato, cassava leaves, cherry tomato, dry kidney bean, amaranth, lettuce
Expatriates	Potato, "European-type" vegetables

In Cagayan de Oro, most frequently consumed vegetables are: tomato, eggplant, sweet pepper, common cabbage, papaya and cauliflower (Schnitzler et al., 1999).

Consumers' decisions are based on price, availability of the product on the market, and on the qualitative characteristics of the products. Fluctuating vegetable prices are a recognised characteristic of vegetable markets all over the world.

Traditional habits also have a very strong influence on consumer demand for specific products. In many countries, the main demand for flowers occurs around Mother's Day, Valentine's Day, and the Christmas period. In Vietnam, the Tet celebration is the opportunity to offer two ornamental trees: kumquats bearing mature orange fruits and peach trees in blossom. In urban and periurban areas in Hanoi, specific ornamental fruit-tree specialists have set up this type of production, which takes one year of preparation from buying a young tree.

Organisation in the commodity chain

Farmers have two main options for marketing:

- Direct marketing to consumers: by a family member, in retail markets, or at farm gate
- Marketing to intermediate marketing bodies: wholesalers, assemblers, cooperatives or producers' associations, at the farm gate or in markets. These intermediaries may sell directly to retailers such as supermarkets or to other wholesalers.

Farmers' organisations are often described as an efficient system for producers to obtain favourable prices and income security. Yet there are a number of obstacles to collective marketing, including the risky nature of horticultural production and marketing, the scattered location of plots, and the lack of farmers' information on consumer demand and supply sources.

Information systems

Information at farmer level means access to data on prices on the wholesale and retail markets, on production techniques, new outlets, and favourable periods of time for marketing. Access to information about retail prices is one of the main problems for the urban or periurban farmer. The problem may be less important for urban farmers than for the rural farmer because the distances from the farm to the wholesale or the retail markets are shorter. Moreover, in many cases, such as in Hanoi, a family member goes to the wholesale market everyday, so farmers have access to price trends. The proximity of the city allows farmers to gain better insight into consumer demand, to be receptive to new production options, to compare their performance with farmers located in other areas, and to have access to improved technologies.

On the marketing side, information concerns quantity and quality of the vegetables and final retail price. With regard to urban and periurban commodity chains, it can be said that if the product quantity still seems a large problem due, in most cases, to the lack of farmers' organisations, reactivity to new outlets and to retail prices has great advantages. The trader is a key player in the development of innovations mainly through the confident interrelations that he can establish with the end-consumer and with his suppliers.

Production of urban and periurban horticultural crops

Farming systems and environment

Most of the farming systems in the big cities of developing countries do not require much starting capital. Use of labour, however, is far higher than in cereal crop production. In northern Vietnam, for instance, AVRDC has shown that vegetables require twice as much labour per unit of land (456 days/ha) as rice (223 days/ha). The classification of agricultural

production systems proposed by Moustier is well suited to horticultural systems (Moustier, 2000): (i) subsistence home production, (ii) farm-type commercial production systems, (iii) entrepreneurial production systems, (iv) multicropped 'rurban' production systems. Within each group, different kinds of technical systems are used: roof production, open space in the city, hydroponics, organoponics, high-level input production systems, protected cultivation, standard cultivation. Most of the time, horticultural farming is a full-time job. In some locations, however, it becomes a part-time activity for employees, workers, shopkeepers, craftsman, etc. In Dakar, for instance, such persons are called Sunday farmers. They are urban civil servants or employees of private companies who buy land for producing fruit trees and vegetables. Traditional farmers consider that these newcomers are robbing them of their lands and market opportunities.

Land is one of the main constraints in the horticultural system. The average garden surface area for vegetable farmers is rather low: 700m² in Brazzaville, 1,500 m² in Bangui, 760 to 900 m² in Bissau, 700 m² in Antananarivo, 6,750 m² in periurban areas and 500 m² in intra-urban areas in Dar-es-Salaam, 1,490 m² in Hanoi. The harvest is either used for auto-consumption (mainly in the case of intra-urban subsistence-oriented home gardening) and/or for sale. There are two groups of horticultural farmers: (i) farmers who deal only with horticultural products (medicinal plants, ornamental plants, flowers, vegetables, and fruit trees), and (ii) those who also produce cereals or breed animals. In Hanoi province, for instance, 78% of the cultivated area is covered with rice and maize: most of the horticultural farmers also produce food crops and some animals. Whatever the level of specialisation, horticultural activity faces similar urban conditions: (i) problems of quality of natural resources (water, air, soil, light) and inputs (water, fertilizers) needed for production, (ii) high population density that may limit the use of inputs and the management of horticultural waste products.

Industrial activities, wastewater and vehicle traffic increase the levels of heavy metals in the air (lead from the vehicle), in the soil and in the water (cadmium, zinc from chemical and industrial activities). The presence of heavy metals in the environment reaches the plants through the air (roadside dust on the leaves), the underground and surface water, and the soil (deposit of dust and supply by organic and inorganic chemicals). The consequence is an increase of heavy metal content in vegetables for human consumption. In Bangkok, the presence of a permanent fog decreases the light intensity, reducing the photosynthesis activity of the plant. The presence of air pollutants such as sulphur dioxide and fluoride may reduce growth and yield through a reduction in chlorophyll content, and, hence, the inhibition of photosynthesis (Midmore, 1998).

Cropping systems and crop management

The crops

Vegetables usually include between 60 to 100 species. The range of the ornamental crops is larger. Classification may be based on length of cycle, inputs requirements, and risks related to climate and pests. In Central Africa, vegetables are divided into four groups:

- Short-cycle indigenous leafy vegetables (less than one month): amaranth, petsay, local sorrel, etc. that grow with very few disease problems. They are used very commonly, but generated incomes are low due to low prices.
- "Long-cycle" indigenous leafy vegetables (one – two months) with few risks for production and marketing: glossy nightshade, cabbage, chives, Malabar spinach, which provide higher revenues.

- Short-cycle (less than two months) “temperate origin” vegetables, e.g. lettuce and parsley, with risks at production and marketing levels situated between those of leafy vegetables and long-cycle temperate vegetables.
- Long cycle temperate vegetables (more than two months) such as tomato, carrot, purple eggplant, and cucumber that present some risk in production and marketing. They provide the highest revenues, but also present the highest risks.

Another classification is based on internal characteristics including taste, shape, size, colour, origin and shelf life. Vegetables can be ranked in five groups according to their shelf lives:

- very short (1-2 days): day lily and leafy vegetables, leafy mustard, lettuce, amaranth, choysum, jute, spinach, Malabar spinach, pumpkin leaves, sweet potato leaves, cassava leaves, Ethiopian kale, chinese kale
- short (3-7 days): pakchoi, okra, radish, green pea, asparagus
- medium (1-2 weeks): mushroom, sweet pepper, tomato, watermelon, musk melon, cucumber, yard long bean, squash, broccoli
- medium-long (3-4 weeks): common cabbage, cauliflower, eggplant, Chinese cabbage, chilli pepper
- long (more than 4 weeks): onion, garlic, pumpkin, shallot

Year-round vegetable production system or seasonality

The objective of periurban farmers is to produce horticultural products for as long as possible during the year in order to obtain a regular income. They face a number of constraints, though: (i) adverse climatic conditions such as excess of water, lack of water, high temperature; (ii) lack of technical know-how; (iii) lack of on-farm and public infrastructures; (iv) competition between suppliers. Seasonality in supply of vegetables is observed in all vegetable markets in the world. The development of urban and periurban horticulture may decrease the variation of the markets' supply during the year, because of easier access to new off-season technologies.

For year-round production, crops may be cultivated on the same fields or on different fields throughout the year. If horticultural crops are grown continually on the same fields, the length of the period between crops has to be very short. This favours the permanent presence of pests in the soils and the decrease of soil fertility. One solution is hydroponics, to be described in chapter two of this publication.

Production during hot and wet season

Some vegetable species do not adapt to high temperatures and a rainy season. Lettuce yields are still rather low during this season from June to October in the northern inter-tropical and tropical zone. Many breeding programmes have been conducted since 1950 in tropical areas of Japan, the United States, Europe, and Taiwan. Many new varieties have been successfully obtained for resistance to disease (tomato, eggplant, cucumber, melon, sweet pepper, cabbage, etc.) or for better adaptation to high temperatures (tomato, common cabbage). Still, climatic variables (heat, low irradiance) limit the development of the plant. Tomato yield during the hot and rainy season, for instance, is half of the cool season yield. There are still a number of limits to production in the hot and rainy season, especially in the intensive urban and periurban systems.

To avoid the direct physical damaging effects of the rain, it is recommended that vegetables be grown under plastic shelter houses with good static ventilation to avoid the negative effect of temperature increase due to the plastic cover. Growing tomato, cucumber, and lettuce under shelter protects the plants from heavy rains. In the hot and wet season, high temperature and high humidity are factors favouring the development of plant pathogens such as fungi (anthracnose due to *Collectotrichum spp*., fruit rots, downy mildew, Southern blight due to *Sclerotium rolfsii*) and bacteria (bacterial wilt due to *Ralstonia solanacearum*, soft rot caused by *Erwinia spp.*). For solanaceous crops (tomato, pepper, eggplant), frequent cropping also leads to the development of bacterial wilt. Three solutions may limit the damaging effect of this disease: long-term rotations with crops that are not sensitive to the bacteria; growing resistant varieties; growing tomato –the most sensitive plant to this disease- grafted on bacterial wilt resistant solanaceous crops.

On the other hand, periurban production may have to face the problem of lack of water in particular conditions, for instance in Accra. There, the main production occurs during the rainy season and at the beginning of the dry season with the associated risk of disease development.

The development of permanent vegetable crops on a restricted location increases the risk of insect pest development. The absence of adequate rotations leads to problems in controlling pest development. This is one of the causes of the excessive use of pesticides.

Use of pesticides

Chemical pesticides have played an important role in yield increases for more than fifty years. Periurban horticulture has increased this phenomenon due to easy access to the products (via national and international companies, retailers, and wholesalers), technical information, high value of the crops, and the effectiveness of the chemicals. There are three major risks, however: (i) the health risk for consumer, (ii) the risk of polluting the environment (mainly water sources), and (iii) the user risk. Surveys have been conducted regularly on the use of chemicals, their rate of application and the period between the last application and the harvest for marketing.

In Hanoi, low-cost pesticides (organophosphates, pyrethroids, carbamates) with high toxicity (classes I and II) are very commonly used, with little information provided about how to use them. Application rates are much higher than the recommended rates (table 3) for most of the insecticides used. This and the high spraying frequency are the causes of high pesticide residues in the marketed vegetables.

Table 3. Pesticide application rates on Cruciferae (kg a.i./ha/time) in Thanh Tri and Tu Liem districts (1995) *(From, Tran Khac Thi 1999)*

Pesticides	Tu Liem	Thanh Tri	Recommended rate
Wofatox 50 EC (methyl parathion)	1.25	1.50	0.50
Monitor 70 SC (methamidophos)	1.05	1.80	0.70
Dipterex 90 WP (trichlorfon)	1.50	0.50	0.90
Sherpa 25 EC (cypermethrin)	0.20	0.20	0.12

Sumicidin 20 EC (fenvalerate)	0.20	0.20	0.12

Pesticide presence in the city's surface water and wastewater for crop irrigation constitutes a high risk for urban and periurban horticulture, even though this presence is not due solely to urban and periurban horticulture. In Bangkok, a survey has shown residues of organochlorine and organophosphate in the irrigating water (Eiumnoh.& Parkpian, 1998).

Fertilizer management

Two main groups are distinguished: organic fertilizers and chemical (or inorganic) fertilizers. Intensive production of vegetables and ornamental flowers has always made heavy use of organic fertilizers. The quantity used varies from a few tons/ha to fifty or even a hundred tons per year. The organic fertilizers provide most of the micronutrients and improve the structure of the soil. Organic fertilizers have various origins: manure from livestock or poultry; compost from vegetable waste; waste from urban activities: sewage sludge, night soil, household waste, etc. For many centuries, periurban and urban agriculture have managed and recycled the urban waste products (Fleury & Moustier, 1999). These practices cause some risks to the environment: pollution of soils with heavy metals from sewage sludge, pollution of water with nitrates due to huge quantities of organic manure; but also to the health of the consumer (see below). In South-east Asia, use of fresh night soil is a common practice even though it disseminates human pathogens.

The disadvantage of these solid organic sources for vegetable production is that they release nutrients (especially nitrogen) slowly. Liquid fertilizers act faster. This is why these liquid organic fertilizers are often used on the short-cycle leafy vegetables such as amaranth, choysum, and mustard. Often, research has been on combining organic fertilizers and inorganic ones to enhance their efficacy (AVRDC, 2000). In Hanoi, liquid organic fertilizer, such as pig urine, is used to supply nitrogen during crop growth. AVRDC is working on producing an organic liquid fertilizer that does not endanger consumer health.

Inorganic fertilizers are easier to use, especially as regards providing the right dose in relation to plant uptake. The risks concern application and contamination of soils and water by nitrates and phosphates. Also, they might be the source of heavy metals. In Thailand, it has been shown that ammonium phosphate can bring cadmium, zinc, chrome into the environment in excessive quantity[14].

Irrigation

Water is essential to the growth of the plants. Water requirements are related to climatic conditions and the plant species. In most of the capital cities of developing countries, located in tropical and subtropical areas, quantities required vary from 0.1 to 1 l / m²/day in very dry and hot areas. For a crop of 30 days, the quantity of water needed by a leafy vegetable during the dry season will be around 15 l/m².

Different techniques are used for irrigation. Water is supplied through overhead irrigation by tanks, sprinklers or perforated pipes from wells, ponds, or the sewer. Drip or trickle irrigation has been promoted for twenty years now. This technique saves water by 10 to 20% compared with overhead irrigation, but requires clean water in order to avoid blocking the emitters. The full-fledged system includes filters, pumps and a pressure regulator that low

income vegetable growers cannot afford. The advantage of this technique is that water is not in contact with fruits and leaves. It will not, however, avoid contamination of soil and roots of vegetables with biological pathogens. Underground irrigation provides water to the plant by capillarity. Such an underground system can limit the transmission of pathogens to the vegetables thanks to the filtrating effect of the soil. But installation (flat soil) and operation (control of the flows to the plants) are rather difficult and tend to be inaccurate.

Quality of the production

Studies have shown that production in urban and periurban areas does not produce lower quality vegetables than in rural areas[13]. In the context of increasing consumer awareness, it is worthwhile, all the same, paying attention to major elements of the quality of the vegetables: nitrates, biological pathogens, heavy metals and pesticide residues.

Nitrates

Nitrates can cause health problems to very young babies and pregnant women. They are also an indicator of good or bad agricultural practices. Nitrates also cause eutrophication of water in combination with phosphorus. In Europe, there is standard for lettuce (see table 4). FAO and a Russian recommendation also provide extensive standards. In urban and periurban systems, nitrates stem from fertilizers and from irrigation water. Some quick tests, such as Nitracheck®, appear to help farmers in nitrogen management. In Germany, the “KNS system” based on Nmin measurement is commonly used in field vegetable production. Still, these methods need to be validated for the specific urban and periurban leafy vegetables. Moreover, with the objective of developing the use of organic matter obtained from urban waste products in mind, it appears that specific tools must be developed that take into account the problem of the irregular and slow release of nitrogen.

Table 4. Standards for nitrates in lettuce (CE 194/97)

Lettuce type	Nitrates content limit (mg/kg)
Greenhouse lettuce October – March	4,500 ppm
Greenhouse lettuce April – September	3,500 ppm
Open field lettuce	2,500 ppm

Biological contaminants

Biological contaminants are introduced through organic fertilizers, irrigation water and handling and storing of products. Tap water and wastewater are used for irrigating crops and for cleaning vegetables. In Accra, the common micro-organisms isolated form vegetable samples include *Escherichia coli*, *Pseudomonas spp., Salmonella arizonae* on white radish, green pepper, lettuce, and carrot. Helminths and protozoans have also been identified on vegetables collected on fields and markets (Sonou, 2001). In a recent study in Vietnam, 39 samples of choysum (*Brassica campestris spp. parachinensis*) from fields have not shown any presence of Salmonella, E. coli and Shigella, but have revealed the presence of some Ascaris eggs in four cases (10%). These Ascaris eggs probably originate from top dressing applications of liquid organic fertilizer (pig urine). Similar results have been obtained in various studies in Dakar (Ndeye Fatou Diop Gueye & Mouss Sy, 2001).

Regulations exist at production level on the quality of the water and organic fertilizers used. Also, there are standards for the quality of vegetables. According to FAO, water for irrigating vegetables should contain less than 1 egg per litre for intestinal nematodes and less than 1,000 / 100ml of coliform bacteria. For flowers and ornamental crops, less strict regulations have to be set up. In Vietnam, the maximum levels in fresh vegetables are: coliforms 10/1g and Salmonella 0/1g, but for *E. coli, Staphylococcus aureus* and *Clostridium perfringens*, control is done according to a guide of Good Agricultural Practices.

The main problem will be the implementation of the regulations. Numerous projects have been set up, implemented and completed with some success about composting organic matter, deep wells, waste stabilisation ponds and treatment batches. The adoption of safer technologies will have to include mechanisms for certification and the creation of small and medium enterprises specialised in these activities.

Heavy metals residues

In Hanoi, sampling at 25 locations near industrial factories (battery factory, chemical industry), revealed an excess of lead and cadmium on choysum, lettuce, kangkong at two locations (Tran Khac Thi, 1999). In other capital cities of developing countries such as Dar-es-Salaam, it appears, however, that the negative impact due to the urban polluting environment is not as important given the lack of industrial activities (Giza Muster, 1997). Table 5 gives the maximum level for a number of heavy metals. The rate of absorption of heavy metals by vegetables seems linked to the levels present in the soil. Lead is taken up by the plant roots and is then transported to the leaves. Lead from traffic fumes in the air settles on the leaves. It can be washed away by watering the leaves, especially when the leaf surface is waxy (cruciferous plants, Alliums). Cadmium can be taken up by plants through roots and leaves. For these two very poisonous heavy metals with no biological functions, controlling their presence in plants must be done by respecting the soil standards. The locaation of vegetable production with regard to roads and polluting industry, should be looked at carefully. Bio-remediation of the soil by plants, and installation of mycorrhizae that limit heavy metal uptake are long-term projects that might help solving the management of heavy metals in the future.

Table 5. Maximum levels of heavy-metal content in vegetables (from FAO/WHO 1993)

Element	Arsenic	Lead	Mercury	Copper	Cadmium	Zinc	Boron	Antimony
Content mg/kg	0.2	0.5-1.0	0.005	5.0	0.02	10.0	1.8	200

Pesticide residues

Pesticide residues above the maximum residue limit, have been observed several times in markets[12, 13, 18]. In Hanoia survey in 1998 of common cabbages collected on the retail market showed high residues of methamidophos on cabbage, 2 out of 20 samples exceeding the maximum residue limit[17]. More recently, 1 out of 8 samples taken on choysum at harvesting time showed excessive residues of cypermethrin. This in spite of the fact that regulations were already in place for the use of pesticides and in spite of existing recommendations for health safety. The application of pesticides to crops also endangers workers if protective measures are not taken. This is mainly the case for low-income farmers who cannot afford to buy proper clothing and equipment or are not aware of the importance of doing so.

Awareness of risks due to excessive use of chemical pesticides exists at all levels, ranging from farmers, consumers, and public authorities to agro-chemical companies. The urban and periurban horticulture sector is more sensitive to this problem due to the proximity of consumer and farmer. At this moment, penalties are normally not high enough to drastically reduce the over-use of pesticides. More negotiation between all players in the commodity chain might be one solution. In any case, there will be a cost, implying that the consumer must be ready to pay more for having a better quality product and a safer environment. The development of new technology such as integrated pest management and biological control can help in reducing pesticide use.

Conclusions: gaps and research topics

Characteristics of the vegetable commodity chains in urban and periurban areas

The main characteristics of one of the agriculture commodity chains, the vegetable are summarised in the following table[4].

Table 6. Opportunities and constraints of urban and periurban horticulture (*From Moustier and David, 1997*)

	Production	Marketing
Opportunities	**Inputs and know-how flows** Access to inputs Access to urban waste products Diversity of know-how due to human migrations Diversity of sources of incomes and capital Access to technical support	**Market proximity** Low costs of transportation Access to marketing information Confidence relations
Constraints	**Risks at the production level** Precarious access to land Lack of institutional recognition Pollution of air, water and soil Theft and straying Pressure on the land fertility Phytosanitary pressure	Risks at the marketing level High elasticity of the demand (temperate vegetables) Health risks Scattered firms

Sustainability of urban and periurban horticultural systems

Two main hypotheses could be formulated:

- The urban and periurban horticulture sector is not profitable compared to other human activities and needs for urban infrastructure.
- The city would like to maintain urban and periurban horticultural activity in and around the city in order to benefit from its different advantages: links with nature, waste product recycling, job opportunities, greening of cities.

The sustainability of these systems must be of a different kind. In the first hypothesis, it will be related to the direct productive role of the commodity chain to provide horticultural products to the city; in the second one, the productive roles will be supplemented by more qualitative functions about city environment.

In the first case, the horticulture activity will follow the expansion of the city. This is a phenomenon that has been observed for centuries. Research should be more focused on the agricultural problems of horticulture: improving productivity but, at the same time, reducing the negative impacts on the environment (less pesticides, less waste products, recycling urban waste products), organisation of farmers, an innovative sector in terms of products, technologies with a quick and efficient response to consumer demands.

In the second case, more efforts will be directed towards environmental aspects, employment opportunities for a part of the urban population, greening of the city, technology for small-space horticulture, diversification of horticulture towards leisure. In this case, horticulture needs the support of policy makers for securing access to land and natural resources - water, air and light - in the city environment.

In these two hypotheses, two problems remain essential: (i) the response of the horticulture industry to quality demand by consumers, and (ii) the relationship between horticulture and the urban environment.

Periurban and urban vegetable production supply to the urban market

Technical guides on paper or on CD-ROM are now available for horticulture production in most of the cities of the world. Even in the case of small-scale and new growers, it is now possible to find technical packages for the more common vegetables. The commodity chain appears to be better understood all the time, especially in urban and periurban areas. On the other hand, there are fewer skills available for improving the functioning of the commodity chains and dealing with small farmers. NGOs with extensive know-how in vegetables, international agencies and national institutions specialised in vegetables commodity chain can respond to this demand.

In economics, further research activities need to be developed:

- The place of urban and periurban horticulture in the whole horticulture sector in a context of globalisation and agricultural trade liberalisation; what are the comparative advantages of proximity to the market?
- The diversity of the origin of the growers leads to a great diversity of horticultural products; how to link this potential to consumer demand? Analysis of consumer preferences and identification of new possible products.
- Market information and organisation. Market information systems (prices, flows) and concertation between market stakeholders (farmers, traders) are two tools that allow better fine-tuning of supply and demand. The negotiation activities between the different players of the commodity chains will be enhanced through meetings, newsletters, and daily price information.

At the production level, decision making-tools for better management of the crop, the cropping systems, the farming systems need to be established for the specific small size urban and periurban horticultural sector.

Management of horticultural product quality

Most countries have already set up standards for improving the quality of vegetables, mainly based on the improvement of farmers' practices as has been done in Vietnam (Decision 1208 KHCN/QD, July 15, 1996 Ministry of Agricultural and Rural Development; temporary regulation, April 9, 1999 by Ministry of Agriculture and Rural Development). Still, it is in many cases very difficult to set up good control mechanisms and to enforce the regulations. These problems increase in urban and periurban areas where there is easy access to the inputs. In addition, cropping areas are small, easily leading to input overdoses, coupled with the need of farmers to obtain high yields.

The first step will be to follow the existing standards. This requires certification and control mechanisms. To be effective these should be the result of inter-professional negotiations with the support of public authorities.

Some technical obstacles must be cleared for the control methods: basic analytical laboratories and quick on-field tests. New standards must be set for little known vegetables, such as African and Asian leafy vegetables. Also, new technology must be developed in order to reduce pesticide use: alternative technology to pesticide use, biological control, resistant cultivars and crop management.

Horticulture: benefit or cost for the urban environment ?

Horticulture can improve the urban environment: combustion-free zones, green spaces full of flowers, removal of carbon dioxide (on a very small scale), recycling of solid waste, recycling of liquid urban waste products. At the moment, urban planners are slowly accepting the benefits of urban horticulture[13]. The direct effect on the urban environment adds to the reduction of the problems caused by transportation of the different horticultural products in rural areas to urban markets.

The main objective of horticulture will be to reduce pollution to the environment and to limit the uptake of natural resources, especially water. Standards are available for the main risks of environmental pollution. Techniques that may be developed for reducing levels of nitrate, pesticides and heavy metals must be based on decision-making tools that integrate all components of the urban-horticulture system: economic costs, sustainability of the horticultural farming system, regulation systems, costs of control. In the same way, the use of wastewater and water saving techniques such as drip irrigation and mulching must be validated in the context of urban and periurban horticulture.

Acknowledgements

I would like to thank Dr Paule Moustier for her help and assistance in searching for documents and reviewing this article.

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Abalimi Bezekhaya & the Cape Flats tree project**: newsletter to our friends. Abalimi Bezekhaya (The People's Garden Centre), Private Bag X12, Observatory 7935, South Africa**

community development horticulture

South Africa; home gardening; community initiatives

A small newsletter in the true sense of the word, giving news flashes and articles on homegardening and how it helps in completing people's diets. There is also room for a notice board in its columns. Lots of pictures. (WB)

Ableman, Michael **(1999). On good land: the autobiography of an urban farm. Urban Agriculture Notes http://www.cityfarmer.org/autourbanfarm.html. 4 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**
horticulture community development
community gardens; community-supported agriculture; United States

A summary of the book 'On Good Land' about the Centre for Urban Agriculture at Fairview Gardens, California. The Gardens marketing systems are described as well as the other activities on the farm. (NB)

Agbayani, A.L. P., Holmer, Robert J., Potutan, Gerald E., Schnitzler, Wilfried H. **(2001) Quality and quantity requirements for vegetables by private households, vendors and institutional users in a Philippine urban setting. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden, The Netherlands.**
R&D Methodology horticulture
Philippines; market survey

Two studies were conducted to characterize the demands of private households, vendors and institutional users for fresh vegetables in Cagayan de Oro City, Philippines. Specifically, these surveys aimed to provide baseline data for decision-makers and farmer practitioners to further improve the market transparency for vegetables and, thus, contribute to better producer and consumer linkages. The first survey was conducted in February 1998 within different urban and periurban districts of Cagayan de Oro. The second survey using administered questionnaires was conducted in June 1999. A sample group of one hundred respondents was chosen randomly after clustering the various groups of institutional users of fresh vegetables. The generated data of both surveys were subjected to descriptive statistical analysis.

Ajaegbu, Hyacinth I; Berg, Leo van den **(1997). Market gardening, urban growth and sustainable income generation on the Jos Plateau, Nigeria. 13; 115 p.**
horticulture
Nigeria; Jos Plateau; small-scale agriculture; commercial agriculture; periurban agriculture

Examines small-scale commercial periurban horticulture on the Jos Plateau, Nigeria, focusing on marketing aspects. A number of economic models were tewsted to best describe the situation. Authors concluded that a differentiation of various zones in

the periurban area became more apparent. (WB)

Amend, Jörg; Magasini, I; Mutahiwa, Sergei; Swai, Ignaz (1997). Integrated pest management in urban vegetable production in Dar es Salaam. 17 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
horticulture services
Tanzania; horticulture; home gardening; IPM

One of the objectives of urban food production is ensuring sustainable development of the cities. Proper agricultural practices are an important element for ensuring this sustainability. The underlying paper examines the application of Integrated Pest Management (IMP) methods in urban vegetable production in Dar es Salaam. Main objective of the research was to identify pest and diseases occurring in the most important crops cultivated and to develop strategies for IPM for these crops. This report contains the methodology used for the research and the results. The authors also give general recommendations for the vegetable growers in Dar es Salaam, as well as special recommendations for IPM management of the most important vegetables. (WB)

Anderton, Frances; Thompson, Mark **(1999). Agriculture in a megalopolis: farming in the heart of Los Angeles presents opportunities along with challenges. On: http://www.marketreport.com/lafarm.htm. 5 p.**
horticulture
United States; horticulture ; commercial agriculture

Describes city farms in the heart of Los Angeles. The main problem farmers face is insecurity of land tenure, complaining residents, vandalism and harassment by local officials. Most of the produce is directly marketed through farmers' markets which are close to consumers. (NB)

Andrews, S. **(2001), The Allotment Handbook: A Guide To Promoting and Protecting Your Site.**
Supplier : Eco-logic Books, 10-12 Picton St, Bristol BS6 5QA, England
urban horticulture
allotment gardens; land pressure; urbanisation

Allotments are increasingly threatened by development as land prices soar and space is needed to expand cities, towns and villages. Starting with a brief history of allotments and a look at legislation, this book shows how to make your allotment part of a thriving community. If your site is threatened, learn how to organize to stop development in their tracks. Easy to use with a comprehensive contacts, a vital tool for allotment holders, community groups and those who want to see an active use of urban open space.

Baudoin, W. **(2001), Urban Micro-Gardens. Plant Production and Protection Divison, FAO, In: Proceedings on the Sub-Regional Expert Consultation on the**

Use of Low Cost and Simple Technologies for Crop Diversification by Small Scale Farmers in Urban and Peri-Urban Areas of Southern Africa, Stellenbosch, South Africa, January 15-18 2001
urban horticulture
urban areas; gardening

This presentation reviews the opportunities of a simple, low-cost technology adapted to the high-density areas of urban suburbs. The technology allows landless households to produce a broad range of vegetables for family consumption and sale to the neighbourhood. The system is based on growing crops on substrates or floating on water. The technical assessment highlighted the high cost of the mineral fertilizers required for the preparation of the nutrient solution. In this respect, research is needed for the use of alternative sources including organic nutrient solutions obtained from the fermentation of organic waste material. The micro-garden system is environmentally friendly since it not onnly uses recycled materials, but the 'closed system' growing allows avery high water use efficiency ratio. The cost-benefit analysis shows that these micro-gardens, when successfully implemented, can provide from US$1 to US$3 a day as an 'opportunity revenue' from 10 m2, which is often competitive as compared to the casual labour wage the women could obtain by working outside the household.

Bergeron, Bernard **(1998). Activités maraîchères au Congo. 4 p. Ministère des Affaires Etrangères, Coopération et Francophonie, Bureau Production Agricole, Industrielle et Echanges**
horticulture
Congo; resource centres; development projects

Reports on activities in a periurban development programme in Congolese cities. At the heart are 'resource centres' functioning as centres for production, research, marketing, information and training. (WB)

Beverwijk, Jasmin; Baarsen, Dirk-Jan; Duuren, Bert (van) **(199?). Extension and experiental learning in urban agriculture. 7 p. PGO Tropische Landbouw en Rurale Ontwikkeling T050-200**
services horticulture
agricultural extension; allotment gardens

The underlying report analyses experiences with allotment gardening in the Netherlands. Information is given about existing organisations in the field of extension and allotment gardening. Interestingly, there is also information about Farmer Field Schools on IPM in rice as a learning model for other situations and countries. (WB)

Bishwapriya, Saynal **(1985). Urban agriculture: who cultivates and why? A case-study of Lusaka, Zambia. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 15-24. Massachusetts Institute of Technology, Cambridge, Massachusetts,**

USA

horticulture food security and nutrition

case studies; horticulture; Zambia;

Most authorities are now convinced of the fact that urban agriculture is more than an accidental activity undertaken by recent rural migrants. This survey shows once more that many urban poor, who migrated to the city a long time ago, are engaged in food production in order to survive. Most of the urban farmers stated the lack of purchasing power as the major reason for farming. There were other reasons as well, however, ranging from the wish to feel settled in their city home to simple enjoyment in gardening. The survey identified two different types of gardens in Lusaka: plot gardens and rainy-season gardens, used for cultivating different types of crops. In plot gardens, higher-grade vegetables were cultivated, such as rape, tomato, cabbage, onion and spinach, as well as fruits, while in rainy-season gardens, staple food, i.e. root crops, maize and beans, were produced. The survey stressed the need for stronger support from local authorities. At this point of time, urban farmers often experience the reverse, jeopardising their activities. In addition, land tenure policies will have to be changed so as to render more land available for the urban poor. (WB)

Blair, Dorothy; Giesecke, Carol; Sherman, Sandra **(1997). A dietary, social and economic evaluation of the Philadelphia urban gardening project. Urban Agriculture Notes on: http://www.cityfarmer.org/nutritionstudy.html#diet. 6 p. Nutrition Department, College of Health and Human Development, Pennsylvania State University, University Park, Pennsylvania 16802, USA Supplier: City Farmer, Canada's Office of Urban Agriculture**

horticulture food security and nutrition economic impact

United States; home gardening; surveys

An evaluation study among 144 gardeners in the Philadelphia Urban Gardening Project and 67 non-gardening controls. Data collected included demographic variables, food frequencies and dietary habits, measures of life satisfaction, and neighbourhood involvement. The average value of garden site produce was assessed. Interestingly, gardening was positively associated with community involvement and life satisfaction. An interesting and important study. (WB - from original abstract)

Boissière, Thierry **(1999). Jardiniers et société citadine dans la vallée de l'Oronte en Syrie centrale. Doctoral dissertation in ethnology, Université Lumière Lyon 2, Lyon, France. 2 volumes. 751 p.**

horticulture community development

Syria; Homs; Hama; history; market gardening; water supply; urban gardening

This landmark study is unique in several regards. It is one of the only dissertations on urban agriculture that adopts the ethnological approach, and to be undertaken by an anthropologist. It is rare in its detailed historical analysis combined with a

thorough assessment of the present-day situation. It is a rare in-depth study of the Middle East, an underrepresented region in research on urban agriculture. Finally, it is exemplary in placing at its core the changes in water supply (in addition to farming practices); water is the oft-neglected element in such studies. “Through the management of water and crops, as well as through the human connections and the relation to the city, this study has the ambition to reconstitute the evolution of an entire society that organized itself long ago and to present its main characteristics.” This ambition is admirably met in this dissertation. (JN)

Bon, Hubert de; Ducelier, D.; Hernandez, S.; Temple, L. **Appui aux productions maraîchères et fruitières périurbaines de Yaoundé. Agriculture périurbaine en Afrique subsaharienne, p. 89-92**

rural-urban linkages horticulture

periurban agriculture; marketing; vegetables; sub-Saharan Africa

Vegetable crops are intended to be marketed and are often produced by young farmers, new to the business. The major species grown are: African spinach, jute, Solanum aethiopicum and lettuce. Green peppers, parsley, basil an dokra are also grown. CIRAD-FLHOR works on improving the production techniques practised and the sanitary quality of the marketed produce. The agronomic support for fruits aims to diversify the range of products with species adapted to the prevailing conditions. A number of varieties already has been selected and distributed. Vegetable and fruit crops from the periurban zone play an essential role in market supplies. A study under way includes quantifying fruit and vegetable movements and monitoring and analysing prices and urban market supplies. Major surveys of markets, notable in Yaoundé will determine the role of fruits and vegetables from urban and periurban areas compared to produce from further a field. (NB - Abstract adapted from original)

Boncodin R. Prain, G. and Campilan, D. **(2000) Dynamics in Tropical Homegardens. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**

horticulture food security and nutrition

Homegardens; Philippines;

The importance of home gardens, the small areas of cultivated land immediately surrounding a home or a homestead, is often underestimated despite its vital contribution to meeting various household-needs, especially for the poor families in developing countries. The authors explore the importance of homegardens in the Philippines and give the findings of the programme, Users’ Perspectives with Agricultural Research and Development (UPWARD).

Brierley, John S **(1985). West Indian kitchen gardens: a historical perspective with current insights from Grenada. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 52-60. Dept. of Geography, Univ. of Manitoba, Winnipeg, Manitoba, Canada**

horticulture
West Indies; Grenada; home gardening

Describes kitchen gardens in the West Indies and traces their history since the slave plantation days. Trees play an important role in West Indian homegardens as do root and tuber crops. Of all crops grown distribution tables with indices of occurrence are given. (WB)

Brownrigg, Leslie **(1985). Home gardening in international development: what the literature shows. Washington, DC: League for International Food Education. 126 p. + app.**
horticulture
home gardening; development projects; bibliographies; resource organisations; Nigeria; Chile; Mauritania

This is a pioneering (and little-known) literature review on home gardening, funded by USAID. The author not only reviewed the published writings on the subject, but also documented the activities of major international organizations concerned with home food production systems. The review was researched and written with two audiences in mind: international development professionals whose programs do or could include home gardening, and other readers from the range of academic disciplines which involve the home garden who have an interest in its history and traditions. It contains case histories from Nigeria, Chile and Mauritania, plus several shorter case descriptions. Three major appendices are on: resource organizations; garden projects and programs; and a bibliography. (adapted from original by JN)

Bruce, Hank; Folk, Tomi Jill **(2001), Global Gardening: Increasing the Diversity of Plants in Your Own Garden While Feeding a Hungry World. Winner Enterprises**
urban horticulture
globalisation; home gardening

All over this earth, our global garden, people are cultivating a great diversity of vegetables and fruits. There are over 15,000 edible plants that can help to sustain our global village, yet over 99% of the American diet is based on less than 100 plants. We have a world of unique, unusual and exotic vegetables to discover, enjoy and share at the dinner table of our global village. Some of these might even become a part of your garden and add diversity to your own mealtime adventure. This book is a safari into the exotic gardens of the world.

Burleigh, J.R. and Black, L.L. **(2001) Supporting Farmers Towards Safe Year-round Vegetables in Manilla. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment horticulture
Philippines; AVRDC; IPM; agrochemicals

AVRDC collaborates with the Central Luzon State University-Philippines, the Bureau of Plant Industry-Philippines, and the Technical University of Munich-Germany in a project entitled “Development of periurban vegetable production systems for

sustainable year-round supplies to tropical Asian cities". The project aims to design, test and implement production systems for sustainable year-round supplies of vegetables to markets in Metro Manila - and by model verification, to other tropical Asian cities as well. This article focuses on part of the work of the periurban vegetable production project, which is to decrease the ubiquitous use of pesticides in periurban Manila through introduction of IPM techniques.

Cáceres, D; Arbomo, M **(1994). Surviving on little land: women's struggle in town and country. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 8-9. Department of Rural Development, Faculty of Agronomy, National University of Córdoba, CC 509-5014, Córdoba, Argentina**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
horticulture
Argentina; home gardening; labour; urban communities; urban development; urban environment; urban population; urban wastes; women

Socioeconomic policies implemented in recent decades in Argentina have led to division of land into small plots (minifundizacion) and expanding poverty belts around the big cities. Growing food in small gardens is seen as one way to help the poor feed their families. Daniel Cáceres and Miryam Arbomo present two case examples - one urban and one rural - from Córdoba Province in central Argentina. (ILEIA)

Chaplowe, Scott G **(1996). Local food security: Havana's popular gardens: sustainable agriculture. In: WSAA vol. 5 no.22 (Fall 1996). 4 p. World Sustainable Agriculture Association (WSAA), California Chapter, 8554 Melrose Ave., West Hollywood, California, 90069 USA**
horticulture
Cuba; Havana; food security; community gardens; community organisation

A description of the emergence of private gardens, state owned intensive gardens and other forms of urban farming in Cuba. The gardens enhance community participation and organisation, food security and food diversity. (NB)

Chewya, JA; Eyzaguirre, PB **(eds) (1999). The biodiversity of traditional leafy vegetables. IPGRI, Rome. 182 p.**
horticulture
Africa; vegetables; nutrition; biodiversity; gender; small-scale agriculture

Here we are presented with five reports covering five African countries South, East & West. The studies document the value of green leafy vegetables as an efficient crop for small urban parcels, as a tool in maintaining the stability of ecosystems, for their capacity to repel insects and their micronutrient value in locally based food systems. Women in Africa are found to be the primary producers, beneficiaries and the custodians of green leafy vegetables. (JS)

Chibesa, L **(et al.) (19??). Small-scale cultivation around Kalingalinga. In: In the shadow of Lusaka (source unknown) p. 13-29. 29 p.**
horticulture
Zambia; home gardening; land use; urban construction; tenure rights

Reports on homegardening in a squatter area in the eastern part of Lusaka. The paper looked specifically into possible resettlements of those who owned -or rather: leased from the government- plots as a result of building activity in this area, but could not draw positive conclusions as to the degree of competition existing for this land nor as to the quality of new plots acquired. Final part of the paper contains a number of portraits of home gardeners. (WB)

Chivinge, A.O., V. Machakaire and G. Mudimu **(2001), An Overview of Urban Agriculture in Zimbabwe, Constraints and Solutions. Crop Science Department, Faculty of Agriculture, University of Zimbabwe. Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001.**
Supplier: Crop Science Department, Faculty of Agriculture, University of Zimbabwe, P.O. Box MP 167, Mount Pleasant, Harare, Zimbabwe
urban horticulture
urban agriculture; Zimbabwe, Africa (Eastern)

The difficult economic conditions in Zimbabwe hit urban dwellers particularly hard. Urban agriculture was the consequence. Major activities include the growing of field crops (on any vacant piece of land), horticulture (within the confines of the land allocated for residential purposes), ornamental plants and livestock production. The history of urban agriculture indicates that it has been practised since the twons were established, although much of it started with the influx of foreigners as labour in the mining industry and as domestic workers, with the intensification of the Zimbabwean war of liberation after 1976 which brought rural people into urban areas, and with the influx of those fleeing from the Mozambican civil war after 1980 who could not get land in rural areas. In terms of horticulture , the poor in high density areas produce mostly for feeding the family, while those better off combine home consumption and selling. Constraints to increased production are the shortage of land, poor or non-existent extension services (due to lacking government support for urban agriculture) and failure to purchase inputs. These constraints vary with the location of the urban of peri-urban area. It is recommended that the city authorities accept urban agriculture as a reality and that they willl come up with policies that create an enabling environment to train urban growers. This will expose them to the correct technologies, especially in horticultural production, which is sustainable and environmentally friendly. High yields can be achieved and poverty reduced as these growers are trained and other facilities are made available.

Chongwe, E.H. and J.L. Ngondo **(2001), Urban and Peri-Urban Horticulture in Malawi. Paper prepared for the Sub-Regional Expert Consultation Meeting on**

Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001.
Supplier: Ministry of Agriculture and Irrigation Development, P.O. Box 30134, Lilongwe 3, Malawi
urban horticulture
horticulture; urban areas; periurban area; Malawi, Africa (Eastern)

The paper examines the state of Urban and Peri-Urban Horticulture in Malawi where the industry is young but growing at a very fast rate. It is contributing between 30 - 40 % to the national horticultural crop demand. It is also generating cash income, raw materials for industries, foreign exchange earnings and creating employment opportunities for producers, vendors, hawkers, middlemen, input suppliers and institutions. Major urban areas in Malawi are Blantyre, Lilongwe, Mzuzu and Zomba. Out of an urbanisation rate of 14 %, about 11 % live in these four major urban areas. Broadly, horticulture in these Urban and Peri-Urban areas focuses on the growing of vegetables, fruit, spices, ornamental and floriculture. In spite of its importance, the sectors development has been spontaneous and uncoordinated hence it is being threatened by issues of pollution, high water rates, gender bias and sustainability due to urban development among many other setbacks. Policymakers have to be sensitised to these in order to bring about lasting development in the sector.

City Farmer **(1996). Food gardens in South Africa. Urban Agriculture Notes on: http://www.cityfarmer.org/s.africa.html. 2 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture
food security and nutrition horticulture
vegetable gardens; gardening practices; Soweto; South Africa

A brief description of the Food Gardens Foundation in Soweto, South Africa. The Foundation developed a method for growing vegetables which is especially useful if there is shortage of land, water or money. (NB)

City Farmer, Canada's Office of Urban Agriculture **(1999). City farm in Perth, Australia. Urban Agriculture Notes http://www.cityfarmer.org/perth19.html. 2 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture community development
community gardens; Perth; Australia

Gives a description of a community garden in Perth, Australia. (NB)

City Farmer, Canada's Office of Urban Agriculture **(1999). City farms in the United Kingdom. Urban Agriculture Notes http://www.cityfarmer.org/cityfengland8.html. 3 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture

horticulture food security and nutrition services
city farms; United Kingdom

Brief description of some city farms organised in the Federation of City Farms in the United Kingdom. (NB)

Cornell University Extension **(1999). Direct marketing today: challenges and opportunities. USDA On: http://www.ams.usda.gov/directmarketing/DirectMar2.pdf.**
horticulture services
market gardening; periurban agriculture

This manual presents every step the urban or rural farmer needs to take in order to be a direct marketer. Applicable everywhere, but especially in USA. Includes directory to resources. (JS)

Cosgrove, Sean **(1994). Une histoire de deux villes: comparing Canadian community gardening programs in Montreal and Toronto. Cities Feeding People Series report no. 11. 9 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
community development horticulture
Canada; Montreal; Toronto; Healthy Cities programme; community gardens

In the early 1970s Montreal developed gardening programmes. In Toronto this development has been much slower. Montreal has one of the best community gardening programmes in North America. Toronto has shown some leadership in urban environmental management including healthy cities approaches. Key challenges are to develop a valued community gardening culture in Toronto, the implementation of healthy cities principles and the establishment of effective partnerships between citizens and government. (NB)

Croon, Tom (de); Riel, Karel (van) **(1998). Urban horticulture in Dar es Salaam: farming systems, risks, strategies and gaps in information. 7 p. Wageningen University and Research Centre**
horticulture
Tanzania; home gardening; farming systems research

Describes and typifies various gardening systems within the city bounds of Dar es Salaam, in which the class depends on tenure rights, ranging from none to institutionalised rights. The different systems are typified and specific problems of the different systems are listed. (WB)

Decheng, Su **(1999). Tree mushroom production for city farmers. Urban Agriculture Notes http://www.cityfarmer.org/treemushroom.html. 3 p. 5 Skaling Ct. Apt. 9, Saint John, New Brunswick, Canada, E2K 4G8**

Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture
mushrooms

Describes how mushrooms are able to decompose polymer, cellulose and other products of organic waste and at the same time produce a crop. The remaining mushroom mycelia after harvesting are an excellent fertiliser. (NB)

Delphin Regis, Mildred **(1999). Care Haiti: urban horticulture project Port-au-Prince, Haiti. Urban Agriculture Notes http://www.cityfarmer.org/haiti.html. 5 p. Urban Horticulture CARE-HAITI, 92, Rue Gregoire P.V., BP 15546, Pétion-Ville, Haiti**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture R&D methodology
Haiti; home gardening; development projects

Offers a description of the recent initiatives in urban farming of CARE in Haiti. In two pilot sites activities started with the set up of demonstration gardens to generate interest and awareness. Based on this a number of groups have been formed for urban farming. The project aims to document technical approaches to urban agriculture, to document the food and income generation potential and to develop an effective extension and learning approach. (NB)

Dennery, Pascale **(1999). Urban agriculture in informal settlements. Urban Agriculture Notes http://www.cityfarmer.org/nairobi.html. 5 p.**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture
food security; urban policies; poverty; nutrition; Kenya

Discusses the results of a study in Kibera, Nairobi, Kenya. Findings indicate that engagement in food production is beneficial to low-income households. Produce is used directly and indirectly by the household to obtain food, access cash and educate children. In Nairobi in general and Kibera in particular, uncertainty with respect to access land is of major concern to food producers. Timely policy interventions are needed to legitimise food production in and around informal settlements. (NB)

Department of Horticulture **(1990).The role of horticulture in human well-being and social development: setting the agenda. 25 p. Department of Horticulture, Virginia Polytechnic Institute & State University; American Society for Horticultural Science; American Association of Botanical Gardens and Arboreta; American Horticultural Therapy Association**
horticulture
urban livelihoods; well-being; social aspects

The objectives of the symposium were to collect, present and analyse information on

the psychological, physiological and social responses of people to plants and to identify research priorities to further explore this issue. The underlying programme contains summaries of keynote papers as well as names and addresses of participants. (WB)

Doshi, RT **(1992). City farming: an innovative technology. 27 p.**
horticulture
India

Relates a number of horticultural practices the author has tested out in Bombay, India over a number of years. (WB)

Drescher, Axel W. **(1994). Gardening on garbage: opportunity or threat? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 20-21. Institute for Physical Geography, Werderring 4, D-79098 Freiburg, Germany**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
wastewater reuse horticulture
community health; health; health hazards; home gardening; organic wastes; toxic substances; urban environment; waste management; Zambia

Gardening on waste disposal sites is common practice in many developing countries. Such sites offer fertile land not used for other purposes, but toxic wastes and heavy metal pollution may threaten human health. Axel Drescher presents a case study of such a periurban garden in Zambia. (ILEIA)

Drescher, Axel W. **(1997). Management strategies in African homegardens and the need for extension approaches Paper presented at the International Conference on Sustainable Urban Food Systems. Ryerson Polytechnic University. Toronto,Canada. 22-25 May 1997. Papers**
gender horticulture food security and nutrition
Africa, Zambia, household survey, food security, management strategy, women's role, gender differences, intervention strategy, extension services

The relationship between urban food production, food security and urban environments has been largely neglected. This paper focuses on results from a household garden survey conducted during 1992 and 1993. The main objective of the survey was to clarify the role of household gardens for household food security in Zambia and to identify differences and problems in management strategies and their effects on production in different areas. The results reveal that the main actors in urban agriculture are often women. In all compounds studied in Lusaka, women were to a greater extent involved in cropping and gardening than men. Gender analysis is used to reveal differences between men's and women's urban agriculture techniques with respect to alternative methods of plant production, crop species, and use of fertilizer, manure and compost. The paper argues that gender specific

differences in agricultural activities need to be paid more attention by extension services in urban and periurban areas. (AH)

Drescher, Axel W. **(1997). Management strategies in African homegardens and the need for new extension approaches. In: Food Security and innovations: successes and lessons learned / F. Heidhues and A. Fadani. 11 p. Universitaet Freiburg, Hebelstrasse 27, D-79104, Freiburg, Germany**
Supplier: City Farmer, Canada's Office of Urban Agriculture
services horticulture
home gardening; food production; food security; extension services; Zambia;

Reports on gardening and cropping in Lusaka. As stated elsewhere, these activities often take place in a setting of non-co-operative authorities. This paper comments on urban farming activities and examines the relationship between land access and social status of the compounds. The author argues that, while wet-season staple food cropping is practised on a broad scale, dry-season vegetable gardening is much less widespread because many city dwellers lack access to resources necessary for this activity. Urban farming has not been addressed by extension services as these solely focused on the rural sector. Output, especially of leafy vegetables, could be increased considerably, however, were such services provided to gardeners. Information needed primarily concerns with pest management, species diversity and soil fertility. (WB)

Drescher, Axel W. **(1997). Urban agriculture in the seasonal tropics of central southern africa: a case study of Lusaka, Zambia. On: http://www.cityfarmer.org/axelB.html#axel. University of Freiburg, Germany**
horticulture R&D methodology
Zambia; periurban agriculture; home gardening; surveys

Analyses findings of the big Household Garden Survey in and around Lusaka and in Zambian rural areas in 1992-93. Purpose was to determine the role of household gardens for urban households; the contribution of garden produce to diet and budget of the household; to draw up an inventory of the main problems encountered with the household garden; and to find out about motives of households to be involved in gardening or not. A distinction is made throughout the text between different types of agriculture in and around Lusaka: gardening for food, semi-commercial and commercial gardening, and rainy season agriculture. In the rainy season the production of staple foods predominates, whereas during the dry season people concentrate on vegetable production. Factors influencing involvement in any of these types of gardening are governed by internal or external factors, such as labour availability, access or entitlement to resources, education, occupation, and more. The impression is that gardening actually does contribute to food security and/or generation of income. (WB)

Drescher, Axel W. **(1999). Urban agriculture in Northern Spain: brief observations: La Huerta del Abuelo Rosel. Urban Agriculture Notes http://www.cityfarmer.org/spain.html. 2 p. University of Freiburg**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition
community gardens; Zaragoza; Spain

A brief description of 'La huerta del Abuelo Rosel' in Zaragoza, Spain. (NB)

Drescher, Axel W. **(1999). Urban agriculture in the seasonal tropics: the case of Lusaka, Zambia. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds). p. 67-76. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
horticulture
gardening; staple crops; food production; gender; food security; household economy

This paper focuses on different components of urban agriculture in Lusaka, Zambia. Both of the major agricultural activities - the dry-season gardening and rainy-season production of staple food crops largely depend on access to resources like water and land. It was found that dry-season cultivation is practiced by those with access to the resources essential to this activity. This access is lowest in the high-density, low-income compounds in Lusaka. There are significant differences between the roles of women and men in urban household food security. Women are the major actors in urban agriculture, but they are disadvantaged with respect to income generation and access to resources and markets. Special attention is given to the cultivation of indigenous vegetables ("locals") and ongoing vegetable-gathering activities, which play an important role in nutrition and are mainly undertaken by women. A household-gardening model that is also applicable to other household activities was developed to come to a better understanding of household activities in their social, economical, and environmental contexts. Urban agriculture in Lusaka contributes to household food security directly by providing food and indirectly by reducing expenditures. (Abstract adapted form original)

Drescher, Axel W. **(2001), The German Allotment Gardens - A Model for Poverty Alleviation and Food Security in Southern African Cities? Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001**
urban horticulture food security and nutrition
allotment gardens; food security; poverty alleviation, Africa (Southern)

This paper asks whether the German experience with urban allotment gardens can be a model for Southern Africa. The potential exists for urban gardens to help Southern African cities to reduce poverty and improve security and living conditions. Conditions of hunger and poverty were widespread in Germany and other European

countries nearly 200 years ago when the first 'gardens for the poor' emerged. Allotment gardens consist of a piece of land between 200 and 400 square meters, most of them with a little shed for storing gardening tools. Shortly after WW II, Berlin contained 200,000 allotment gardens. Today there still are about 800,000.

Dubbeling, Marielle **(1999). Urban agriculture and feeding Latin American and Caribbean cities. Urban Agriculture Notes http://www.cityfarmer.org/feedingLatAmer.html. 5 p. Urban Management Program Latin America and the Caribbean, Garcia Moreno 1201 and Mejia, Quito, Ecuador**
Supplier: City Farmer, Canada's Office of Urban Agriculture
food security and nutrition horticulture R&D methodology
food security; Latin America; best practices; poverty alleviation; waste; resource management; food security; nutrition; income generation; gender; environment

Presents the best practices and city consultation project of the Urban Management Program for Latin America and the Caribbean. The thematic orientation is on urban poverty alleviation, urban environmental management and participatory urban governance. The objective of the project is to assist a group of resource and associate cities with documenting urban agriculture experiences, producing analysis of urban agriculture activities and implement a city consultation process. (NB)

Eames-Sheavly, Marcia **(1996). Radishes to riches. Member workbook. Cornell's Fruit and Vegetable Sciences Department. Ithaca, NY.**
horticulture
market gardening; marketing; youth; United States

The "Radishes to Riches" MEMBER workbook (142M5) is a guide for youth or anyone who wants to get into the direct-market business. It takes the reader through the basics of marketing including deciding on what to grow, (what will people buy?; how much can I sell?), where to sell the produce, how to prepare it for sale, pricing, and promotion. It includes worksheets to make project and marketing plans, keep records of accounts, and tally a business summary. (JS)

Eberhard, R **(1989) Urban agriculture: the potential in Cape Town. Summary Report, working paper 89/E1-E5. Cape Town, South Africa: City Planner's Department, Town Planning Branch, 1989.**
horticulture
South Africa; Cape Town; urban planning; land use; literature review; economics; vegetable gardens; community gardens

This early report on urban agriculture in South Africa was prepared by a professional in Cape Town's Town Planning Branch. It contains five sections that are meant to be relatively free-standing. Part 1 is the summary report. Part 1 is labeled "Literature Review", but it is in fact a more substantial piece than that. First, it uses the literature

to assess the physical, economic, socio-cultural and institutional factors that influence the interest and participation in urban agriculture. Second, it presents summaries of around two dozen case studies of urban agriculture from across the world, with an emphasis on Africa. In Part 3, an attempt is made at estimating the economic value of small vegetable gardens in Cape Town. Part 4 then presents a detailed case description of an existing project in Cape Town, initiated and run by the Catholic Welfare Bureau. Finally, in Part 5 (26 p.), an assessment is made of the potential of introducing community gardens to Cape Town. (JN)

Eberlee, J **(1999). Urban gardening in Haiti. IDRC Reports. May 28, 1999**
http://www.idrc.ca/reports.
community development horticulture
Haiti; home gardening; urban poor; nutritional status

Residents of some of the poorest urban areas of Haiti are improving their health, nutrition status and income by growing vegetables in containers (old tires, baskets, pails, etc.) in confined spaces such as backyards, verandahs and rooftops. Under the supervision of CARE-Haiti and other partners, more than 400 people from 11 neighborhoods in Port-au-Prince and Gonaïves have attended training sessions on how to establish gardens where space is limited. Funds provided by the International Development Research Centre (IDRC), CARE-Canada, the Canadian International Development Agency (CIDA) and CARE-USA are helping CARE-Haiti design, implement, monitor and evaluate space-confined gardening methods, including technologies tested in other IDRC-sponsored projects. This article is also available in French. (HC, IDRC)

Egusquiza, Rolando **(1987). Curso de cultivo de papa en huertos caseros. Asociación Perú Mujer & Universidad Agraria de la Molina, Lima.**
horticulture services
home gardening; gender; training; root crops; Latin America

This is a trainers' manual for women raising potatoes in neighborhoods. The initial objective was to train trainers or promoters. The stated objectives were good nutrition, micro-enterprise, good health and provision of service to low-income women. Methods of cultivation offered in the course were experimental. (JS)

Flood, Carlos Alberto **(1990). Small-scale sub-urban and periurban biological agriculture: a social-oriented program of local food production. 18 p.**
horticulture
Argentina; education programmes; biological horticulture

Describes underlying considerations and implementation elements of an adult education programme promoting biological food production in the suburbs of Buenos Aires. (WB)

Floquet, Anne**. Potentials and perils on (sic) periurban agriculture in a West African coastal region. Symposium 'Rural Farming Systems Analysis: Environmental Perspectives'. Workshop E: farming and rural systems in zones of transition. Paper E/6 p. 446-456. University of Hohenheim, Germany**

horticulture health and environment

West Africa; Benin; periurban agriculture; environmental degradation; rural-urban migration

Market demands change quickly in West Africa as a result of fast-growing cities. The underlying paper describes the situation in Benin, where farmers from the south have largely failed to grasp the opportunity of the urban consumption market. Soil mining has led to a decrease in the production of staple food and fuelwood in the South of Benin and to soil depletion, with ensuing rural exodus. Based on six years of field research, changes in cropping and farming systems and socio-economic changes, in the light of a rapidly changing environment, are described in this paper. (WB)

Florin, Bénédicte **(1997). Savoir faire son jardin au Caire. In: Les Annales de la Recherche Urbaine No. 74 (March 1997): 85-94.**

horticulture

Egypt; resettlement; social housing; social relations; leisure; home gardening

In addition to the enjoyment, the small gardens in an old social housing complex in Cairo are useful in regulating relations between neighbors. In a new housing estate at the edge of Cairo, where earthquake refugees have been relocated, gardens are a means of building up hope again. (adapted from original by JN)

Food and Agriculture Organization (FAO) **(2001) Proceeding of Regional Seminar "Feeding Asian Cities", Bangkok, Thailand, November 2000. On: http:/www.fao.org/waicent/faoinfo/agricult/ags/agsm/sada/asia/index.htm**

food security and nutrition horticulture services

Asia; marketing; horticulture

This seminar was organised by the Association of Food Marketing Agencies in Asia and the Pacific (AFMA), and the Regional Network of Local Authorities for the Management of Human Settlements (CITYNET), in collaboration with GTZ, International Union of Local Authorities (IULA), Ministère des Affaires étrangères (France), UNDP/UNCHS/World Bank - Urban Management Programme - Regional Office for Asia and the Pacific, World Union of Wholesale Markets (WUWM) and with the technical support of FAO.

Food and Agriculture Organization (FAO) **(2001) Proceedings of Sub-Regional Expert Consultation on "Urban and Periurban Horticulture in South-African Countries". Stellenbosch, South Africa. January 2001.**

food security and nutrition horticulture
Southern Africa; horticulture; Malawi; Zimbabwe; South Africa; Botswana; Tanzania; Namibia; Mozambique

The papers of this expert consultation on urban agriculture, focusing on horticulture in Malawi, Zimbabwe, South Africa, Botswana, Tanzania, Namibia, and Mozambique. Three discussion groups were organised on Opportunities and Constraints; Assessment of Project Profiles on selected countries; and Training Needs and Methodologies.

Freeman, Donald B. **(1991). A city of farmers: informal urban agriculture in the open spaces of Nairobi, Kenya. McGill-Queen's University Press, Montreal; 159 p.**
horticulture city ecology
Kenya; land use; land tenure; informal sector; food security

This book – one of the first commercial publications on urban farming - presents a review of urban agriculture in Kenya over the past century. It reports on a 1987 six-city survey of urban food production and consumption. And it reports on a central Nairobi metro survey of who farms what, where. It defines the benefits of this activity from several points of view. It provides a good tool for future researcher due to its extensive tables, maps, and references. (JS)

Funes Monzote, Fernando **(199?). Cuban agricultural alternatives: an overview of Cuba's experience in organic agriculture. 14 p. Pastures and Forages Research Institute (IIPF); Cuban Association of Organic Agriculture (ACAO), Apartado Postal 4029, CP 10400, Ciudad de la Habana, Cuba**
horticulture
organic agriculture; Cuba; biological control; food production systems; integrated farming systems

Provides a historical overview of agricultural development in Cuba from the perspective of organic agriculture. The state of the art of integrated farming systems, biological pest control and other issues are presented. Possibilities and approaches to encourage new strategies for the support of an organic model at national level are presented. (NB)

Furedy, Christine **(1998). Appropriate technology for urban wastes in Asia: avoiding past mistakes. In: Biocycle (July 1998) p. 56-59**
wastewater reuse horticulture
urban wastes; Asia; appropriate technology, case studies

Compost-making is widely considered as a suitable way of reducing solid waste disposal problems but has become controversial in Asia as it is mostly based on waste treatment in complicated mechanical plants. Though these are easy to

administer for municipalities with relatively few parties involved, they are often built without proper cost-benefit studies, and perform badly as a consequence. When looking, however, at composting taking place in community settings, one comes across flourishing composting systems. Among the many examples cited in this highly interesting article, we mention here the garbage farms in Calcutta, described as a model for community-based approaches to composting. Here, the wastes are used in situ, with a host of waste pickers sieving through the materials plots of mature dump land are leased out, thus avoiding the costs and complications of transportation, at the same time giving rise to a flourishing vegetable production on the dump sites. Apart from such economic or ecological arguments there is the argument of employment: an estimated 20,000 people find work as a result of this intensive farming. (WB)

Garden to kitchen newsletter**. Family Food Production and Nutrition Project, Unicef Pacific Operations, c/o UNDP, Private Mail Bag, Suva, Fiji**
food security and nutrition horticulture
Pacific Islands; children; malnutrition

This quarterly targets the Pacific Islands, contains interesting assorted information about homegardening in the pacific setting. The few issues in our possession report about pest control, country profiles, cultivation techniques, news from the field, malnutrition related diseases, and so forth. (WB)

Garnett, Tara **(1996). Farming the city: the potential of urban agriculture. In: The Ecologist vol. 26 no. 6 p. 299-307**
city ecology horticulture
home gardening; allotment gardens; political aspects; United Kingdom

Describes urban agriculture in Great Britain, primarily allotment gardens, of which there are around half a million in Britain nowadays. In spite of the fact they are thriving, with long waiting lists, allotment gardens are under heavy threat from urban development schemes. There is a highly interesting description of the rise of the allotment movement in Britain, as a result of political considerations. (WB)

Gavrilov, Alexander **(1997). Rooftop gardening in St. Petersburg, Russia. Urban Agriculture Notes on: http://www.cityfarmer.org/russiastp.html#russiastp. 3 p. Center for Citizen Innitiatives, St. Petersburg, Russia**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition
rooftop gardening; home gardening; St. Petersburg; Russia

The Rooftop Gardening Program in St. Petersburg started in 1993. This short article gives facts and figures and describes some of the techniques used in the project. The project achieves much impact with citizens despite a complete lack of interest from city administration. (WB)

Gbadegesin, Adeniyi **(1991). Farming in the urban environment of a developing nation: a case study from Ibadan metropolis in Nigeria. In: The Environmentalist vol. 11 no. 2 (1991) p. 105-111**
horticulture city ecology
Nigeria; Ibadan; surveys; food security; urban poor

Reports on a survey among 800 part-time or full-time farmers in the urban fringe of Ibadan. Results showed well-known considerations such as reducing people's expenses on food and supplementing the family's income. Major threat was reported to be competition from non-agricultural land uses. The article describes characteristics of the urban farming system in Ibadan, in which the proportion of crops grown for staple is high. Interestingly, roughly half of all those who had been approached to sell their land, had turned down this offer (though the article does not give information about prices offered). (WB)

Gockowski, J. **Intensification of horticultural production in the urban periphery of Yaoundé. Agriculture périurbaine en Afrique subsaharienne p. 63-79**
rural-urban linkages horticulture
Yaoundé; Cameroon; periurban agriculture; surveys; farming systems

Population growth of more than 6%, proximity to the largest urban centre and high rural population densities all contributed to intensification and diversification in Beti farming systems around Yaoundé. A random survey of 208 households in 16 villages 12 to 90 km from Yaoundé was conducted. Sixty-five % of the households interviewed adopted an intensive monocrop horticultural system with on average 3 monocrop fields per adopting household. They maintained roughly the same number of traditional field-systems as non-adopters, indicating an increased mobilisation of labour and increased tomatoes, okra, sweet green and hot peppers. Pests and diseases were cited most frequently as the major agronomic constraint. Variation in market access resulted in significant price differentials as a function of distance to market. The valuable genetic diversity in local land races of tomatoes and the indigenous West African okra is in danger of being lost. Many indigenous leafy vegetables are very important particularly to the urban poor. These crops have largely been neglected by research with the same risk of genetic erosion as farmers turn to cabbages and tomatoes. Rootknot nematodes were the most cited problem among commercial producers. Efforts to develop improved fallows at IITA and elsewhere need to focus on the impact of fallow species on cyst populations. Given the lack of resources at the disposal of public research instates results should be shared through regional organisational frameworks. (NB - Abstract adapted from original)

Gonsalves, JF; Arizala **(1986). The bio-intensive approach to small-scale household food production. IIRR & UNICEF, Silang Cavite Philippines, illustrations, tables**

horticulture services
household gardening; bio-intensive horticulture; poverty; gender; ecology; nutrition; integrated pest management; waste recycling; composting

This is a packet of 20 educational one to six-page items that constitute the substance of a short course. They present the concept of biointensive horticulture practice and specific methods for specific crops. (JS)

Gonzalez Novo, Mario; Murphy, Catherine **(2000). Urban agriculture in the city of Havana: a popular response to a crisis. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 329-347. DSE, GTZ, CTA, SIDA**
horticulture food security and nutrition
food security; food policy; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; environmental regulation; hydroponics; Havana; vermiculture; biopesticides; biodiversity; reforestation; Cuba

Havana probably offers the most successful example for which the concept of urban agriculture was applied as a response to a food crisis, not only by individuals, but also as a government-supported strategy. The main idea of urban agriculture in Havana is “Production by the neighbourhood, for the neighbourhood”. In general it is an intensive high input, high output system. There are many different forms of urban farming: (a) popular gardens, (b) basic production co-operative units with about 10 to 15 members, (c) state farms (d) individual farms (e) co-operative supply units. The organopónics and intensive gardens, which work well in the urban setting, are important in the total production. The government made land available for farming providing secure land-use rights and there are a number of regulations concerning urban agriculture e.g. on the use of pesticides. There is a large network of support services for producers and direct marketing by the producers has been facilitated. Urban agriculture increased the diversity of crops and had a dramatic impact on the deteriorating food situation in Havana. Overall 117,000 people work in jobs related to urban agriculture. Waste is recycled though urban agriculture a reforestation programme started and urban agriculture has become an important element in urban development and different departments co-operate in improving the impacts of urban agriculture. (NB)

Gough, Robert E; Barclay Poling, E **(eds) (1997). Small fruits in the home garden. 272 p. ISBN 1_56022_057_0 (pbk). USD 24.00**
Supplier: Food Products Press, c/o Haworth Press, 10 Alice Street, Binghamton, NY 13904-1580, USA
horticulture
fruit culture; home gardening

A technical guide to growing and harvesting small fruit in home gardens. Species presented are for temperate zones (with the exception of grapevines). (WB)

Grand-Pierre, Reginald **(1993). Preliminary investigations: periurban agriculture in Port au Prince.**
horticulture
Haiti; periurban agriculture; food processing

This is a short sub-sector analysis of urban agriculture in a Caribbean city. Fourteen sub-sectors are defined and potentials for each projected. (JS)

Groening, Gert; Wolschke-Bulmahn, Joachim **(1995). Ein Jahrhundert Kleingartenkukture in Frankfurt am Main. Frankfurt: W. Kramer & Co. 311 p.**
horticulture community development
allotment gardens; leisure gardens; policy; organisation; food security; community greening; Germany

"One hundred years of community gardening in Frankfurt" is a special history book about urban agriculture in good times and not so good times. It provides a depth of written and visual history not provided in any other book. (JS)

Groening, Gert **(1996). Politics of community gardening in Germany. In: Urban Agriculture Notes on: http://www.cityfarmer.org/german99.html#german, 16 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**
community development horticulture land use planning
community gardens; Germany; municipal policies

Gives quantitative data about community gardening in Germany and highlights difficulties in obtaining urban land for small gardens in Berlin, Germany. The paper examines implications of zoning law in Germany. There is an interesting historic overview of community or allotment gardens and their contribution to community development. (WB)

Gura, Susanne **(1996). Vegetable production: a challenge for urban and rural development. In: Agriculture + Rural Development, vol. 3 (1996) no. 1, p. 42-44 Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA); Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL); Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ)**
horticulture food security and nutrition
vegetable production; consumption patterns; nutrition; farming systems

Vegetables play an important role in food security. Vegetable production has been mostly concentrated on species with a high market value. However, the poor usually can't afford these types of vegetables. Urban poor mainly consume leafy vegetables which wither quickly. Urban agriculture can play an important role to increase this production. Three systems of production are distinguished: urban shifting cultivators,

household gardeners and periurban market producers. It is argued that these systems need development support for land saving technologies, improved recycling of waste, recycling technologies and urban community development approaches and interdisciplinary approaches. (NB)

Hargesheimer, Ken**. Urban agriculture: gardening, market gardening, mini-farming, mini-ranching. Gardens / Mini-farms Network, Lubbock, TX, USA**
horticulture economic impact rural-urban linkages
home gardening; gardening techniques; urban livestock production; youth; United States

Focuses on the potential of various forms of urban agriculture, notably from the perspective of an opportunity for youth employment. Much of this paper is a mapping of production techniques. In addition, a condensed overview is given of important publications and suppliers' addresses, for the American market. (WB)

Holl, Annegret **(1998). Urbane Landwirtschaft in Havanna (Kuba) zwischen staatlicher Planung und 'moviemento popular'. 90 p.**
food security and nutrition community development hydroponics
Havana; Cuba; home gardening; community gardens; food security; agricultural markets; commodity-oriented agriculture

Urban agriculture in Havana is considered by many authors as an essential contribution to Cuban food security, is very much instigated by the state and now covers over 6,000 hectares within the city boundaries. This paper reports on a fact-finding trip examining if urban agriculture in Havana is as successful as is often claimed. Doing a survey to that effect revealed itself difficult in the current political setting. The author highlights existing discrepancies from state regulations, more particularly with regard to the composition of crops produced: many citizens go for staple food production rather than vegetables. The paper concludes that the contribution of urban agriculture to food security is less than what is often reported and certainly not enough to feed Havana. Also, rural production should be much more directed towards the internal Cuban market. A refreshing look at things which are so often just taken for granted and therefore an important contribution paper. (WB)

Holmer, Robert J; Schnitzler, Wilfried H **(1999). Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems: Vietnam, Laos and Philippines. Urban Agriculture Notes http://www.cityfarmer.org/laos.html. 5 p. Periurban Vegetable Production Project (PUVeP), Xavier University College of Agriculture, PO Box 78900, Cagayan de Oro, Philippines**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture economic impact services
vegetable production; Vietnam; small- and medium-sized enterprises; Laos;

Philippines

Gives a description of the Urban and Periurban Small and Medium-Sized Enterprise Development for Sustainable Vegetable Production and Marketing Systems. The project is implemented in Vietnam (Ho Chi Minh City), Laos (Vientiane) and the Philippines (Cagayan de Oro). The project aims to facilitate small and medium sized enterprises in South-East Asia with access to the market by developing socially, economically and ecologically sustainable vegetable production systems. (NB)

Holmer, Robert J. **(2001) Appropriate Methodologies for Microenterprise Development in Urban Agriculture. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology horticulture services
micro enterprise; informal sector

Much of the developing countries' rapidly growing population forms part of the economy that lies outside the regulatory framework of governments in what is known as the informal sector. Although the definitions vary according to the country context, it is generally agreed that the informal sector, whether rural or urban, comprises small and micro-enterprises producing and distributing basic goods and services in unregulated, but competitive markets. This paper reviews available literature and the contributions to the workshop.

Hoogerbrugge, ID; Fresco, LO **(1993). Homegarden systems: agricultural characteristics and challenges. IIED Gatekeeper series no. SA39. 23 p. Department of Agronomy, Wageningen Agricultural University (WAU), PO Box 341, 6700 AH Wageningen, The Netherlands**
Supplier: International Institute for Environment and Development (IIED), 3 Endsleigh Street, London WC1H 0DD, UK
horticulture
Asia; cultivation; family labour; home gardening; labour; land use; marginal land; population density; small-scale agriculture

In the humid tropics only two systems of traditional, low input farming have evolved under high conditions of high population densities: wet rice cultivation and homegardening. Much is known about wet rice systems but surprisingly little about homegardens. Homegardens are defined as 'small scale, supplementary food production system by and for household members that mimics the natural, multi-layered ecosystem'. This paper discusses many sources of 'informal' or 'grey' literature on agronomic aspects of homegardens, including several unpublished field observations. It aims to increase the understanding of the homegardens flexibility in the light of changing conditions in Southeast Asia and discusses its applicability and potential for increasing food security in certain parts of Africa and Central America.

(RV)

Howorth, Chris; Convery, Ian; Majani, Bituro **(1995). Feasibility study of urban horticulture in Dar es Salaam. 31 p. Natural Resources Institute (NRI), Central Avenue, Chatham Maritime, Kent ME4 4TB, UK**
Supplier: ETC(UK)
horticulture economic impact
Tanzania; economic impact; political aspects

Gives an overview of the urban agriculture situation in Dar Es Salaam. The report provides figures about cost and benefits of urban and periurban farming. A number of other issues are also discussed: local authority perception of urban farming, water and land supply, urban waste management, composting and recycling. Different projects for the promotion of urban horticulture undertaken in the Dar Es Salaam area are briefly described. (WB)

Ignacio, NG **(1994). Resettle and survive. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 18. International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
land use planning horticulture
home gardening; Philippines; small-scale agriculture; urban communities; urban development; urban environment; urban population; vegetables

Urban populations in developing countries are growing fast. It's expected that by 2025, urban centres in the developing world will be home to some four billion people, a figure equal to the world's total population in 1975 (World Resources 1994). Rapid population growth and urbanisation are straining resources. Shelter, sewerage, clean water and even the most basic of amenities, food, are at a premium and malnutrition is endemic. (ILEIA)

International Institute of Rural Reconstruction (IIRR)**. Urban agriculture issues: case study of DBB (Dasmarinas Bagong Bayan) Project. 6 p. International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines**
horticulture
Philippines; development projects; resettlement projects; home gardening

Describes the Dasmarinas Bagong Bayan Project, a major semi-urban resettlement project south of Manila. In order to boost low incomes of recent settlers, the Philippine government encouraged the development of a semi-commercial bio-intensive gardening project among just over 50 growers. (WB)

Jacobi, Petra **(1997). Importance of vegetable promotion in Dar es Salaam, Tanzania. 15 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**

horticulture economic impact services

Tanzania; agricultural production systems; economic analysis; marketing

Urban agriculture in Dar es Salaam involves a large proportion of the city population, Therefore, the city has been of major interest for research undertaken in this area for many years. The Urban Vegetable Promotion Project, started in 1993, deals with the different production systems of vegetables in and around Dar es Salaam. Three major production systems are determined: periurban production, open space system and homegarden production. The report gives useful information about the number of people engaged in gardening, different cropping patterns and cultivars used, cultivation periods, and approximate yield. It is argued that the different production systems all occupy a specific niche with regard to vegetable production and consumption in Dar es Salaam. (WB)

Jacobi, Petra ; Amend, Jörg; Kiango, Suzan (1999). Farming in the city: Vegetable production in Tanzania. In: Gate: Technology and Development no. 2 (April-June 1999) p. 14-20

horticulture food security and nutrition

Tanzania; vegetable production

Dar es Salaam is a good example of the potential of urban farming. Besides cattle raising, vegetable production is the most prominent activity, with a clear focus on leafy vegetables. The reasons are: a huge demand, it can be grown throughout the year, there are pest resistant crops, investments are reasonable, certain crops can be picked continuously and competition from outside the town is minimal. The authors conclude that urban farming creates jobs and income, reduces household spending, maintains green space and contributes to reusing organic waste. More and more stakeholders acknowledge the importance of urban agriculture in Dar es Salaam. An extended version of the article can be found in 'Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda' published by DSE. (NB)

Jacobi, Petra; Amend, Jörg; Kiango, Suzan (2000). Urban agriculture in Dar es Salaam: providing for an indispensable part of the diet. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 257-283. DSE, GTZ, CTA, SIDA

horticulture food security and nutrition

vegetable production; dairy farming; community gardens; food security; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Tanzania

Homegarden production, Livestock production in homesteads, community gardens, open space production, and periurban production in Dar es Salaam are discsussed. Perishables (milk, leafy vegetables) are produced in intraurban areas the periurban area supplies a mix of perishables and staples (maize, rice a.o.). More than 90% of

leafy vegetables come form opens spaces and home gardens while 60% of the milk is produce in urban and periurban areas. Urban farming contributes to the maintenance of green open spaces, improving the micro climate and preventing illegal dumpsites. The different production systems contribute considerably to family income. There is a strong link between the socio-economic status of a family, the objective of the production and the involvement of women. “Female agriculture” contributes more to the household. Urban agriculture is affected by, access to resources (water), insecure land-use titles, the unsatisfied demand for fresh food especially green leafy vegetables. Level of organisation is low and urban retail poses problems. Urban agriculture has received attention on various policy levels. Its recognition is reflected in several laws and regulations. It is expected to keep its importance especially for the urban poor. (NB)

Jacobi, Petra. and Kiango, Suzan. **(2001) Ways to monitor & evaluate Urban and Periurban Agriculture – Experiences from Dar Es Salaam, Tanzania. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology land use planning horticulture

Tanzania; monitoring and evaluation; participatory monitoring; indicators

In Tanzania urban and peri- urban agriculture is a well-known activity and it has reached the level of official acceptance. Systematic monitoring and evaluation as well as channelling generated information and feedback from the field to the relevant levels has supported this acceptance. In the discussion about participatory M&E against conventional M&E it appears that the former should replace the latter. It is argued in this paper that there should be a balance to be struck between “conventional” and “participatory” monitoring. There should be both “hard data” and a system that allows primary stakeholders to monitor and evaluate their activities using different methods and own indicators. Truly appropriate monitoring and evaluation should enhance internal learning and provide evidence to support qualitative statements about the impact of an action.

Jansen, Hans GP **et al (1995). Sustainable periurban vegetable production and natural resources management in Nepal: results of a diagnostic survey. AVRDC, Taiwan; 40 p.**

horticulture

irrigation; marketing; agricultural extension; economics; Nepal

This report is concerning a diagnostic survey of vegetable production in three districts of the Katmandu valley, daily delivery to the city markets. A good analysis is done of annual cropping patterns and methods of production. The economic analysis leads to a set of recommendations leading to increased production. (JS)

Jeavons, John **(1974). How to grow more vegetables than you ever thought possible on less land than you can imagine. Palo Alto, CA: Ecology Action of the Peninsula. 81 p.**

community development horticulture

history; composting; biodynamic gardening; vegetable crops; integrated pest management

This book has continued to be updated and reissued until recently. It is a manual of biodynamic raised-bed horticulture, a history, a philosophic statement and a vision. At its core are methods developed in the Marais in Paris in the 1890s, to which were added the biodynamic techniques of Rudolf Steiner in the 1920s. Alan Chadwick integrated biodynamic and intensive farming in the 1940s and brought them to California in the 1960s. This book reports on results and methods carried out at the University of California at Santa Barbara, on the basis of Chadwick's lessons. (JS)

Karaan, M. **(2001), Urban Horticculture in the Cape Metropolitan Area: An Appraisal of Activities and Institutional Support. Department of Agricultural Economics, University of Stellenbosch. In: Proceedings on the Sub-Regional Expert Consultation on the Use of Low Cost and Simple Technologies for Crop Diversification by Small Scale Farmers in Urban and Peri-Urban Areas of Southern Africa, Stellenbosch, South Africa, January 15-18 2001.**

urban horticulture

institutional support; horticulture; urban areas; South Africa,

This paper reports on research done to evaluate the contribution if urban agriculture to the livelihoods of recently urbanised people in the Cape Town Metropole. The study emanated from an evaluation of non-government support to promote urban agriculture and hence is also an appraisal of the effectiveness of NGO support. The NGO under evaluation was Abalimi Bezekhaya. The investigation is specifically an evaluation of people's motivations for engaging in urban farming, the efficiency of such activity and the effectiveness of existing support structures. First, a brief background of the study area is sketched, followed by a concise history of Alabimi Bezekhaya. The analysis that follows is specifically an assessment of motivations, production costs and support measures. A short account is also given of recent efforts by local authorities to cater for urban agriculture. Conclusions and recommendations follow.

Kalumba, KV **(19??). Ten case studies of small-scale gardening in the Thornpark / Villa Elisabetta area of Lusaka. In: In the shadow of Lusaka (source unknown) p. 37-45**

horticulture

home gardening; Zambia; surveys

Paints a picture of the typical Lusaka urban gardener and infers general conclusions about the gardener's position vis-à-vis city authorities and about his attitude towards poverty and how to cope with it. (WB)

Kiango, Suzan and M.E. Nzalawahe **(2001), Urban and Peri Urban Horticultural Production in Tanzania. Ministry of Agriculture and Co-operatives, Dar es Salaam, Tanzania. In: Proceedings on the Sub-Regional Expert Consultation on the Use of Low Cost and Simple Technologies for Crop Diversification by Small Scale Farmers in Urban and Peri-Urban Areas of Southern Africa, Stellenbosch, South Africa, January 15-18 2001**

urban horticulture

Tanzania; urban areas; periurban area; horticulture, Africa (Eastern)

In Tanzania, high urban growth rates with limited formal employment have meant a mushrooming of all kinds of informal employment. Here, urban agriculture is one of the important informal activities, as it provides income to a cross section of the urban population. It contributes to the city economy, as it is an industry in itself that includes production and marketing activities. It has proved to be one of the survival strategies for all social classes to cope with the declining standard of living. It provides and increases access to high value food for relatively poor urban dwellers. Wide ranges of ethnic groups participate in urban agriculture. Some background in horticulture and limited formal employment is the major reason for a farmer to engage in urban agriculture. The farmers represent the average working population (50-60% in the ages of 20-40). Men and women both participate: men are more active in open space production while women are responsible for home gardening in high-density areas. Availability of intra-urban land and a variety of water sources favour urban agriculture. However, land tenure, illegal land use and insecurity of land use limits long term investment in these open spaces. On the other hand, acces and reliability of water supply plays a major role in the size and duration of production. In some areas, low surface water quality and high rates of water bills limit production. The nature of urban agriculture offers opportunities for nutrient recycling from one production system to another. Composting of organic wastes contributes to the availability of inputs, especially manure, and benefits the city environment. Informal land acquisition gives equal chance on access to land to both genders. Acces to formal credit to subsistence producers appears to be difficult while capital investment in peri urban areas could play a significant role. Furthermore, a variety of recommendations looking at different institutions as well as follow up activities are highlighted.

Kleer, Jerzy **(1987). Small-scale agricultural production in urban areas in Poland. In: Food and Nutrition Bulletin vol. 9 no. 2 (1987) p. 24-28. University of Warsaw**

food security and nutrition horticulture

home gardening; allotment gardens; agricultural production; Poland

Contains a historic overview of small-scale food production in Polish towns and cities. One interesting figure: in the mid-1980s, total output from allotment gardens accounted for over 6% of total agricultural production in Poland. (WB)

Knierim, Andrea **(1996). Agricultural development potential around Dolisie in the**

Congo: a case study in the catchment area of a small town. In: Agriculture + Rural Development vol. 3 (1996) no. 2 p. 51-54
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)
economic impact horticulture rural-urban linkages
Congo; periurban agriculture; socio-economic aspects

Examines the potential of periurban agriculture around the city of Dolisie in the Congo. Technical issues are addressed, but also who are the target groups for agricultural innovations and intensification activities. In this analysis, a distinction is made into 3 agricultural circles in and around the town: (1) lots within the town and around its fringes; (2) areas within a radius of 10 to 15 kilometres; (3) villages in a radius of up to 50 kilometres. All 3 different circles are farmed by different groups of producers. (WB)

Kogi-Makau, Wambui **(1998). Production and utilization of vegetable (sic) and fruits in two urban sites in Dar es Salaam: a case study in Mbuyuni and Manzese, Dar es Salaam, November 1995 to November 1996. 74 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
horticulture services
household survey; Tanzania; consumption patterns; home gardening; marketing

Presents the results of a household survey in two areas of Dar es Salaam. Data are given on acquisition and consumption patterns of vegetables and fruits and on production and utilisation of agricultural produce. (WB)

Koizumi, M; Abbas, D; Stares, J **(2000). AVRDC report 1999. Asian Vegetable Research and Development Center Publ. No. 300-503, 152 p.**
horticulture
vegetables; Asia; Africa; Central America; nutrition; periurban agriculture; composting

This research report is full of data from Asia, Central America and Africa. Program II *Year-round vegetable production systems* includes: (i) a significant degree of data and reportage on periurban food production, (ii) its socio-economic impact, (iii) the nutritive value of policy interventions, and (iv) municipal composting. Its 134 tables are an essential resource to be up-to-date on the advance of research in vegetable production technology. (JS)

Kouvonou, FM; Honfoga, BG; Debrah, SK **(1999). Sécurité alimentaire et gestion intégrée de la fertilité des sols: contribution du maraîchage périurbain à Lomé. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa:**

contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 83-103. Institut International pour la Gestion de la Fertilité des Sols - Afrique
horticulture
vegetable production; nutrition; income generation; soil fertility management

Vegetable production can be a good example of integrated soil fertility management. Vegetable production benefits from stable markets and accessible inputs. The average net monthly income of vegetable production is relatively high. Production is sensitive to the use of organic and inorganic fertilisers. (NB)

Kropotkin, Peter **(1985). Fields, factories and workshops. Tomorrow Freedom Press First published in 1890, 199 p.**
horticulture
periurban agriculture; market gardening; environment; organic agriculture; bio-intensive production; Europe; history

This reissue of a classic work serves as a background to understanding the beginnings of modern urban agriculture in the mid-19th century. It thus assists us in perceiving the possible future of sustainable urbanization. (JS)

Kuiler, Esther **(1998). Toekomstperspectieven voor biologische stadslandbouw in Nederland: stadslandbouw als onderdeel van de urbane bosbouw. AV no. 98-07. 72 p. Departement Omgevingswetenschappen, Sectie Bosbouw, Agricultural University Wageningen, The Netherlands**
horticulture urban forestry rural-urban linkages
landscape design; urban livelihoods; biological agriculture; home gardening; Netherlands

Looks at urban agriculture from the livelihood point of view and examines its contribution to creating an attractive urban landscape in the setting of The Netherlands. In Dutch. (WB)

Lanting, H., M.S. Rao and K. Ravi **(2001), Tomato: A Field Guide to Ecofriendly Crop Protection.**
Supplier: Bangalore: Agriculture Man Ecology (AME) AME, 368, ath Cross, JP Nagar 3rd Phase, Bangalore 560 078, Karnataka, India
urban horticulture
India; pest management; vegetable production; vegetables; organic agriculture

This is an illustrated handbook of insect pests and diseases most commonly found in the tomato-growing regions of India. This book aims to promote organic plant protection practices. It does not aim to cover all the other aspects of organic tomato farming, but encourages adoption of many useful organic plant protection practices through minimal use of chemicals. For each important insect pest, disease or nematode, the reader will find recommendations and strategies for appropriate biocontrol, and simple instructions for the preparation of bio-inputs.

This guide is primarily intended for tomato growers in India and their service groups - agricultural extension workers, farm managers, horticulturists, agronomists, tomato processing units, agro-input manufacturers and seed companies. Its main objective is to serve as a quick reference tool for effective and ecofriendly management of the more economically important and prevalent pests of tomato in India.

Lahr, PF; Lehen, CC **(1989). Techniques and resources for fast growing hot weather vegetable gardening in Port-au-Prince, Haiti. ECHO (Educational Concerns for Hunger Organization) North Fort Myers, Florida. 49 p.**
horticulture
Haiti; Caribbean; small-scale agriculture; irrigation; composting; vegetables

This is a useful manual for many tropical urban areas. It includes 15 Appendices on how to do it. Eight specific types of gardens are described. (JS)

Lawrence, Joseph **(1999). Urban agriculture: the potential of rooftop gardening. Urban Agriculture Notes http://www.cityfarmer.org/roofthesisIntr.html. York University, North York, Ontario, Canada**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture
rooftop gardening

This elaborate thesis explores rooftop gardening based on the author's experience. Practicalities like farm layout, crop selection as well as analyses on economic potential and other issues are presented. (NB)

Lewis, Ingrid U **(1996). The promotion of traditional vegetables: examples from Africa. In: Agriculture + Rural Development vol. 3 (1996) no. 1 p. 48-49**
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)
horticulture
Africa; traditional vegetables; nutrition; conservation; gender issues

There has been a drastic decline in the use of traditional vegetables in the world. In the framework of the Urban Vegetable Promotion Project in Tanzania, research was conducted into the scope for restoring traditional strains of vegetables to the position of importance which their nutritional value merits. Improvement, distribution and in-situ conservation are discussed. This seems a very praiseworthy initiative in which there is much scope for community involvement, especially of women. (WB)

LifeSpin **(1997). Pocket-sized Farms - kid's garden book. LifeSpin. On: www.execulink.com/~life/**
community development horticulture

youth; education; organic gardening

Organized around the seasons the book is designed for children to use as members of a school garden club or in their own backyards. The book uses two fictional characters, the Crow and the scarecrow, in a rhyming story format to guide children through a series of important organic gardening principles. It is intended both as a source of inspiration and a learning opportunity for children. A second part of a package *Teacher's and Parent's Guide to Organic Gardening,* includes organic gardening advice, a number of educational activities, and specific tips for gardening with young kids. A third component is *The Kid's Workbook* – (JS)

Loraine, Isabelle **(1994). Agriculture in the non-urban areas of Melbourne Region. Government of Victoria, Australia.**

horticulture

periurban agriculture; Australia; urban planning; environment

This is an exceptional comprehensive analysis of periurban agriculture in a temperate climate. Its focus is urban planning and urban development strategies. The elements analyzed include: (i) land values, (ii) agricultural production and marketing, (iii) environmental impacts, (iv) recreation, natural resource conservation, (v) comparisons to France and the USA, (vi) comparisons of metropolitan sub-regions. In all a model worthy of considering when setting out to do an agricultural metropolitan study. (JS)

Losada, Hermenegildo **(et al.) (1998). Urban agriculture in the metropolitan zone of Mexico city: changes over time in urban, suburban and periurban areas. In: Environment and Urbanization vol. 10 (1998) no.2 p. 37-54**

horticulture food security and nutrition

urban livestock; ornamental plants; urban farming systems; environment; environmental pollution; urban planning; land tenure; cultural aspects

The paper describes the scale and nature of agricultural production in Mexico City, according to the different zones defined and how these have adapted to the changing demands from urban populations for food, wood and recreation. Evidence is provided that agriculture has successfully adapted its products and production methods to the changes, which include a deteriorating environment and lack of government support. The producers developed ways to use degraded land and use large volumes of waste in the production process. Its is argued that appropriate support for the diverse urban agricultural production comes with many ecological advantages and creates new jobs. However this also requires important changes in the ways city authorities manage urban expansion. (NB - Abstract adapted form from summary)

Losada, Hermenegildo **et al (1999). Assessing the sustainability of a periurban agroecosystem: the terraced production of Nopal-vegetable (Opuntia ficus**

indica) in Milpa Alta, Mexico City. (Unpublished). Universidad Autonoma Metropolitana-Iztalpalapa, Mexico DF, 29 p.
horticulture
Mexico; sustainable agriculture; farmers' organisations; economics

This study report presents a phenomenal growth of the production of Nopal (edible cactus) within a large metropolitan area by four items in 15 years. It studies this urban agriculture success story from several points of view and comes to a positive conclusion. (JS)

Madisa, M.E. and D.L. Keboneilwe **(2001), Urban and Peri-Urban Horticulture in Southern African Countries: Status of Urban and Peri-Urban Agriculture in Botswana. Department of Agricultural Research / Division of Agricultural Planning and Statistics, Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001**.

urban horticulture
horticulture; urban areas; periurban area; Botswana, Africa (Southern)

The contribution and performance of the horticultural subsector in Botswana continue to pose a great challenge to government, particularly the Ministry of Agriculture. Whilst physical and climatic factors that constrain the productivity of the sector cannot be ignored, the infancy of the horticulture as an industry need to be acknowledged. Horticultural farming that includes products such as cabbage, carrots, tomatoes, etc. is not part of the traditional farming systems. However, as socio-economic and demographic changes set in, urban and peri-urban agriculture has become increasingly relevant, particularly in the midst of unemployment, food insecurity and poverty. As government policy strives to improve quality of life for all people, diversification of agricultural production base has been adopted. The National Masterplan for Agricultural Development (NAMPAD) has also identified the need to better plan agricultural production zone as well as putting sewage water and contaminated well fields and dams to productive use. This will go a long way in addressing unemployment, waste management and food security problems in urban and peri-urban centers. There is, however, a need to develop a public policy that can ensure the integration and sustainability of urban and peri-urban agriculture in urban and peri-urban centers. Furthermore, low-cost technologies and training on horticultural skills will need to be developed.

Marsh, R **(1994). Nutritional benefits from home gardening. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 14-15. Asian Vegetable Research and Development Center (AVRDC), PO Box 205, Taipei 10099, Taiwan; IICA, PO Box 55-2200, San Jose, Costa Rica**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
horticulture food security and nutrition
Bangladesh; community health; home gardening; nutrition; nutritive value; urban communities; urban development; urban environment; urban population; vegetables

Seasonal hunger and malnutrition are ever-present conditions for the landless or near landless rural poor and urban slum dwellers. These groups are particularly vulnerable because of low and irregular cash incomes. In Bangladesh, as in other tropical countries, many such households use the small area around their house to grow food to supplement field crops, purchased food and generate income for households with access to markets. The pilot homegarden project of Helen Keller International (HKI) reported here has looked specifically at the impact of improved home gardening on the nutritional status and health of poor households. (ILEIA)

Marulanda C; Izquierdo J **(1991, 1998). La huerta hidropónica popular. FAO. On: www.rlc.fao.org/prior/segalim/prodalim/prodveg/10046.pdf.**
hydroponics
horticulture; training

This manual presents the step by step method of “popular hydroponic agriculture” as invented in Colombia in the 1980s. It uses illustrations and checklists. English and Portuguese versions available on paper at request. An audio-visual video training course, with nine classes, available in Spanish and Portuguese, (JS from authors)

Mbaye, Alain; Bon, Hubert de ; Pages, Jacques**. Vers une gestion concertée de resources naturelles en zone périurbaine: Le cas de la région de Dakar. Agriculture périurbaine en Afrique subsaharienne p. 125-139**
horticulture
Senegal; natural resource management; farming systems; water management

With increasing urbanisation and industrialisation the pressure on natural resources has increased. An analysis of agricultural production systems in the Dakar periurban region revealed substantial diversity, with a predominance of irrigated systems in the Niayes and Cape Verde areas. Urban agriculture faces several challenges: the deterioration and increasing scarcity of natural resources decreasing agricultural production with increasing food requirements, the development of periurban agricultural production and associated industries and the importance of horticultural and fruit production sector in the national economy. The paper focuses on the methods of water resource management and on activities of the "Centre pour le Développement de l'Horticulture" (CDH). After describing the impact of water availability on production systems and outlining a typology of farms, the main problems related to water availability are discussed. The CDH was set up to guide the development of market gardening in the Niayes region. Many innovations have been developed including pest management cropping schedules and monitoring marketing operations. TH CDH is to work on improving , diversifying and intensifying production, developing integrated systems, develop natural resource management techniques and develop decision making tools. (NB - abstract adapted form original)

Mbaye, Alain **(1999). Production des légumes à Dakar: importance, constraints et**

potentialités. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 55-66. Institut Sénégalais de Recherches Agricoles (ISRA), Centre pour le Développement de l'Horticulture (CDH)
horticulture
vegetable production; Senegal; production systems

Vegetable production in Dakar represents 40% of the national production. In Dakar there is strong pressure on available resources, which are rapidly degraded. Whereby urban vegetable production systems directly compete with non-agricultural urban needs. (NB)

Mbaye, Alain; Moustier, Paule **(2000). Market-oriented urban agricultural production in Dakar. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 235-256. DSE, GTZ, CTA, SIDA**
horticulture
commercial agriculture; food security; food policy; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Senegal

The article defines urban agriculture as agriculture for which there is an alternative in the use of resources – one agricultural and an other non-agricultural. This generates competition but also possible complementarity. Five production systems are discussed: (a) family periurban vegetable production systems, (b) commercial periurban vegetable production, (c) specialised systems of poultry farming, (d) periurban systems of combined agriculture and poultry production, (e) backyard horticulture and livestock systems. The contribution of urban agriculture is substantial for vegetables and poultry. Cereals and tubers are of less importance. Organic waste is systematically used in farming. Dakar's principal site of agricultural production has an important function for drainage and erosion prevention. It is estimated that urban agriculture creates 15,000 jobs. There is no formal policy framework for urban agriculture, it is no priority in urban planning. This affects mainly small producers as they have insecure land use rights. The final part contains recommendations with regard to urban agriculture, the preservation of physical resources and in the area of collaborative efforts and information systems. (NB)

Mbiba, Beacon M **(1993). Urban agriculture in Zimbabwe: implications for urban poverty and management. The Making of Modern Africa Series. ISBN 1 85628 857 9. NLG 225.00. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe**
horticulture food security and nutrition
Zimbabwe; urban environment; urban development; development policies

The book is based on research conducted in Zimbabwe in 1991 and rejuvenated local interest on urban agriculture. In southern and eastern Africa, urbanisation is a major process transforming the economies. Most urban centres were lanned for

much smaller populations and they lack adequate formal sector employment for the growing workforce. As a result most urban environments are characterised by informal sector activities, of which urban agriculture is increasingly an important feature. While it acknowledges that the activity is a significant source of food and income for the urban poor, the book draws attention to development conflicts raised by the activity. The book places urban agriculture within the context of urban economy, urban management, and urban development also discussed are the gender dimension, environment institutional aspects. Lastly ways to develop urban agriculture to its full potential in Harare are explored. (NB)

Mbiba, Beacon M **(1999). Urban agriculture in Zimbabwe. Urban Agriculture Notes http://www.cityfarmer.org/zimbabwe.html. 2 p. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe Supplier: City Farmer, Canada's Office of Urban Agriculture**

horticulture food security and nutrition

Zimbabwe; poverty; income generation; food production

A summary of the book "Urban agriculture in Zimbabwe" by Beacon Mbiba. A table of contents is provided. The book adresses the phenomenon of urban agriculture in Zimbabwe. (NB)

Mbiba, Beacon M **(2000). Urban agriculture in Harare: between suspicion and repression. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 285-301. DSE, GTZ, CTA, SIDA**

horticulture food security and nutrition

farming systems; food security; food policy; land use systems; ecology; economic impact; gender; urban policies; poverty; land tenure; legislation; Zimbabwe

Harare has several conditions favourable to urban agriculture including a relatively wet climate, large residential plot size and large open spaces in the city. Urban agriculture can be classified into on-plot agriculture, off-plot agriculture, and periurban agriculture. The collapse of the formal economy gives rise to urban agriculture. Most of the production is for subsistence. Whereby women provide the bulk of the labour and management inputs. This can be related to their traditional roles of food procurers. The official view is that urban agriculture poses a threat to the environment, but potential contributions to the environment remain unexplored. Existing policies swing between repression and tolerance, while urban agriculture is not perceived as a viable solution for food security or job creation. The general opinion is that there is ample rural land available for production, rather the problem is the inequitable distribution of land. Research and lobbying helped to create a basis for dialogue around the potential of urban agriculture. For this the target should be to increase food production and make it available, affordable and adequate through out the year. The challenge is to discover how the ambiguity of the legal framework can be used to extent urban agriculture. (NB)

Medellín Erdmann, Rodrigo A **(1995). Container farming: organic food production in slums of Mexico City. In: Gate (March 1995) p. 32-35**
hydroponics horticulture
Mexico

Reports on ANADEGES, a joint project by some 20 NGOs launched to help urban poor in Mexico City develop a capacity to produce food organically in backyards or on rooftops or balconies. Several techniques were introduced to increase production, mostly in relation to production and application of fertiliser. (WB)

Memon, Pyar Ali; Lee-Smith, Diana **(1993). Urban agriculture in Kenya. In: CJAS/RCEA (January 1993) p. 25-42. Mazingira Institute, Nairobi, Kenya**
horticulture food security and nutrition
food security; surveys; Kenya

Presents the results of a survey among urban farmers in Kenyan cities by the Mazingira Institute. The study concludes, once more, that subsistence production in towns and cities has been neglected in economic and spatial planning to the point of being outlawed Still, the economic value of urban subsistence farming is both significant at the national level and crucial to the poor themselves. (WB)

Meyer-Renschhausen, Elisabeth; Holl, Annegret **(eds) 2000. Die Wiederkehr der Gaerten: Kleinlandwirtschaft im Zeitalter der Globalisierung. 229 p. ISBN 3-7065-1534-2. Innsbruck: Studien-Verlag**
horticulture food security and nutrition community development
horticulture; gardening; allotment gardens; vegetables; conferences; Germany; United States; Cuba; Mexico; Burkina Faso

More and more city dwellers become involved in producing vegetables and fruit, rather than consume commercially produced food. The reasons strongly vary, however, from sheer necessity in many Eastern European and developing countries to a reaction to the unhealthy commercial products and the benefits of a relaxed pastime for overstressed urban citizens.

A number of chapters in this book were originally presented at the 'International Symposium on Urban Agriculture and Horticulture: the Linkage with Urban Planning' held in Berlin in July 2000. Cases described are from Western Europe -Germany, in particular-, Eastern Europe, the USA and from developing countries. Many different aspects are described, ranging from the land use issues, that never fail to come up in these cases, to community development and to descriptions of gardening systems, like the chinampas near Mexico City. Interestingly, a number of projects are analysed that were unsuccessful in involving the beneficiaries. Invariably, these projects did not take traditional production and consumption patterns enough into account. This is an important warning not to automatically paint a rosy picture of urban gardening. (WB)

Midmore, David J **(1994). Simple hydroponics for food security. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 11-12**
hydroponics
vegetable production; pesticides

Vegetable growing can be intensified by means of a simple system of hydroponics - growing plants without soil - which uses resources efficiently and can be adapted to local conditions. David Midmore from the Asian Vegetable Research and Development Center (AVRDC) presents a space-saving production system which can be used worldwide. ILEIA)

Midmore, David J **(1996). Sustainable and ecologically sound vegetable growing in periurban farming. In: Agriculture + Rural Development vol. 3 (1996) no. 1 p. 50-52**
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)
horticulture hydroponics
periurban agriculture; vegetable production; nutrition, South East Asia

Examines how growing vegetables around cities can be done on a more sustainable and, at the same time, more economically sound basis. Often, claims on land and other inputs fore this activity are very high in view of increased demand for foodstuffs. The author provides alternatives, notably hydroponics, based on his experience in South East Asia with the Asian Vegetable Research Development Center (AVRDC). (WB)

Midmore, David J; Niñez, Vera K; Venkataraman, Ramesh **(1991). Household gardening projects in Asia: past experience and future directions. AVRDC Technical Bulletin no. 19. 28 p. ISBN 92_9058_049_6. Asian Vegetable Research and Development Center (AVRDC), PO Box 205, Taipei 10099, Taiwan**
horticulture
gardening; vegetables; home economics; home gardening; Asia; humid zones

Household gardens have never received much attention from development agencies. During the 1980s, however, small-scale family food production came to receive the backing of UNICEF, FAO, USAID and a number of NGOs. These small agricultural plots are mainly cultivated by women. Their importance lies in the enrichment of the staple diet. They also mean, sometimes, a much-needed additional source of income for the family, and a -relative- financial independence of women in male-dominated societies. In order to consolidate lessons learned from experiences with household garden projects, an International Workshop on Household Garden Projects was held in Bangkok, on 13-15 May 1991. During this workshop, effectiveness of projects was analysed and also which were the factors

contributing to success or failure of the projects. (WB)

Mnidga, H; Lyimo, M **(1997). Communication manual. 87 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
horticulture R&D methodology
agricultural extension; communication; participatory learning

Ten different sessions are covered in this manual, ranging from practising basic knowledge on communication, adult learning, and working in groups to facilitation. Apart from the extensionists involved in the Urban Vegetable Promotion Project (UVPP), this course was open to other interested extensionists in the Dar es Salaam region. Sessions shared a common factor: concentrating on improving the flow of information and supporting the participatory approach for distributing technical knowledge. (WB)

Mougeot, Luc JA **(1994). The rise of city farming: research must catch up with reality. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 4-5. Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands**
horticulture food security and nutrition
home gardening; urban communities; urban development; urban environment; urban population; urban wastes

Farming has probably been carried out in cities ever since they came into being. Luc Mougeot from the International Development Research Centre (IDRC) in Canada traces the history of farming from ancient cities to the challenges facing urban planning and research in the North and South at the dawn of the 21st century. (ILEIA)

Moustier, Paule; Mbaye, Alain; Bon, Hubert de; Guérin, Hubert; Pages, Jacques (eds) **(1999). Agriculture périurbaine en Afrique subsaharienne: actes de l'atelier international 20-24 avril 1998, Montpellier, France. 278 p. Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Montpellier, France; Conférence des Responsables de Recherche Agronomique en Afrique de l'Ouest et du Centre (CORAF)**
horticulture
Africa; horticulture; periurban agriculture; animal husbandry

Conference proceedings providing a state-of-the-art overview of periurban agriculture and horticulture in Africa south of the Sahara. This important publication highlights the wide array of agricultural activities in and around cities in Africa and the important place these activities occupy in the unofficial economy of African states. After a general introduction defining periurban agriculture and setting its limits, numerous case studies are presented, grouped according to ecozone (humid tropical and soudano-sahelian). (WB)

Moustier, Paule **(2001) Assessing The Socio-Economic Impact Of Urban And Periurban Agricultural Development. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology economic impact horticulture
West Africa; Central Africa; policy; vegetables

The paper provides practical indicators and field methods for assessing the impact of urban and periurban agriculture in social and economic terms (employment, income, added value, and food supply). In a context of growing advocacy for policy support in favour of urban agriculture, while public resources are shrinking, it is more and more necessary that researchers provide rigorous assessment of the contribution of urban agriculture to policy objectives. The paper is based on the author's fieldwork in West and Central Africa, mostly centred on vegetable production and marketing, as well as some literature review.

Mulenga, Bowa **(et al.) (1979). Gardening in the city. 16 p.**
horticulture
Zambia; home gardening; surveys

An early account of urban, rainfed, agriculture in areas in Lusaka and Mufulira. Many of the later so frequently advanced pros and cons of urban agriculture are already presented here. Socio-economic characteristics are given, as a result of surveys done. (WB)

Muster, Gisa **(1997). Environmental problems of urban agriculture: a case study of Dar es Salaam, Tanzania. Master's thesis, University of London, School of Oriental and African Studies. Dar es Salaam, Tanzania: GTZ, Urban Vegetable Promotion Project, 1997. 33 p.**
horticulture
Tanzania; ecology; environmental problems

This thesis was prepared through the Urban Vegetable Promotion Project (UVPP) of Tanzania. It assesses four types of environmental concerns associated with urban farming: air quality, water quality, erosion, and pollution from agriculture. The results show that farming can generally benefit the urban environment. (JN)

Muster, Gisa **(1998). Environmental problems of urban agriculture: a case study of Dar es Salaam, Tanzania. 58 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
Supplier: Ministry of Agriculture and Co-operatives (MoA&C) and Deutsche

Gesellschaft fuer Technische Zusammenarbeit (GTZ).
city ecology horticulture R&D methodology
Tanzania; open space management; off-plot cultivation; vegetable production

Shows the interaction between the urban environment of Dar es Salaam and agricultural production in open spaces, examining environmental effects in particular. In addition, the role played by urban agriculture in the city's economy is examined. A methodology is presented to estimate the environmental impact of vegetable production on the city's environment. (WB)

Niang, Seydou **(19??). L'agriculture urbaine au Sénégal: bilan et perspectives. 26 p.**
horticulture
Senegal; vegetable production; surveys

Traces the history of urban and periurban horticulture in the region of Niayes and provides factual and quantified information about horticultural activities in the area. (WB)

Niñez, Vera K **(1985). Introduction: household gardens and small-scale food production. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 1-5.**
horticulture food security and nutrition
home gardening; food production; gardening practices

Discusses household gardens as a household-level food production strategy and provides a useful list of functions and benefits, apart from the obvious food supply. Definitions are given of home gardens as against field production and market gardening and a systematic comparison is made between these three production modes. Interestingly, the author remarks on the fact that those who were involved in traditional gardening systems are rarely the ones who participate in the design and implementation of garden projects. This seems a strange state of affairs. (WB)

Niñez, Vera K **(1985). Working at half-potential: constructive analysis of home garden programmes in the Lima slums with suggestions for an alternative approach. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 6-14. International Potato Center (CIP), Lima, Peru**
community development horticulture
Peru; home gardening; food security; development projects; programme evaluation

Describes gardening and garden development projects in Lima, Peru, providing the socio-economic and nutritional background of low-income target populations against which small-scale food production development projects were conceived at a time when such initiatives were still rare. (WB)

Niñez, Vera K **(1986). The household garden as a lifeboat. In: Ceres no. 112 (July/Aug 1986) p. 31-36. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

horticulture food security and nutrition

home gardening; food security; Peru; traditional gardens

Describes household gardens as an additional source of food for the urban poor. A typology for these gardens is given, both from a biophysical and a socio-economic viewpoint. Initial gardening programmes were unsuccessful, the author argues, as they were mostly a replica of temperate, 'budget' gardens and took local conditions and customs insufficiently into account. A Peruvian urban gardening project is analysed in detail. Community gardens evolved from European-style gardens to traditional Peruvian gardens as external financial support came to an end. This resulted in a shift of species planted, with a stronger staple food component, in more intercropping, and in a multi-layered set-up, including banana, papaya and climbing species. The author draws a number of conclusions based on such project experiences all hinting at the importance to link up with existing practices. Extension and advertising campaigns are important to interest as wide a range of people as possible. (WB)

Nitsch, Egbert; Aue, Christina **(199?). Bedeutung staedtischer Land- und Gartenwirtschaft in Einer Welt: Gaerten als Beitrag zur Welternaehrung und zur Oekologisierung der Staedte. 33 p.**

horticulture food security and nutrition city ecology

food security; urban poor; urban policies

Examines the role and position of urban agriculture in the light of food security for the urban poor. A number of policy measures are presented that are necessary to reach a wider impact. The authors argue that this role is not restricted to cities in developing countries but plays an important role in greening cities in industrialised countries as well. (WB)

Nitsch, Egbert; Aue, Christina; Schmitt, Brigitte **(1998). Zur staedtischen Land- und Gartenwirtschaft in einer Welt: Beitraege der gruenen Veranstaltung vomm 22 Juni 1998 in Bonn. 139 p. Arbeitskreis II (Umwelt, Raumordnung und Staedtebau, Verkehr, Landwirtschaft) der Bundestagfraktion von Buendis 90 / der Gruenen, Bundeeshaus, 53113 Bonn, Germany**

R&D methodology rural-urban linkages horticulture

Agenda 21; Germany

Contains a number of papers presented in the framework of a seminar organised by the German Green Party. In quite a number of German cities, processes are taking place that are local implementations of Agenda 21. The underlying discussion aims at giving a more practical focus to the Agenda 21 discussion. (WB)

Nugent, Rachel A. **The sustainability of urban agriculture: a case study in Hartford, Connecticut. Urban agriculture notes; on: http://www.cityfarmer.org/rachel.html#rachel. 20 p. City Farmer, Canada's Office of Urban Agriculture**

horticulture economic impact

economic impact; sustainable agriculture; sustainability; United States

This study defines a framework for examining the impacts of urban agriculture and applies it to data from the city of Hartford, Connecticut, USA. It uses an extended cost-benefit approach which includes market and non-market economic, social, and environmental factors affected by urban agriculture. Non-quantifiable factors are discussed qualitatively as they are integral to understanding the effects of urban agriculture. The author concludes that, on the basis of data gathered, it cannot be concluded that urban agriculture in and around Hartford is sustainable, be it economically, socially, or ecologically. A longer time frame would be needed to draw conclusions about this issue (WB - from original abstract)

Orione, Julio **(1990). The cultivated city: kitchen gardens in Buenos Aires. In: UNESCO Sources no. 17 (July/August 1990) p. 13**

horticulture community development

home gardening; Argentina; food security

Describes the research work on homegardening done by the Center of Urban and Regional Studies (CEUR), Buenos Aires. Much of this article deals with the motives of urban dwellers to engage in this activity. (WB)

Pérez Rivero, Roberto **(19??). Permacultura: un proyecto exitoso? Enseñanzas para el futuro. Foundation for the Nature and Humankind, Cuba**

horticulture

Cuba; permaculture

A brief historic overview of permaculture experiences related to urban agriculture in Cuba. (NB)

Permacultuur in de stad **(1996). In: Permacultuur nieuws: ontwerpen van een duurzame samenleving / vruchtbare intergratie van cultuur & natuur vol. 7 (1996) no. 22/23. 24 p.**

horticulture

United Kingdom; permaculture; community gardens; mulching; composting; rooftop gardening; city farms

An issue on different aspects of permaculture in the city, covering a wide array of themes like community gardening, balcony gardening, mulching, composting, and the City Farms programme in the UK. In Dutch. (WB)

Pinzás, Teobaldo **(1994). Can city farming survive? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 10. Instituto de Estudios Peruanos, Horacio Urteaga 694, Lima 11, Peru**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
economic impact food security and nutrition horticulture
home gardening; horticulture; Peru; urban communities; urban development; urban environment; urban population; urban wastes; vegetables; waste recycling; women

Early 1994 ETC Foundation asked Theobaldo Pinzás to make an exploratory study on urban agriculture in Peru. This is an excerpt from his report, focusing on his findings about urban vegetable growing. In his full report, he suggests that more attention be given to recycling of waste and sewage water. (ILEIA)

Portable gardens made from old tires **(1996). In: Echo Development Notes (April 1996). 1 p.**
hydroponics horticulture
San Salvador; tyres; containers

Brief introduction about growing plants in tyres in San Salvador. (WB)

Potutan, Gerald E; Schnitzler, Wilfried H; Arnado, JM; Janubas, LG; Holmer, Robert J **(2000). Urban agriculture in Cagayan de Oro: a favourable response of city government and NGOs. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 413-428. DSE, GTZ, CTA, SIDA**
city ecology horticulture food security and nutrition
vegetable production; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; land tenure; nutrition; NGOs; school gardens; home gardening; Philippines

Cagayan de Oro is a boomtown in Mindanao. A considerable number of farmers work in the periurban area mainly in vegetable production. Within town about 40% of the households engages in backyard farming and the majority of schools maintain nurseries. Vegetables are considered ‘poor man’s food’. Farmers consume more vegetables than wealthier people and farming contributes considerably to in-kind family income. There are initiatives to produce and improve composting of urban organic material. As powers became more decentralised, a City Agriculture Office was established. Awareness on urban agriculture is increasing. This all helps to promote urban agricultural initiatives. Legislation has been passed to secure agricultural land. Activities at local level are backed by a sustained flow of information through the media and by successful co-operation of NGOs and local government. (NB)

Pro Huerta **(1990?). Promoción de la autoproducción de alimentos: proyecto**

integrado. Buenos Aires, Argentina: Subsecretaria de Agricultura, Ganaderia y Pesca, Instituto Nacional de Tecnología Agropecuaria, (INTA).
community development horticulture
Argentina; manuals; training; home consumption; organic agriculture

This binder was prepared by Argentina's Pro Huerta, one of the largest and most important programs for training gardeners in the world. It contains seven training booklets: (0) a general booklet on Pro Huerta and one can use it; (1) a booklet on the small farm; (2) one on the intensive organic garden; (3) one on the organic soil; (4) one on organic soil additives; (5) one on planning for work in the garden; and (7) one on the management of the organic garden. Some technical sheets complete this well-organized collection.

Prudencio Boehrt, Julio **(ed.) (1997). Agricultura urbana en americana latina: memoria. 252 p. Agricultura Urbana Investigaciones Latino Americana (AGUILA), c/o ETC Andes, La Paz, Bolivia. Casilla 9355, La Paz, Bolivia**
hydroponics wastewater reuse urban livestock
Latin America; workshops

The outcome of a seminar on urban agriculture, held in La Paz in 1995, these proceedings are subdivided in a number of themes for which the situation in Latin America is analysed: (1) hydroponics; (2) waste recycling; (3) homegardens and communal gardens; (4) small livestock rearing. (WB)

Prudencio Boehrt, Julio **(1994). People's hydroponics in Latin America. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 13. Casilla 6254, La Paz, Bolivia Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands**
hydroponics
home gardening; horticulture; Latin America; plant production; vegetables

In Latin America urban farming is primarily a survival strategy for the poorest. This usually involves some form of gardening and small-scale animal keeping, but there have also been efforts to introduce hydroponics as a solution for landless people. This account of experience with People's Hydroponics comes from a longer article by Julio Prudencio Böhrt (1994), which gives an overview of urban farming in Latin America. (ILEIA)

Purnomohadi, Ning **(2000). Jakarta: agriculture as an alternative strategy to face the economic crisis. In: Growing cities, growing food: urban agriculture on the policy agenda. - p. 453-465. DSE, GTZ, CTA, SIDA**
horticulture economic impact
crisis response; commercial agriculture; vegetable production; food security; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; Jakarta; Indonesia

The production of fresh vegetables in Jakarta is essential as the congestion of the city inhibits timely rural imports. As a result of the Asian crisis urban farming spread rapidly and the governor of Jakarta gave permission to the people to farm vacant land left by broke developers. There are two main types of farmers: land owners and workers. Most workers are male migrant workers who lost their jobs in the fallout of the crisis. Farming occurs among others on vacant land, along rivers and roadsides and in home gardens. Almost all produce is marketed. Despite the widespread nature of urban agriculture it is seen as a temporary phenomenon and is not included in the city master planning. The city government could play an important role to expand the activity in Jakarta. (NB)

Research, Development and Consultancy Division (REDEC) **(1996). Urban agriculture in Gweru: proceedings of a one-day workshop organized by ENDA - Zimbabwe, Midlands Hotel, Gweru, 16 October 1996. 24 p. Research, Development and Consultancy Division (REDEC), Environment and Development Activities (ENDA) - Zimbabwe, PO Box 3492, Harare, Zimbabwe**

food security and nutrition economic impact horticulture

Gweru; Zimbabwe; workshops; home gardening; off-plot cultivation

At this workshop, results of a household survey conducted by ENDA in Gweru in 1996 were presented, looking both at on-plot and off-plot cultivation. A fair number of parameters was discussed and quantified. (WB)

Research, Development and Consultancy Division (REDEC) **(1996). Urban agriculture in Zimbabwe: realities and prospects: proceedings of a workshop organised by ETC International and ENDA-Zimbabwe. 36 p. Research, Development and Consultancy Division (REDEC) of Environment and Development Activities (ENDA), Zimbabwe; PO Box 3492, Harare, Zimbabwe; ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**

horticulture food security and nutrition

Zimbabwe; urban policies; organisation of producers; socio-economic aspects; environment; health

The four-day workshop of practitioners, researchers and policy makers included stakeholders' perspectives, field visits, and the policy context of urban agriculture and research experiences. From different towns (Harare, Gweru, Mutare) perspectives on urban agriculture were presented. Issues discussed were: organisation of farmers, land tenure, technical support, risks of urban agriculture. Conclusions and recommendations regarding urban agriculture in Zimbabwe are given. (NB)

Richter, Juergen; Schnitzler, Wilfried H; Gura, Susanne (eds) **(1995). Vegetable production in periurban areas in the tropics and subtropics: food, income and quality of life. DOK no. 1721 A/a. 160 p. Zentralstelle fuer Ernaehrung und**

Landwirtschaft (ZEL), German Foundation for International Development (DSE), Wielinger Strasse 52, D-82336 Feldafing, Germany
horticulture rural-urban linkages
Africa; Asia; Latin America; marketing; plant production; vegetable crops; case studies; Chile; food supply; urban planning; workshops

Urban agriculture is receiving more and more attention as a way to improve livelihood in third-world country cities. Ensuring food supply through boosting food production in rural areas and establishing storage facilities has insufficiently reached the newly established urban masses. A figure to illustrate the upcoming of this new activity: about 200 million urban dwellers in developing countries are now urban farmers, thereby providing food to about 700 million people. Also to be considered is the aspect of food quality: vegetables, a very important produce of urban agriculture, complete the food basket of the urban population. These proceedings primarily address an audience of researchers and policy makers and have for objective to analyse the contribution to food, income and quality of life by urban agriculture. From the conclusions it appears that most European-sponsored urban agriculture projects deal with genetics and breeding of a few species -legumes, potato, tomato- with little attention given to traditional vegetable crops. Most projects are in Africa, probably reflecting priorities of development policies of European countries. As a result of this workshop, a number of preconditions for successful interventions were identified with regard to social participation, resource use, infrastructure, marketing and credit facilities. (WB)

Robson, Emma **(1989). Growing crops: rooftop gardens offer Colombia city dwellers alternatives to poverty. In: World Development Journal of the UNDP (November 1989) p. 28-29. United Nations Development Program (UNDP)**
hydroponics horticulture
rooftop gardening; Bolivia; Bogotá; waste recycling

A story about a UNDP project on rooftop gardening in Jerusalem, a poor area of Bogotá. All vegetables are grown as hydroponics, in a local low-cost version using recycled materials, like rice bran, wooden crates and recycled polythene. (WB)

Rocha, JL; Barahona, T **(1998). Puerto Morazan: la camaronicultura: un espejismo en tiere salada? Nitlapan-UCA, CIFOR, Proterierra-Inifom; 99 pages**
services hydroponics
aquaculture; ecology; financing; cooperatives

Puerto Morazan, a town famous for its shrimp farms, was hit by Hurricane Mitch in 1998, with a devastating effect on its most important industry, shrimp production, processing and shipping. The producers are grouped into cooperatives and they have a capital demand that they can not afford, and have been forced to contract heavy debts at high interest rates. This is at a time when the price of shrimp is falling worldwide. The future of the town, closely linked to shrimp with its (negative) ecological consequences, is in a state of uncertainty. Shrimp culture can be either an

oasis or an illusion. This study may have significant awareness raising capacity for other one-product urban agriculture towns and cities. (JS adapted from authors)

Rosset, Peter; Medea, Benjamin **(eds) (1994). The greening of the revolution: Cuba's experiment with organic agriculture. Ocean Press, Melbourne, Australia: 85 p.**

food security and nutrition horticulture

organic agriculture; bio-intensive horticulture; community-based agriculture; policy; planning; emergency agriculture; Cuba

This is the story of Cuba responding to an economic and health crises with an organic and urban agriculture strategy. It is particularly strong in the area of knowledge systems. It stretches from history, to policy to narrow focus specifics of how it was done. (JS)

Sanyal, Biswapriya **(1986). Urban cultivation in East Africa. UNU Paris, 75 p.**

horticulture urban livestock city ecology

home gardening; surveys; urban livestock; urban forestry; urban management; geography

This is a groundbreaking report, predecessor to a doctoral dissertation defining the role of agriculture in East African cities, focus on Lusaka. It has an economic slant with excellent micro-geography. (JS)

Schilter, Christine **(1991). L'agriculture urbaine à Lomé. Geneva: IUED, and Paris: Karthala Press. 334 p.**

horticulture economic impact

Togo; food supply; farming practices; cooperatives; marketing; economics

This is one of the first book-length commercially published studies on urban agriculture. It considers the range of farming practices found in Togo's capital, Lome. A whole chapter is devoted to the role of cooperatives. The second half of the book assesses the economic dimension of the urban food production system. (JN)

SEMTA **(1991). Manual de cultivos protegidos. Mtec 17. La Paz, Bolivia: SEMTA, Unidad de Capacitación y Transferencia Tecnológica. 120 p.**

horticulture

Bolivia; manuals; cultivation practices; sheltered cultivation; climate protection; raised beds

This "manual on protected cultivation" is much broader than the title implies. Protection includes here general climate consideration, choice of plants, soil understanding, raised beds, as well as sheltered cultivation. It includes excellent graphics to explain practices to the lay person. (JN)

Skinner, G. William **(1981). Vegetable supply and marketing in Chinese cities. In: Vegetable farming systems in China: report of the visit of the vegetable farming systems delegation to China / Donald L. Pluckett, Halsey L. Beemer, Jr. (eds), p. 215-280**

horticulture services

China; vegetable production; marketing; selfsufficiency; zoning; urban planning

Describes the marketing situation in China with respect to vegetables in the early 1980s. All cities visited had in common that the larger part, well over 85%, of vegetable demand could be fulfilled through production within the city bounds. The author also reports on production ecology differences at the various locations and highlights stringent zoning aspects as an outcome of political ideology. Very detailed information, but relevant for those interested in China. (WB)

Skinner, G. William **(1981). Vegetable supply and marketing in Chinese cities. In: Vegetable Farming Systems in China / D.L. Plucknett and H.L. Beemer, Jr. (eds). Boulder, Colo.: Westview Press, 86 p.**

food security and nutrition horticulture

food security; city planning; China; metropolitan area; periurban agriculture; waste management; livestock

This is a breakthrough study of the potential of large cities to be significantly nutritionally self-reliant in the areas of micronutrients and protein. The survey included the 15 largest cities in China, and found them to be 85 percent self-sufficient in vegetables. All aspects of the urban food security issue are examined including: (I) production methods, (ii) marketing, (iii) policy, (iv) locus (inner, suburb and peri), (v) organization (government and civic, (vi) health, (vii) waste management, (viii) land use management and more. Comparisons amongst cities are well presented. (JS)

Skoloda, David **(1984). Farming in the big apple. In: Farmfutures (April 1984) p. 32-33**

horticulture

herbs; commercial herb production; UNITED STATES; New York; marketing; greenhouses

Describes the operation of a commercial herb farm in the Bronx, New York. The city farm has managed to created itself a market niche for all year-round, high quality locally grown herbs, flowers, and specialty vegetables. (WB)

Smit, Jac **(1992). Farm in a box. Developing Countries Farm Radio Network package no. 27 script 5. 4 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada M5G 2C2**

hydroponics horticulture
container gardening; composting

A radio script for dissemination in a large number of developing countries, explaining how to produce crops in containers. As usual with the Developing Countries Farm Radio Network and Jac Smit for author, this makes for nice reading, full of practical information. (WB)

Smit, Jac **(1993). Analysis of the urban agriculture sector in the metropolitan area of Port-au-Prince, Haiti. CARE. International, Atlanta. 3 Volumes.**
economic impact horticulture
Haiti; small livestock; land use

The purpose of the study reported herein was a rapid appraisal of the opportunities, constraints and potential interventions in assisting small-scale agricultural producers, processors and marketers within the Port-au-Prince metro area to increase their incomes. Twenty-two sub-sectors were analyzed and twelve identified as worthy of support. Bidonville Agriculture was particularly commended. CARE selected Vegetable production for further study and support. (JS)

Smit, Jac **(1993). Grow food cheaply by the roadside. Developing Countries Farm Radio Network package no. 29 script 8. 5 p. Developing Countries Farm Radio Network, 40 Dundas Street West, Box 12, Suite 227B, Toronto, Ontario, Canada M5G 2C2**
food security and nutrition horticulture
roadside cultivation; home gardening; vacant lands

A radio script for dissemination in a large number of developing countries, explaining how even the landless can farm using vacant land along road sides for food production or as a grazing area for their animals. Interestingly, there are some unexpected advantages to be found in roadside farming: it is easier for bringing inputs to the garden or for delivering products, even selling them along the roadside. Obviously, much of the farmers' worry concerns the many thefts, which farmers often avoid by harvesting their crops before they are completely ripe. Protecting oneself against theft eminently lends itself to group initiatives, where all farmers take turns in guarding the area. The author also gives hints at how to get the water necessary for gardening. There is a special paragraph on the hazards of lead poisoning, as a result of exhaust fumes settling on the crops. Fruiting plants or root crops are, in this context, generally safer to grow than leafy vegetables. Full of practical information, and presented clearly. (WB)

Smit, Jac **(1995). Food for the poor: urban and rural vegetable production. In: Development & Cooperation no. 5 (1995) p. 22-23**
food security and nutrition horticulture
vegetable production; deficiency diseases; horticulture; periurban agriculture; small-

and medium-sized enterprises; food security; nutrition

Describes small-scale vegetable production in Africa and Latin America, both in urban and in rural settings, and its contribution to food security and in fighting deficiency-related diseases. (WB)

Socorro Castro, Alejandro R **(1999). Cienfuegos, the capital of urban agriculture in Cuba. Urban Agriculture Notes http://www.cityfarmer.org/cubacastro.html. 4 p. University of Cienfuegos, Cuba**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture
Cuba; vegetable production

Provides production and area data on urban agriculture in Cuba. According to the indicators of the Ministry of Agriculture, Cienfuegos is the most productive province with regard to urban agriculture. (NB)

SODEM **(1990). Curso de huertos familiares. La Paz, Bolivia: SODEM. 20 p.**
horticulture food security and nutrition services
training; home gardening; Bolivia

This binder contains a collection of Spanish-language training material on home gardening. It is intended for trainers rather than gardeners themselves. (JN)

Stanhill, G **(1977). An urban agro-ecosystem: the example of nineteenth-century Paris. In: Agro-Ecosystems no. 3 (1977) p. 269-284. Institute of Soils and Water, The Volcani Center, ARO, Bet Dagan, Israel**
city ecology horticulture waste recycling
France; Paris; ecological systems; waste recycling; horses; manures

One hundred years ago a sixth of the area of Paris was used to produce annually more than 100,000 tons of high-value, out-of-season, salad crops, grown on very heavily manured 'hotbeds', partly under glass or protected from the winter cold by straw mats. The cropping system was sustained by the use of approximately one million tons of stable manure produced each year by the horses who provided the power for the city's transport area. This article gives a very detailed, quantitative account of this unique farming system, with a wealth of figures demonstrating its extent and importance. In the first quarter of the 20th century, the system declined rapidly, as a consequence of the replacement of the horse by the motor car, competition for land within the city, and competition from areas with a more favourable climate outside the city, facilitated by improvements in the transport system. A fascinating description of an outstanding system that once was known to the English-reading world under the name of 'French gardening'. (WB)

Stevenson, Christopher; Kinabo, Joyce; Nyange, David **(1994). Urban horticulture in**

Tanzania: a situation analysis of the production, marketing and consumption of fruits and vegetables in Dar es Salaam, Dodoma and Arusha. 94 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
horticulture services
Tanzania; agricultural production; marketing; home gardening; consumption patterns

Presents facts and figures about urban agriculture in Tanzania's three largest cities, looking at: production of fruits and vegetables, consumption patterns, and marketing systems. A major, thorough study, putting in evidence differences between the cities due to differences in climate, land use patterns and population growth rates. (WB)

Stevenson, Christopher **(1996). Market production of fruits and vegetables in the periurban area of Dar es Salaam, Tanzania. Dar es Salaam, Tanzania: GTZ, Urban Vegetable Promotion Project. 40 p.**
horticulture economic impact
Tanzania; fruits; vegetables; market gardening; periurban agriculture

This report is one of the publications to come out of the Urban Vegetable Promotion Project (UVPP) of Tanzania. This study surveys the characteristics of urban horticultural farmers and their activities in Dar. It includes consideration of spatial and marketing characteristics. (JN)

Sumberg, James; Kleih, U **(1994). Fostering the development of periurban agriculture: the case of Port-au-Prince, Haiti. 14 p. School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK**
horticulture rural-urban linkages
Haiti; marketing; plant production; ; vegetable crops

Argues that an analysis of periurban production and marketing systems should go beyond a singular concern with the producer and consider a wide set of issues. The case of vegetable production and marketing around Port-au-Prince, Haiti, is used to briefly explore some of these issues. Vegetable production and marketing in Port-au-Prince is well established, significant in quantity and value and generating income. Public sector research and extension contribute little to the development of the sector while market opportunities, input Suppliers, farmer organisations and innovative farmers provide the stimulus for technical change. The main areas of concern are presented, among others: reduced turnover, low purchasing power of consumers, transport (costs and infrastructure), poor sanitary conditions and fluctuation in market prices. (NB)

Sumberg, James; Kleih, U; Grand-Pierre, Reginald **(1994). Production and marketing of vegetables in the Port-au-Prince periurban area: a sub-sector study. CARE International. 56 p.**
horticulture services
periurban agriculture; Caribbean ; Haiti; marketing; policy; trade; information

This report considers the production of vegetables and flowers for the daily Port-au-Prince market. It defines the periurban agriculture sector as dominated by 10,000 small-scale producers in two districts and proposes ways to improve both food distribution to the city and to improve the income of the farmers. (JS)

TEGON; HARP **(1998). Surviving in the city: resources of the urban poor in developing countries. 12 p. TEGON, Costerweg 27, 6700 AG Wageningen, The Netherlands; HARP, PO Box 1781, 3000 BT Rotterdam, The Netherlands**
horticulture
urban poor; urbanisation; informal sector; access to land; access to water

The outcome of a series of lectures called 'Surviving in the City'. In this report there are summaries of 4 lectures on: causes and consequences of urbanisation; access to land, water and houses; functioning of the informal sector; and potentials and problems in connection with urban agriculture. (WB)

Tha Hla, Patima **(1999). Bangkok gardens: how does your garden grow? Urban Agriculture Notes http://www.cityfarmer.org/Thaigardens8.html. 3 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**
horticulture city ecology
Thailand; Bangkok; vegetable production; home gardening

The article is a report of a seminar on how to grow vegetables in urban areas, more specifically in Bangkok, and what are problems encountered. (NB)

Thaman, Randolph R **(1995). Urban food gardening in the pacific islands: a basis for food security in rapidly urbanising small-island states. In: Habitat International vol. 19 (1995) no. 2 p. 209-224. The University of the South Pacific, Fiji**
horticulture
home gardening; Pacific Islands

Urban food gardening is seen as an important means of overcoming problems caused by unemployment, inequality, poverty, falling real wages, malnutrition and nutrition-related degenerative diseases in the small-island states of the Pacific Ocean, such as Papua New Guinea, Fiji, Tonga, Kiribati and Nauru. This paper argues that the formal promotion, expansion and improvement of small-scale urban food gardening is a direct and economically, socially, technologically and nutritionally appropriate means of bringing about sustainable national development and promoting food security. Despite the fact that the potential urban food production is not clearly understood by planners and policy makers, it should be viewed as a component of agricultural development strategies given the benefits it confers. Policies which would lead to its growth are discussed. (original abstract)

Torres Lima, Pablo A; Canabal Cristiani, Beatriz; Burela-Rueda, Gilberto **(1994). Urban sustainable agriculture: the paradox of the Chinampa system in Mexico City. In: Agriculture and Human Values vol. 11 (Winter 1994) no. 1 p. 37-46**
horticulture
Chinampas; Mexico; sustainable agriculture; urban development; economic impact

Informs about the historical chinampa system near Mexico City. The paper examines this ancient and sustainable farming system and assesses how it has been affected by the expansion of Mexico City. The chinampa system's economic viability is based on the efficient use of farming technologies and resources management strategies that tend to maintain levels of productivity in horticulture and floriculture. Chinampa agriculture generates high income and employment for families and other local residents. It will require much effort and determination, above all from the farmers themselves, to withstand the demands for urban land for other purposes with, on the short term, a higher economic profit. (WB)

Tricaud, Pierre-Marie **(1987). Urban agriculture in Ibadan and Freetown. 45 p. The Food Nexus Programme, The United Nations University, Toho Seimei Building, 15-1, Shibuya 2-chome, Shibuya-ku, Tokyo 150, Japan**
horticulture food security and nutrition
case studies; Nigeria; Ibadan; Sierra Leone; Freetown; land tenure; urban management; forestry; livestock

This report presents urban agriculture in Nigeria and Sierra Leone. It identifies the extent of the practice, the urban farmers, the role of agriculture in the urban ambiance and the methods of cultivation. There are many similarities between two case study cities, Freetown and Ibadan, both being capitals of anglophone countries, with a similar climate and historical background. However, there are also a number of differences, Freetown being a coastal city while Ibadan is located inland. The two cities have developed in a different manner: while Ibadan grew from 600,000 to 2,500,000, Freetown simply doubled its population to 400,000. This report describes the situation with regard to land and land tenure systems in both cities. Information is given about origin and composition of city gardeners. There is a difference in the type of crops cultivated in the two cities. In Ibadan, urban farmers mostly cultivate staple food, whereas in Freetown the interest for vegetable cash crops is prevalent, due to differences in consumer habits. Actions are suggested for developing urban agriculture including land policies, composting programmes and organising the gardeners. (WB)

UNDP **(1989). The productive home and urban community. UNDP Bogota Colombia, 28 p.**
community development hydroponics
housing; poverty; hydroponics; urbanisation; Latin America

This community planning document makes and excellent presentation of rooftop hydroponics with scale models and economic analysis. (JS)

UN-FAO **(1990). Development of Pekarangan Land. FAO (TCP/INS/8852) 50 p.**
community development horticulture
home gardening; policy; training; agricultural extension; ecology; nutrition; micro enterprise; medicinal plants; herbs

This report presents the results of four surveys of home gardens in Java, Sumatra and Timor (240 farmers in all). In addition, it reviews 22 papers covering the fields of policy, ecology, nutrition, commodities, and case studies. Further, it presents the results o a desktop review of 50 papers written between 1975 and 1988. It suggests the formation of a new institution in Indonesia to support home gardens, as well as further research, extension, training, better inputs, and improved marketing. (JS)

Vasey, Daniel E **(1985). Household gardens and their niche in Port Moresby, Papua New Guinea. In: Food and Nutrition Bulletin vol. 7 no. 3 (1985) p. 37-43. Dept. of Sociology, Divine World College, Epworth, Iowa, USA**
horticulture
Port Moresby; Papua New Guinea; surveys

Reports on the results of a study of urban gardening in Papua New Guinea assessing the economic importance of urban food production in and around Port Moresby and aiming to improve future household garden programmes in that area. Data were collected through a survey in 1981 among 700 households. Improvements in home gardening might be brought about through instituting land allotments, regular water supply, and improved extension. (WB)

Vasey, Daniel E **(1984) Management of food gardens in the national capital district. Unpublished. University of Papua New Guinea at Port Moresby, 70 p.**
horticulture
Papua New Guinea; home gardening; agricultural extension; plant diseases; horticulture

This is an analysis of an extensive survey and reports on the management methods and state of the crops in home gardens, managed by the majority of household in the capital metropolitan area. Some highlights were: (i) crops grown are typically good nutritional compliments to bulk purchased food, (ii) cassava and banana most common, (iii) sweet potato and maize are the prime problem crops, (iv) one-fifth of urban farmers use commercial inputs, (v) in-migrants quickly learn the urban way of farming. Interestingly, most households raised crops, one in four of the gardeners sold their produce regularly, but only one in ten at a formal market. Two of three principal gardeners were women. Recommendations are made for extension services. (JS)

Wasescha, Anna; Ness, Karla **(1999). Involving children in children's gardens: farm in the city, St. Paul, Minnesota. Urban Agriculture Notes.**

http://www.cityfarmer.org/AnnaW.html. 11 p. Farm in the City, 1312 Dayton Avenue, St. Paul, Minnesota, USA
Supplier: City Farmer, Canada's Office of Urban Agriculture
community development horticulture
children; urban gardens; education; United States; environmental awareness

Description of the project 'Farm in the City' and its achievements. The project area, Dunning Field, lies between two educational institutions. It was hoped that the project would serve as a new town square uniting educational and residential communities and providing a gathering place for community building events. The mission of Farm in the City is to educate children about the environment, food creativity and the importance of diversity. (NB)

Webber, Tammy **(1999). Green roofs cool city rooftop gardens in Chicago to fight smog, heat. Urban Agriculture Notes**
http://www.cityfarmer.org/greenroofs.html. 2 p.
Supplier: City Farmer, Canada's Office of Urban Agriculture
city ecology horticulture
United States; rooftop gardening; city microclimate

Discusses the potential and developments of rooftop gardening for Chicago to fight smog and improve the city's microclimate. (NB)

Weber, Florence **(1998). L'honneur des jardiniers: les potagers dans la France du XXe siècle. Socio-Histoires, ed. Gérard Noiriel and Michel Offerlé. Paris: Belin. 287 p.**
horticulture
France; history; gardeners; ethnology

This remarkable book is a combination of historical and ethnological research. It studies the evolution of the gardener in France from one end of the Twentieth Century to the other. It shows how the "jardin potager" is an invention of the turn of the (20^{th}) century, resulting from the concerted actions of philanthropists, horticultural professionals and poor citizens. She shows how, among the latter, northern industrial workers played a key role in the development of the activity, which now involves one out of three households in France, whether at a home garden or in a community garden. Belin also demonstrates how, apart from economic and recreational considerations, pride in one's work plays a key motivation for the involvement of the latter group in gardening. (JN)

Wekerle, G.R. **(2001) Multicultural Gardens: Changing the Landscape of the City. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning community development horticulture

Canada; leisure; PRA; multi-cultural society; immigration

Toronto is one of the world's most multicultural cities, yet, until recent years, the landscape of the city reflected primarily an Anglo-American tradition in landscape design and private gardens. This has changed. The landscapes of private gardens and public spaces, including parks, have begun to reflect the diversity of ethnocultural communities that inhabit and use these spaces. Horticulture forms the basis for communication across cultures; in some instances,it generates conflicts over public plantings and the appropriate use of public space. Immigrants to Toronto bring with them rural traditions formed in far flung parts of the world. Gardeners from Southern Europe, Latin America, the Caribbean, and South Asia bring to the city their agricultural experiences and make new demands on the city to meet their needs for earth to grow foods and plants from their homelands. Drawing from intensive interviews with immigrant gardeners, the paper reports on key themes emerging from the research: the importance of urban agriculture in maintaining cultures and traditional knowledge; the use of urban gardens to transmit culture to the next generation; how horticulture forms the basis for communication across cultures; and the emergence of an underground economy, divorced from the market economy, of seeds and plants to meet the needs of immigrant gardens.

Wilson, Geoff **(2002) Can Urban Rooftop Microfarms be Profitable? Urban Agriculture Network-Western Pacific. In: The Economics of Urban Agriculture - Urban Agriculture Magazine no. 7, August 2002, pp.22-24.**

urban horticulture economic impact

rooftop gardening; urban areas; Australia, Oceania (incl. Australia and NZ)

This question has been answered (on paper) by the Southside Chamber of Commerce in the city of Brisbane, in sub-tropical Australia. The Chamber calculated that with a little more than A $200,000, a "rooftop microfarm" based on waste management could yield around 20% return on invested capital, and employ three to four people. The Southside Chamber of Commerce Urban Agriculture Group is now considering how to fund a pilot project in Mt Gravatt Central in Brisbane, in the state of Queensland to prove the feasibility study findings.

Wilson, Geoff **(ed.) Urban agriculture and microfarming: growing food in small places. The Urban Agriculture Network Western Pacific (TUAN), PO Box 2223, Mansfield, Queensland 4122, Australia**

food security and nutrition horticulture hydroponics

urban food; Singapore

The first issue of the magazine published by The Urban Agriculture Network Western Pacific (TUAN). This issue is a free insert in 'Practical Hydroponics and Greenhouses' with a global circulation of 12,500 six times a year. It remains unclear whether the magazine by TUAN will be published with the same frequency. From its look, the magazine primarily addresses those who practice, or are interested to start, agriculture in a confined urban space, with a clear business orientation. The first issue features Singapore for having a well advanced urban agriculture within its city limits.

Winterbottom, Daniel **(1999). Hopeless future for gardens of hope? Casitas gardens of reclamation. Urban Agriculture Notes http://www.cityfarmer.org/casitas.html. 12 p. El Museo del Barrio, 1230 Fifth Avenue at 104th Street, New York, NY, USA**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture community development
United States; community gardens

Documents community gardening among Puerto Ricans in New York. Ten cases of gardens with casitas or wood frame structures are displayed. The people transformed vacant and garbage strewn lots into productive vegetable and flower gardens. The gardeners provide comments and emphasise the community aspect of their work. (NB)

Yachkaschi, Jasmin **(199?). Production, marketing and consumption of urban and periurban fruit and vegetables in Tanzania: introduction. 2 p. AFC Consultants, Bonn, Germany**
horticulture
periurban agriculture; vegetables; marketing; food consumption; Tanzania

The introductory chapter to a thesis. The study was centred around various field surveys conducted in three selected cities of Tanzania. In these cities, comprehensive investigations were made both at different levels of the production and marketing system, and at the level of household consumption. (WB)

Yapi Affou, S**. Agriculture intra-urbaine en Côte d'Ivoire: les cultures et les acteurs. Agriculture périurbaine en Afrique subsaharienne p. 101-109**
horticulture
Ivory Coast; Abidjan; Bouaké; commercial enterprises

The emergence of commercial intra-urban agricultural activities benefited from various factors. Intra-urban agriculture has grown in the main two cities of Ivory Coast (Abidjan and Bouaké) despite urban sprawl. Farming in the city has been favoured by urban growth, changes in dietary habits, increasing demand for vegetable products, availability of cheap labour and the laxity of municipal authorities. (NB - Adapted form original)

Zapp, Jorge **(1992). Cultivos sin tierra. 46 p.**
hydroponics
containers

A detailed description of how to grow plants as hydroponics. There are interesting appendices on production costs and revenues and on a comparison between plants grown in soil and in hydroponics. (WB)

Zurayk, R., Talhouk, S., Chatila, J. and Abdul-Samad, L. **(2000) Environmental costs of periurban agriculture in coastal Lebanon. . In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning horticulture
Lebanon; environment; cost-benefit; commercial

The notion of urban agriculture carries an intrinsic "small scale" connotation. On Lebanon's heavily urbanised coastal zone, intensive agriculture occupies large areas, and competes for space with human

settlements and natural ecosystems. Urban farming is favoured by a mild climate, the availability of water and a closeness to markets. In this paper, we describe the main periurban agricultural systems, which include open field vegetables, protected cultures and banana orchards. The environmental significance of the high input production, such as heavy fertiliser and pesticide application is also addressed. Special reference

is made to the implications of the competition between agriculture and natural space on plant biodiversity. Data on plant biodiversity in periurban agriculture and natural space is presented, along with GIS analysis of the dynamics of land use in selected locations on the Lebanese coast.

Zurick, David N **(1983). Food production in the urban environment of Katmandu, Nepal. Unpublished. Honolulu: University of Hawaii; 28 p.**
horticulture food security and nutrition
Nepal; land use; household economy; planning; organisation; history; land tenure; water; livestock; consumption; ecology

This study is quite comprehensive and based on grassroots observation as well as library research. It is found that urban agriculture is an important economic activity in the Katmandu metropolitan area, and in need of policy and programmatic support. (JS)

2.3 Urban Forestry

Urban forestry starts in a nursery.

(Picture: René van Veenhuizen)

State-of the Art on Urban Forestry

Dr. Guido Kuchelmeister,
TREE CITY, Germany

1. Concept and Definition

Urban forestry (UF) has at least three roots: (i) urban green management in Europe, (ii) forestry in North America and (iii) urban agriculture in developing countries.

Worldwide, policy decision makers and citizens are increasingly recognizing, articulating and investing in the urban forests as a vital component of the urban landscape, infrastructure and quality of life. Significant progress has been achieved in UF research and development through concerted interdisciplinary efforts in industrialized countries. Multipurpose urban forestry in developing countries is still in its infancy. There is an urgent need to allocate more resources to this area, especially for global, regional and national networking and in particular with a focus on poverty alleviation related UF issues.

Urban forestry, a term used probably for the first time in the 1970s in the United States, is still a developing discipline. UF has at least three roots**.** The most influential one has been the multidisciplinary approach, developed in North America, but strongly rooted in the European tradition of urban green management. In many European cities, the term UF is still related to urban woodlands only.

Present trends suggest that urban forestry and urban greening approaches are merging worldwide, and the terms are frequently used interchangeably. The latest impetus of UF comes from urban agriculture initiatives in development cooperation. Definitions of urban agriculture include forestry and even all urban vegetation.

In industrialized countries it is common that community and urban forestry are used as a twin terms, whereas community forestry (social forestry) is associated with rural development forestry in development cooperation.

While urban agriculture is still struggling for its identity, especially in conceptualising its distinctive urban (ecosystem) feature, urban forestry has a longer tradition as a holistic, multi- and interdisciplinary approach to urban ecosystem management. This extends beyond traditional boundaries (sectoralism) like single tree management/horticulture (arboriculture) and forestry and management of larger green areas (including parks). Today, specialists from (urban/regional) planning, horticulture, forestry, landscape architecture, (landscape) ecology, plant pathology, sociology, psychology, political sciences, agroforestry, etc. work together within urban forestry.

For the general public it would be best to use the term **urban greening** as a comprehensive term, comprising all urban vegetation management (green spaces or urban vegetated areas) including farming and forestry.

The broadest **urban forestry definitions** regard UF as the entire area influenced by the urban population. The question whether the urban forest should extend beyond the edge of urbanized areas is problematic. There have been liberal interpretations of the distance over which urban activities influence forests, but these do not justify the application of a new label to forests which can be understood and managed using accepted concepts and methods. Therefore, UF has, in a more restricted sense, to focus on planting and management of all sites for urban trees and shrubs and related vegetation. All these woody perennials, and how they are embedded and interact together with the urban ecosystem, form a unified resource, i.e. **the urban forest.** This resource can be broken down into various tree categories including garden and farm trees; street, parks and open space trees; woodlands on vacant and derelict land as well as trees and woodlands along rivers.

Also, regional urban parks and other forest resources within the urban fringe or periurban areas of densely populated areas are an integral part of the urban forest resource. In addition to trees, shrubs and other resources that make up the rural forest, the urban forest also includes many other elements that the forester has to work with, that are not generally encountered in rural forests like utilities, streets, new developments and high population pressure.

UF also addresses the urban-rural interface, i.e. the transitional zone in which land uses begin to change from urban use associated with land development, to more agricultural or rural forestry land uses. In industrialized countries, models for the rural-urban continuum have been worked out. In developing counties there is much conceptional scope for improvement.

In brief: Urban forestry is a modern urban ecosystem approach of urban tree management encompassing long-term planning, interdisciplinary professional coordination and local participation. The aim of UF is to secure the health and vitality of the urban forest resources, and, therefore, the sustained delivery of benefits for both current and future generations of urban dwellers. UF is an approach to make trees compatible and functional in an urban environment (urban ecosystem). Hence, the main focus of UF has to be on the portion of the forest found within the built environment.

In industrialized countries UF has focused on amenities and environmental benefits. In poorer countries there seems to be a consensus among development circles that UF must initially focus on meeting immediate needs for basic necessities and this can be best achieved by multiple resource use.

2. The Urban Forest Resource

Resource base

There is a dearth of information about urban forest resources in developing countries. Even in highly industrialized countries comprehensive information on vegetation in cities is lacking: due to different definitions and mandates only part of the urban forest has been assessed (e.g. street trees, public resources).

The current discussion on criteria and indicators for urban quality and sustainable human settlements pay insufficient attention to urban forests. Vice versa, the development debate on sustainable forest management hardy discusses urban forests. Some models of urban forest

sustainability considering vegetation resource, community framework and resource management, have been developed in industrialized countries. For poor neighbourhoods simple and inexpensive indicators still have to be tested.

Benefits

Urban forests can improve the quality of urban life and livelihood in many ways, providing both tangible (e.g. food, energy, timber, fodder) and less tangible environmental and societal benefits and services. Evidence suggests that urban forest resources can play an active role in providing goods and services to alleviate poverty, improve livelihoods, and enhance well-being in developing countries.

Tangible benefits

Many urban trees suitable for resource-poor settlements provide **food**, particularly fruits, but also edible leaves, shoots and even flowers. Urban forestry practices improving food security of poor people include the collection of wild edible plants, planting of low-care fruit bearing street trees, including a gardening component, in multifunctional parks or creating edible public parks, laws enforcing that a proportion of new housing schemes is allocated to fruit trees. Food from trees in private agroforestry gardens or allocated plots in public gardens can contribute significantly to food security in developing countries. Yet it is the least documented. In arid and semi-arid areas, it is a common urban forestry practice to establish windbreaks to protect agricultural land and enhance the productivity of the land.

Many forestry development projects have been dealing with urban **wood energy** (woodfuel) issues. However, supply and demand of wood energy in urban areas is not understood as thoroughly as in rural areas. Intensive research in the 90s showed that woodfuel can be beneficial for the global climate (carbon-neutral); the energy safety net of urban poor is increasingly scarce and worse than rural people; thus they spend a significant proportion of their income or time in securing woodfuel. Inexpensive charcoal is as close as many households in poor neighbourhoods will come to modern fuels. Variation in woodfuel collection depends on forest cover, population density, availability and stability of alternative sources of energy, cash income, etc. With the increase in numbers of urban poor, woodfuel will remain a burning issue.

Good urban practices include **timber** harvesting combined with intensive outdoor recreation activities. Systematic planting of street trees for timber production can offset the costs of tree care through harvesting of trees. Timber production from urban forests has not been optimised due to a mix of ignorance, tenure insecurity and deficits in technical know-how. Periurban (timber) plantations are the most recognized urban forestry practice in development cooperation.

The dependence of people on **non-wood (non-timber) forest products** is also not well understood. Dependence of people in periurban areas and smaller settlements is more obvious.

Shelter

Organic materials are still widely used in urban areas in poor neighbourhoods. Adequate supply of bamboo and other timber seems a problem for a significant and growing number of households. The problem is most severe in arid areas and the vicinity of cities.

Environmental services

Today the main focus of attention in urban forestry is on environmental services. Measuring environmental urban forest benefits and translating these into monetary value in North America has greatly contributed to a situation in which policy makers and citizens appreciate more the value of the urban forest.

Concern about global warming has facilitated the dissemination of in-depth knowledge about the functions of urban trees in microclimates, air quality improvement and carbon dioxide reduction in industrialized countries, especially in North America.

Since urban trees reduce the need to burn fossil energy, they are a more important investment for green house mitigation than rural trees. The energy saving potential (from lower air condition requirements) of an urban tree is up to fifteen times higher than the benefit of a rural tree, although the role in global sequestration is limited. Enhancing carbon sequestration through carbon forests is appreciated by urban initiatives. For instance, ICLEI (The International Centre for Local Environmental Initiatives) is currently recommending “carbon” trading in cities.

Energy conserving landscaping by strategically planting trees can maintain comfort without air conditioning, but has hardly systematically been incorporated in housing projects in resource-poor settlements.

The benefits of urban forests for the protection of urban water supplies, wastewater treatment systems and storm water management is increasingly being articulated, especially in semi-arid and arid zones and periurban areas. Protection of the suburban and rural areas that serve as the source of the cities' water is a traditional urban forestry linkage. Yet there is much scope for integration into urban planning. The link between urban faucets and rural watersheds is increasingly obvious, but few forest services have developed a comprehensive forest plan and compensation or service fees for managing the land for high quality of water and other watershed values.

In many countries it is popular custom to reclaim unused and degraded land and terminated landfill sites through afforestation and to convert these to parks. Basic research on the potential for woodland established on landfill sites demonstrated that trees could be grown successfully on capped landfills without endangering cap integrity, provided that appropriate restoration and silvicultural procedures are adopted.

Urban forests have a vital role in **nature conservation** (e.g. older gardens and parks, periurban agroforests, botanical gardens, wetlands, protected zones). Incorporating urban forests in networks improves biological conservation and biodiversity. Greenbelts and greenways (linear parks) can serve as biological corridors, reconnecting a city to its

surrounding bioregion. Yet, the global discussion on biodiversity and forestry does not have a special urban theme.

Societal benefits

Forest related activities and urban agroforestry practices can be labour intensive and can provide work opportunities. This may be especially important for livelihoods and survival strategies of the very poor. No comprehensive study on work opportunities in developing countries has been conducted. In wealthier countries the green (arboricultural) industry is a well-documented and significant business.

Urban forests are increasingly appreciated in environmental **education** for urban dwellers, and are part of environmental education worldwide.

It is obvious that urban forests greatly enhance outdoor **recreation**. Lower income residents tend to frequent city parks more than wealthier citizens, yet the per capita green area is much lower. Only very few cities have delivered plans to increase green space in low-income quarters. Recreation for poor neighbourhoods must be based on recreation values of the poor, offer affordable access, and combine recreation with other urban functions.

With growing policy attention to the social values of urban trees, more studies aim to identify public values and preferences related to the recreative use of urban forests.

Some research in North America has indicated that public involvement in UF can help strengthen **community cohesion** of neighbourhoods by providing people with an opportunity to work together for the benefit of the local environment. It is also a well-known fact in industrialized and transitional countries that urban forest results in increased property value and can attract new businesses and investors.

Outside North America, only very few studies have investigated the psychological and health aspects of urban forests and trees. Attention to the health values of urban trees has recently increased.

3. Research and Development

Status

Urban forestry research has been advancing rapidly in North America through concerted and coordinated actions, particularly through the efforts of the International Society of Arboriculture, the Society of American Foresters and the USDA Forest Service, and non-profit-organizations.

In Europe, urban forestry research is still very fragmented. The Tree Route Network (TRN) dealing with "Research on Urban Trees in Europe“ which aims to establish urban forests and urban trees as a scientific domain in Europe, has facilitated much cooperation and coordination in Europe. In developing countries urban forestry is still in its infancy and is strongly oriented towards the style of industrialized countries.

In Europe and developing countries, multiple-country research overviews have mostly been anecdotal or limited in scope, covering for example only parts of the urban forest resource (street trees, urban woodlands) or structural human interference (planning, selection, establishment or management). Traditionally, studies on urban forests are limited to applied, small-scale research at the municipal level.

Coordination at the national level, often enhanced by regular national conferences (e.g. Brazil, Ireland, China, Thailand, United Kingdom and USA) is an exception.

Developing countries: UF-related activities are evolving rapidly in developing countries. However, little technology transfer, research and information exchange occur.

Urban agriculture development initiatives take urban forestry into consideration, particularly with regard to agroforestry activities. Many urban development projects include an urban forestry component, yet forestry is hardly on the urban development agenda.

Among donor agencies the Inter-American Development Bank has made the biggest efforts in the development of integrated urban greening. A few initiatives, such as the TREE CITY Initiative, focus on poor settlements in developing countries. FAO has done pioneer work on UF by launching a program on urban and periurban forestry as long ago as 1993. Some city-to-city cooperation (North-South, South–South) has included urban forestry activities. RUAF (Resource Centre for Urban Agriculture and Forestry), a new urban agricultural resource centre has even the term forestry in its acronym.

Multipurpose urban forestry research is in its infancy in developing countries. Most information on urban forestry in developing countries is very scattered. More information is available on vegetation, rather than on people who might benefit from them. There is a dearth of published quantitative information about the relationship between urban dwellers (particularly the poor) in developing countries and urban forests, on how they value, use or would like to use these areas, and how urban forests affect health and well-being.

A limited number of case studies on UF exist such as the EC financed Forest-City Interface component of APFT (Avenir des Peuples des Forets Tropicales) in Africa, or the series completed by FAO (11 case studies). The latter documented a wide range of benefits including some products directly useful for people. However, it is not clear if the value of these products exceeds others such as annual cropping. Very little is known about the relationship between urban forestry and livelihood, still less about the livelihood of the poor. The DFID (Department for International Development, UK) which has recently funded case studies on researchable constraints to the use of forest and tree resources by poor urban and periurban households in developing countries, is a very rare exception.

Poverty alleviation

The potential for urban forestry to become more directly instrumental in poverty alleviation initiatives will be debatable as long as it is not better researched. The greatest urban forestry knowledge gap is that the poverty alleviation-urban forestry nexus has not been systematically researched in-depth. The most urgent tasks ahead would include concerted actions to comprehensively assess the role of urban forestry in poverty alleviation and to

prioritise specific UF practices for the poor and very poor in urban and periurban areas, in different ecozones as well as small, medium and large settlements and megacities.

Since foresters are conspicuously absent in urban development initiatives, and since for other specialists trees are not a major concern, it its very unlikely that forestry will appear more visibly on the urban development agenda very soon. However, there are some indications that food security related development activities will pay more attention to the roles of urban trees in future.

There is an obvious need to improve the exchange of experiences, and to synthesise available information in-depth. This includes: (i) approaches and methodologies for planning urban forestry programs; (ii) the relative importance of the environmental and productive functions of urban forests in different ecozones and for different social groups; (iii) building up the technical knowledge base and developing of adequate institutional frameworks to support urban forestry programs.

4. Urban Forestry Practices

Urban forestry practices are increasingly included in best urban practices.

Parks and greenways: Urban parks are traditionally one of the most obvious forms of urban forestry. However, parks have often been the domain of quite different professions, with distinguished approaches and practices, as compared to street trees. In many cities, parks are threatened by buildings, spontaneous settlements, vandalism, environmental stress and restricted government funds. It is more and more acknowledged that many parks can only be preserved and managed through the commitment of residents and innovative management approaches.

The potential of multi-functional park design and management is insufficiently known among urban planners and other stakeholders concerned with the development of low-income communities. Still, there are some cases in which successful innovative multifunctional parks as a component of slum improvement programs (storm water control, wastewater and sewage treatment, recreation and gardening) have been implemented.

Greenways (linear parks) can have multiple uses and functions, such as improving environmental quality, providing recreation, and serving as an alternative transportation route (bicycle and foot paths). They are promising, but have been less promoted than conventional parks.

Public parks are especially important for the urban poor, because they have few affordable options for recreation and thus place a high value on green areas. Lower income residents tend to frequent city parks more than wealthier citizens do because they lack the financial resources and leisure time to reach distant recreation sites.

Street trees, the most obvious urban forestry practices, are often more difficult to establish and maintain than their counterparts in parks. Due to inadequate planting space and the high cost of protecting individual trees, collision and vandalism have destroyed many street trees.

Space limits the selection of species and reduces vigour and longevity. On the other hand, sufficient innovative techniques are available that increase the survival rate and longevity of street trees.

A disturbing trend in some cities in developing countries is to replace tough, multi-purpose, and native trees with modern ornamentals that have not yet proved themselves. Often, low-care wild edible plants are excellent candidates for use as ornamental street tree plantings. When properly managed, street trees provide significant quantities of fuelwood, poles, fruits or medicine. However, multipurpose street tree research is in its infancy.

The general perception of the exclusive public responsibility for street tree planting has prevented creative public-private partnership in the past. However, entrepreneurs generally prefer to sponsor trees in central locations with high traffic density. These sites are the most challenging ones for good growth conditions, but a good business sponsor can better ensure the survival and vitality of trees. Generally, there is significant evidence that street trees survive and flourish best when people living adjacent to them commit themselves to be responsible for tree care in one form or another.

Trees in urban farming have only recently received more attention under the umbrella of urban agricultural initiatives. Agroforestry gardens are probably the most significant urban green space in tropical developing countries. Some tree species require little space and can be manipulated into shape by training, coppicing, lopping, or pollarding. Climbing woody perennials are very suitable for small gardens. Still, few urban forestry programmes have facilitated the integration of trees into farming.

There is no reason why agroforestry techniques developed in rural areas could not be adopted to the context of urban areas. For instance, Sloping Agricultural Land Technology (SALT) is a diversified system of contour hedgerow inter-cropping in which permanent and non-permanent crops are grown along with the hedgerow. This can be promoted in low-income settlements to improve farming and stabilize sloping land.

In arid and semi-arid areas, it is a common urban forestry practice to establish windbreaks to protect agricultural land and enhance the productivity of the land. Properly managed windbreaks can provide significant quantities of fuel and poles and other tree products without jeopardizing their primary protective function.

Protected areas are natural or reconstructed habitats that receive some level of ecological protection in order to preserve their ecological or biological functions. Generally they tend to be small in urban areas. For instance, greenbelts are basically open space buffers amid the congestion and pollution of most large cities.

Although urban forests may contain less biological diversity than rural woodlands, they still play a significant role in conservation of biodiversity.

Wetlands deserve attention as a priority candidate for protected status. Usually they contain a high level of biodiversity and offer a range of environmental services. Protected key areas and buffer zone concepts developed in rural forestry can be adapted to the urban context.

5. Challenges

The basic challenge for urban forestry is to develop and maintain a sustainable urban forest resource that meets multiple societal and personal demands. This challenge is especially pronounced in developing countries. Without commitment to allocate sufficient resources for

research and development of UF networks at national, regional and international levels, progress will be slow.

Challenges to urban forest development in developing countries - and elsewhere - are: (i) little technology transfer, research and information exchange; (ii) inadequate appreciation of the economic value of the urban forest and low comprehensive valuation of multipurpose urban forestry; (iii) insufficient local participation and private-public partnerships; (iv) inappropriate land use policies (access and security of user rights to urban forest); (v) ecological and technical constraints of the urban environment; (vi) sustaining funds for urban forests, and, above all, (vii) integration of forestry into urban planning and development.

Many local forestry-related initiatives and innovative partnership models are evolving rapidly in developing countries and elsewhere. Yet little exchange occurs. Lack of suitable networks to facilitate coordination means there is a high risk of duplicating efforts, and reinventing the wheel. Also, the experience and methodology gained in rural development (social forestry) is not really utilized in urban forestry.

Urban forestry researchers with a focus on poor neighbourhoods in developing countries have no institutional home. Thus the greatest impact of a research project would be to facilitate networking among all scientists working on urban trees in poor neighbourhoods which find themselves underrepresented in the current development initiatives in urban agriculture and sustainable urban development.

Insecure or unclear ownership and/or rights to the use of urban forests can be the most serious obstacle in poor neighbourhoods in developing commitment towards urban forests. Participatory planning and management tools can greatly contribute to sustainable urban forest management in poor neighbourhoods.

Over the last decades, many innovations and good practices have become available in industrialised countries for planting and sustaining urban forests. Not all of them are appropriate and relevant for resource-poor people. For instance, in developing countries only a very limited number of species are planted as urban trees. Species richness is not a problem, but for ecological and economic reasons there is an urgent need to increase the number of species which have multiple values. This is a totally new field of action in forestry for community development.

At the urban-rural interface issues such as forest fragmentation, varying land and social values, and numerous landowners, create new challenges in the management of these interface areas. The growing interface and interzone problem of turning rural forests into urban forests poses a great threat to not only the residents but also the environment. For that reason, rural foresters have to take urbanization into account in planning rural forests. They need to develop a better understanding of it, become more involved in the urban planning process and cooperate with urban groups.

With accelerated urbanisation, in order to retain the urban forest resource (thus contributing to functionally healthy urban ecosystems), forestry professionals need a more balanced urban and traditional training, including some demonstrated skills in working with land developers,

home builders, municipal governments, planning boards and the urban poor. This would require huge efforts in education and training. Unfortunately, too few education opportunities in developing countries exist as yet.

Ataie, Ahmad Mehdipour **(1999). Urban and periurban forestry in the near east: a case study of Iran and its Capital, Tehran. In: Urban and periurban forestry: case studies in developing countries / Salah Rouchiche Salah (et al.) (eds), p. 163-194. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy. Rome: FAO**
Supplier: FAO Food and Agriculture Organization of the United Nations
urban forestry
urban forestry; air pollution; environmental degradation; wastewater management; Iran; Tehran

Community mobilization in a coalition of government departments, municipalities, NGOs and community groups resulted in urban and periurban forests in Iran. The forests perform many different functions like to supply wood and pulp industry, stabilization of sand dunes, fuelwood, fodder, wind and dust protection reduction of air pollution. In Tehran planting trees alleviates air pollution while effective waste water and sewage management can provide irrigation water. Among the constraints in urban forestry Tehran faces are technical knowledge, limited availability of suitable spaces, shortage of water and pollution of plants. (NB)

Belgian Urban Forestry Practice and Research Association **(1998). BUFPRA Newsletter: an international mouthpiece on urban forestry. Belgian Urban Forestry Practice and Research Association, Vrije Universiteit, Department of Human Ecology, 103 Laarbeeklaan, 1090 Brussels, Belgium**
urban forestry

A number of issues on this newsletter on urban forestry have seen the light, providing information both in English and French. (WB)

Bell, Michael **(2000). The gardeners guide to growing temperate bamboo. Timber Press 159 pages.**
urban forestry
forestry; household gardening; non timber forest products

Bamboo is a particularly productive multiuse urban agriculture crop. This exceptionally clear guide deals with the nitty-gritty of bamboo cultivation and propagation of about 200 varieties suited to temperate climates. (JS)

Benge, Mike **(1996). The economic and ecological value of trees in urban environments. 10 p. Agency for International Development (USAID), Washington DC, 20523-1812, USA**
urban forestry economic impact

United States; urban trees;trees; urban environment; economic aspects; public health

Examines from various angles (urban environment, aesthetics, public health, economics) the role of trees in urban settings, notably in the USA. (WB)

Bergerie Nationale, Département Périurbain **(1996). Agriculture et forêt en zones périurbaines : constats et perspectives. (1996). Actes de la Rencontre de la Bergerie Nationale de Rambouillet, 1996. Rambouillet, France: Bergerie Nationale, Département Périurbain. 102 p.**

urban forestry

France; periurban agriculture; land use; agricultural preservation; policy

These are the proceedings of a conference held at the Bergerie Nationale, one of France's leading institutions working on periurban agriculture. The meeting resulted from the coming together of a dozen different public and non-profit institutions concerned with the impact of urbanization on agriculture in France. (JN)

Braatz, Susan; Kandiah Arumugam **(1996). The use of municipal waste water for forest and tree irrigation. In: Unasylva 185 (1996) p. 45-51.**

urban forestry wastewater reuse

wastewater; municipal management; resources; irrigation

This article discusses some of the experiences to date and various issues related to the use of wastewater for forest and tree irrigation. This combines the goals of managing municipal effluents with those of enhancing forestry practices in periurban areas. (adapted from original by JN)

Carter, Jane E **(1995). L'avenir de la foresterie urbaine dans les pays en développement: un document de réflexion. 95 p. Forestry Department, Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

urban forestry

environmental aspects

Provides a state-of-the-art overview of urban forestry in the framework of a new programme on urban forestry launched by FAO's Forestry Department. (WB)

Carter, Jane E **(1995). The potential of urban forestry in developing countries: a concept paper. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

urban forestry city ecology

environmental aspects

The paper first defines urban forestry and next the changing role of trees in Third

World cities is discussed, with reference to growing environmental concerns. The third section elaborates various locations in which trees may be cultivated after which the benefits and problems associated with urban forestry are discussed. Further key issues like socio-cultural aspects are highlighted in section five. Tree management and tree establishment issues are discussed in section 6 and institutional aspects are reviewed in section seven. The last section deals with topics requiring further investigation and information gaps in developing countries. (NB)

Cline-Cole, Reginald A **(1990). The urban fuel plantation in tropical Africa: a case for re-evaluation. In: Land Use Policy vol. 1990 p. 323-336**
urban forestry
fuelwood plantations; Africa; humid zones

The potential of fuel plantations for ameliorating urban fuel shortages has been limited, mostly, the author argues, as a consequence of faulty assumptions about the location- and time-specific nature of the dynamics of woodfuel 'crises'. The author critically examines monoculture tree plantations and advances strong arguments for increased use of local plant resources and indigenous ecological knowledge in plantation programmes and projects. This should, ideally, lead to a situation of sustainable woodfuel development. (WB)

Community Resources **(1999). Exploring urban non-timber forest products On: http://www.communityresources.org/ntfp.htm. 3 p.**
urban forestry community development
non-timber forest products; resource management

A brief project outlay of the urban non-timber forest products initiative. The paper explains what are urban non-timber forest products and why it wants to explore the potential of this further. (NB)

El-Lakany, M Hosni **(1999). Urban and periurban forestry in the Near East: a case study of Cairo. In: Urban and periurban forestry: case studies in developing countries / Salah Rouchiche Salah (et al.) (eds), p. 131-161. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy. Rome: FAO**
Supplier: FAO Food and Agriculture Organization of the United Nations
urban forestry
desertification; Egypt;

urban forestry in Cairo presents technical problems and tress need to be tested on their suitability in the unfavourable conditions. Strategies to select appropriate species, planting and windbreak designs are discussed. Institutional aspects of the development of green areas are discussed as well a.o. public participation, legal issues, allocation of responsibilities and coordination of activities in forestry. (NB)

Food and Agriculture Organization (FAO) **(1995). An annotated bibliography on urban forestry in developing countries. 100 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**
urban forestry
annotated bibliography; periurban forestry

Includes almost 600 entries related to urban and periurban forestry in developing and tropical countries. Some general references, universally relevant, are also included. Four indexes are included to help in the location of reference material: keywords index, geographic index, author and corporate author index and conference index. (from original abstract)

Forrest, F; Konijnendijk, Cecil C; Randrup, TB **(ed.) (1999). Research and development in urban forestry in Europe: report of COST Action E12 'urban forests and trees' on the state of the art of urban forestry research and development in Europe. 363 p.**
urban forestry
Europe; research projects; development projects; surveys

Reports on research and development in urban forestry in 20 European countries. The survey was carried out by the European Co-operation in the field of Scientific and Technical Research (COST) in the framework of the 'Urban Forest and Trees' programme of the European Commission.In general, current urban forestry research in Europe seems to be very fragmented. Many relevant individual projects are going on, but few are co-ordinated nationally and even fewer internationally. The fact that only a minority of the projects mentions the words 'urban forestry' indicates that the term is rather new at the European level. In the report, urban forestry is interpreted very broadly, including not only research related to trees in the urban environment but also to green structures on a larger scale. (from original abstract)

Haque, Farhana **(1987). urban forestry: 13 city profiles. In: Unasylva vol. 39 no. 155 (1987) p. 14-25**
urban forestry
case studies; trees; ornamental plants; fuelwood; ecological aspects; tree management

Presents 13 case studies from all over the world. This collection shows the wide array in uses that can be made of trees in city environments. (WB)

Horvath, Ronald J **(1968). Addis Ababa's Eucalyptus forest. In: Journal of Ethiopian Studies vol. 6 (1968) p. 13-19**
urban forestry
environmental degradation; deforestation; Eucalyptus; fuelwood plantations; Ethiopia; Addis Ababa; tree farming

Traces the history and describes the tree farming system of Addis Ababa's Eucalyptus forest, as a fuelwood tree for Addis Ababa, but also to provide building materials. Eucalyptus was brought in after all indigenous fuelwood trees around the capital had been exhausted, at the beginning of the 20th century. This publication was written at a moment when negative effects of Eucalyptus plantations were still little researched. (WB)

Konijnendijk, Cecil C**. Causes of conflicts affecting urban forest policy-making: a theoretical approach. In: Conflict management and public participation in land management, p. 133-147. Wageningen Agricultural University, The Netherlands**
urban forestry R&D methodology
forest policy analysis; social conflicts; environmental psychology

In highly urbanised societies urban forests are essential for recreational and environmental purposes. Policy makers, planners and managers these days have to respond to higher, more varied and better expressed demand for urban forest functions while pressures increase. In order to gain insight in the resulting conflicts an analysis was made from an environmental and psychological perspective. Subsequently, a theoretical framework is presented. With this theoretical approach the frequency and intensity of social urban forest conflicts can be partly explained. Better insights are believed to assist policy-makers in future conflict prevention and resolution. (NB - abstract adapted from original)

Konijnendijk, Cecil C **(1997). A short history of urban forestry in Europe. In: Journal of Arboriculture vol. 23 no. 1 (january 1997) p. 31-39. Department of Forestry, Wageningen Agricultural University, PO Box 342, 6700 AH Wageningen, Netherlands; European Forest Institute, Torikatu 34, 80100 Joensuu, Finland**
urban forestry
history; Europe

The term 'urban forests' is often applied to forests under strong urban influence rather than to urban green space at large. This article presents a history of urban forest policy-making, against a background of social conflicts over these urban forests. The author concludes that urban forestry policy-making processes have become complex, involving a larger number of people. (WB)

Konijnendijk, Cecil C **(1997). Urban forests: benefits and functions: overview of contemporarary research in the Netherlands. 31 p. Subdepartment of Forestry, Wageningen Agricultural University; European Forest Institute, Torikatu 34, FIN-80100 Joensuu, Finland**
urban forestry R&D methodology
research projects; Netherlands

Gives an overview of Dutch research in the field of urban forestry policies over the

period until 1997, focusing on the 1990s in particular. Addresses of research organisations and key references are included. (WB)

Konijnendijk, Cecil C **(1997). urban forestry in the Netherlands: lessons from the past**
urban forestry
Netherlands; historic overview; recreational uses; forestry planning

Draws a picture of the development of forests near cities in the Netherlands. The establishment of these forests closely reflects the social history of the Netherlands as regards planning, responsibility and uses of the forests. The author argues that when planning and establishing new forests, policy makers and planners might benefit from historical insights in terms of finding alternative sources of financing, and taking into account local public commitment. (WB)

Kuchelmeister, Guido **(1989). Hedges for Resource-Poor Land Users in Developing Countries. Eschborn, Germany: GTZ. 256 p.**
urban forestry city ecology
hedges; resources; crop selection; crop management

This is a thorough evaluation (including technical assessment) of the use of hedges in developing coutnries. While not specifically focused on urban areas, the document emphasizes the use of hedges where land availability is constrained. (JN)

Kuchelmeister, Guido **(1991). Urban and periurban multipurpose development cooperation: experience, deficits and recommendations. 158 p.**
urban forestry
agroforestry; periurban forestry; tree plantations; parks; development co-operation

A major study providing an overview of multipurpose urban and periurban forestry. It documents the state of knowledge with regard to the potential of forestry as an instrument in development co-operation. It examines and evaluates key issues on different elements of urban forestry and indicates the range of possible successful approaches to tree planting projects in cities and the urban fringe. There are detailed analyses of various urban forestry and agroforestry practices including planting along roads, railways and waterways; periurban plantations with special references to fuelwood production; parkland management; urban trees in between places; soil and water conservation measures; and gardening. Finally, the essential experience, deficits and recommendations for project development are summarised. Contains project descriptions, addresses and an annotated bibliography. An important overview of urban forestry. (WB - adapted from original abstract)

Kuchelmeister, Guido **(1997). Urban trees in arid landscapes: multipurpose urban forestry for local needs in developing countries. Arid Lands Newsletter no. 42**

(fall/winter 1997). 9 p.
urban forestry
forestry fuel; microclimate; multiple resource use; economic aspects

Provides an overview of urban agriculture and its importance. Described are tangible benefits such as contribution to urban food requirements, biomass for fuel and construction material. Furthermore, environmental benefits, like micro climate enhancement and social benefits such as income generation are discussed. Challenges facing urban agriculture are local participation, valuation of forests, land and tree tenure, institutional capabilities, and technical constraints. It is concluded that urban trees should be viewed as an integral part of the urban infrastructure and an asset in arid settlements. To develop and sustain urban forests in developing countries, one can best focus on fulfilling immediate requirements for basic products through multiple resource use as advocated in the article. (NB)

Kuchelmeister, G. and S. Braatz **(2002) The Overstory #87 - Urban Forestry. Permanent Agriculture Resources (PAR). Holualoa, Hawaii: Permanent Agriculture Resources. In: *The Overstory, no. 87,***
Supplier: PAR, P.O. Box 428, Holualoa, Hawaii 96725 USA. also available from: www.agroforester.com/overstory/overstory87.html.
urban forestry
urban areas; forestry

Although trees have been an important part of human settlements throughout history, only recently has their full value to urban dwellers been recognised. Trees and green spaces play an important role in improving city living conditions. In the past, urban forestry in developed countries was considered almost exclusively on the basis of its aesthetic merits. Now, a closer look is being given to the environmental benefits they provide. This article discusses the role of trees in and around densely populated areas.

Kuiler, Esther **(1998). Toekomstperspectieven voor biologische stadslandbouw in Nederland: stadslandbouw als onderdeel van de urbane bosbouw. AV no. 98-07. 72 p. Departement Omgevingswetenschappen, Sectie Bosbouw, Agricultural University Wageningen, The Netherlands**
horticulture urban forestry rural-urban linkages
landscape design; urban livelihoods; biological agriculture; home gardening; Netherlands

Looks at urban agriculture from the livelihood point of view and examines its contribution to creating an attractive urban landscape in the setting of The Netherlands. In Dutch. (WB)

Marulanda L. **(2000) Ahmedabad Green Partnership Project. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**
urban forestry community development
India; partnerships; private sector;

urban forestry programmes and projects need longer time to show results. Trees are long-term products and to make an urban forestry programme a success, the project partners need to keep a constant dialogue and a long-term commitment to make it happen. The author illustrates this in a description of the Ahmedabad Green Partnership Project, which is an effort between the Ahmedabad Municipal Corporation (AMC) and the Private Sector towards increasing the green cover and improving the environmental quality of the city of Ahmedabad in India.

Murray, Sharon **(1996) Managing forest influences in urban and periurban areas. In: Unasylva No. 185 (1996) p. 38-44.**
urban forestry
environmental benefits; urban impacts; air pollution

This paper considers the opportunities for and challenges to the management of trees and forests in urban and periurban areas of developing countries, with the goal of gaining positive environmental impacts. (adapted from original by JN)

Murray, Sharon **(1997). Urban and periurban forestry in Quito, Ecuador: a case study. FAO, Rome, 104 p.**
urban forestry
urbanisation; environment; Latin America; ecology; land use

This report evaluates the current biophysical and social aspects of urban forest ecosystems in the Quito metropolitan area. It explores the potential for beneficial forestry activities and who the beneficiaries may be. It describes, in some detail, the past and present pattern of human, economic, political interventions affecting the forest ecosystem. In conclusion it suggests a strategic approach to achieve better results stressing the linkages to other urban systems. (JS)

Murray, Sharon **(1999). Urban and periurban forestry in Latin America: a case study of Quito. In: Urban and periurban forestry: case studies in developing countries / Salah Rouchiche Salah (et al.) (eds), p. 75-106. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy. Rome: FAO.**
Supplier: FAO Food and Agriculture Organization of the United Nations.
urban forestry
land tenure; forest management; urban planning; Ecuador;

This publication is the first of six case studies commissioned to document work in urban and periurban forestry in the different developing regions of the world. This study on Quito illustrates to those unfamiliar with the field and to those working on urban and periurban forestry programmes the issues faced by different civil groups, NGOs, public and private institutions. It presents the approaches these groups adopted to integrate trees and forests to improve the lives of urban dwellers and enhance the urban environment. Some of the issues presented are landslides and

watershed management, land use changes and markets, and the needs for green recreational areas, creation of productive activities and employment. It is a complex and fascinating subject, an area of forestry where social and ecological concerns are most closely intertwined. (original abstract)

Pastuk, Marília **(1999). Urban and periurban forestry in Latin America: a case study of Rio de Janeiro Metropolitan region. In: Urban and periurban forestry: case studies in developing countries / Salah Rouchiche Salah (et al.) (eds), p. 107-129. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy. Rome: FAO**
Supplier: FAO Food and Agriculture Organization of the United Nations
urban forestry
community reforestation; emergency mitigation; Brazil; Rio de Janeiro

Five cases are presented which in are responses to emergencies caused by severe floods in the lowlands of the city and mudslides on the slopes. Examples are provided of low cost techniques and participatory approaches in reforestation programmes, policy and planning issues are in order to promote integration of environmental policies in urban planning and reforestation as employment and income generating activity. (NB)

Rouchiche, Salah **(et al.) (1999). Urban and periurban forestry: case studies in developing countries. 194 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**
Supplier: FAO Food and Agriculture Organization of the United Nations
urban forestry
environmental degradation; emergency mitigation; desertification; air pollution; urban planning; case studies

With the occurring demographic shifts, causing rapid and uncontrolled urbanization in many parts of the developing world, the issue of urban development is likely to become a focal one in the coming decade. urban forestry has an important potential role in meeting the needs of the urban population and in addressing the social and environmental problems that arise from urbanization. This is the subject of the six case studies that review the present and potential role of urban forestry in the Sahel (Dakar, Niamey, Nouakchott and Ouagadougou); Hong Kong, Kuala Lumpur and Singapore; Quito; Rio de Janeiro Metropolitan Region; Cairo; and Iran and its capital, Tehran. Among the issues addressed are the extent to which urban forestry can provide goods and services, and the role of forestry in environmental protection and enhancement of living conditions. The case studies address issues related to planning, coordination, management and people's participation, and suggest recommendations for the specific cities which could also be adapted to other cities. (original abstract)

Sorensen, Mark **(1997). Good practices for urban greening. Washington, D.C.: Inter-American Development Bank, Social Programs and Sustainable Development Department, Environment Division. 84 p.**
city ecology urban forestry
ecology; urban planning; land tenure; gender; legislation; financing; Latin America

This report was prepared in two drafts, preceding and following a conference in Mexico City, with participants from 23 countries. It is divided into five parts: (i) problems of rapid urban growth, (ii) the benefits of urban greening (particularly social), (iii) the challenges to establishing a greening program, (iv) the requirements of such a program, and (v) the elements of a greening program (including urban agriculture and finance). It includes a useful directory of projects. It is one of the more comprehensive brief reports on urban forestry and agro-forestry. (JS)

Trans Rural Initiatives **(1996). Agriculture et forêt périurbaines sortent de l'ombre. Special issue, supplement to No. 75 (1996). 24 p.**
city ecology urban forestry land use planning
France; periurban agriculture; policy

This supplement to a French periodical contains several syntheses of actions on the preservation of urban (particularly periurban) agriculture in France. These range from agricultural policies of small towns such as Aubagne to the key principles of Paris' "Green Plan". (JN)

Webb, Richard **(1999). Urban and periurban forestry in Asia: a case study of Hongkong, Kuala Lumpur and Singapore. In: Urban and periurban forestry: case studies in developing countries / Salah Rouchiche Salah (et al.) (eds), p. 29-74. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy. Rome: FAO**
Supplier: FAO Food and Agriculture Organization of the United Nations
urban forestry
urban greening; urban planning

Examples of cities in which urban development has included important social forestry activities. The studies provide general information on location population density and physical features. Also the historic development of the cities and urban forestry with in the respective territories is described. Technical issues like selection of species are also included. (NB)

2.4 Urban Aquaculture

Fish farming in Hanoi
(photo by Huub Ruijgrok, taken from video Urban Agriculture)

Urban Aquaculture

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1. Scope and objectives

As with the other contributions in this series this introduction to urban aquaculture is aimed primarily at reviewing the most important literature and knowledge sources on this topic, providing a contemporary, up-to-date reference. In the initial sections a working definition for urban aquaculture will be discussed and a typology for urban aquaculture based on species, location and intensity of production developed. In the following section, prevailing characteristics of existing urban aquaculture systems will be described, and associated benefits discussed. Recognised constraints and emerging threats to urban aquaculture will then be presented. From this assessment, it is anticipated that it will be possible to highlight important knowledge gaps and to suggest areas demanding resources for further research and development. In contrast to other reviews dealing with aquaculture development, this work emphasises the need to consider the role of urban policy and planning, especially concerning recommendations for future developments relating to urban aquaculture. References and resources included in the annotated bibliography were selected based on the objectives of the review, the quality and scope of information presented, their appropriateness for a wide-ranging audience and their accessibility.

2. Defining urban aquaculture

Prior to discussing the current status, opportunities and constraints for urban aquaculture it would be useful to consider a general definition for this activity, or more correctly, group of activities, as urban aquaculture, as it will be presented here, is not homogeneous. Firstly, it is worthwhile considering the urban setting in which aquaculture is deemed to occur, in this review, like that presented by Iaquinta and Drescher (2000) urban environments or more properly communities, are considered to have three key characteristics. Firstly, urbanisation is associated with demographic change in a particular area, namely increasing population size and density. Secondly, the economy moves toward a workforce primarily engaged in non-agricultural activities. Thirdly, those living in urban areas have a social-psychological consciousness of what this means. However, demographic and economic processes giving rise to urbanisation do not occur evenly around urban areas, and many factors influence the rate and extent of urbanisation. Furthermore, urbanisation is not always directly associated with development around pre-existing urban centres. The social-psychological dimension of urbanisation means that through processes such as the transfer of remittances and non-income resources from rural-urban migrants; diffusion of consumerist and urban ideas and

modes of behaviour; participation of returning migrants in community decision-making, even rural communities may undergo urbanisation.

According to Iaquinta and Drescher (2000) peri-urban environments and communities share many facets with those which are regarded as urban; usually the transition from urban to peri-urban to rural communities is regarded as a continuum. In this review we consider that aquaculture activities undertaken in both urban and peri-urban settings share many characteristics, however, we also hope to demonstrate that as communities or environments become more urban in nature, then the management of aquaculture must become more intensive, however, exceptions and limitations exist.

At this point it is useful to consider what is meant when considering aquaculture. According to the FAO (1995) aquaculture may be defined as “the farming of aquatic organisms, including fish, molluscs, crustaceans and aquatic plants. Farming implies some form of intervention in the rearing process to enhance production, such as the regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated. For statistical purposes, aquatic organisms that are harvested by an individual or corporate body that has owned them throughout their rearing period contribute to aquaculture, whilst aquatic organisms that are exploitable by the public as common property resources, with or without appropriate licenses, are the harvest of fisheries”. Beveridge and Little (2002) in contrast suggest that if there is intervention to increase yields and/or ownership of stock or controls on access to and benefits accruing from interventions that this should be classed as a form of culture.

From the FAO definition it should be noted that aquatic macrophytes, cultivated in many Asian counties constitute an important aquaculture activity, however, this production is not recorded in the FAO statistics. Ranching, defined as “an aquaculture system in which juvenile fish are released to grow, unprotected, on natural foods in marine waters from which they are harvested at marketable size” (Thorpe, 1980) may also be considered within the FAO definition where ownership can be retained or transferred. The FAO definition appears to exclude groups other than individuals and corporate bodies from engaging in aquaculture, however, households, families, communities, co-operatives and governments all engage in aquaculture activities. This is of particular importance in the context of urban aquaculture where the equitable management of scarce natural resources is likely to depend upon community-based organisations retaining ownership, or at least the right to exploit aquatic plants and animals cultured using common property resources. Therefore, for the purpose of this review, urban aquaculture may be defined as the practice of aquaculture occurring in urban settings, or areas subject to urbanisation, incorporating by definition, peri-urban areas. In the following section different approaches to urban aquaculture are reviewed with respect to the species cultured and intensity of cultivation.

3. Approaches to urban aquaculture

Considering the range of species produced in aquaculture systems, this review will cover the most significant and widespread groups produced in urban settings, including aquatic plants. With many urban centres located in coastal areas, it is also important to note that urban aquaculture, although probably dominated by production in freshwater, may also include

aquaculture in brackishwater and marine environments. Considering briefly the distribution of aquaculture globally, the FAO's database states that in 1998, Asia accounted for 89% of aquaculture production, Europe accounted for 6.3%, North and South America, 2.1 and 1.9 percent, respectively, and Africa and Oceania less than 1% each. The distribution of case studies presented in this review largely mirrors this situation, with most accounts of urban aquaculture coming from Asia, and a substantially lesser number from other regions. Further to characterising urban aquaculture based on location, species and environment concerned, the review presented here will attempt to demonstrate that the intensity at which urban aquaculture is managed also varies in response to external pressures and incentives for producers. Invoking aquaculture systems typology developed by Coche (1982) we can better describe the nature of aquaculture occurring in urban areas. Extensive aquaculture is characterised by the dependence of stock on natural food; semi-intensive production involves fertiliser applications to enhance natural food production and/or the provision of supplementary feed, which is usually low in protein; culture in intensive systems relies almost exclusively on an external supply of high-protein (>20%) feed. Practically, however, these distinctions can become blurred. Many peri-urban culture systems rely on seepage or the guiding of fertile run-off or 'black water' into water bodies. These inputs may be more or less unregulated although the harvest of products as fish or plants may be highly managed.

In many rural areas where demand and markets for aquatic products are limited, it is common for producers to adopt extensive aquaculture practices, or semi-intensive approaches, but with only selected or restricted interventions. Often aquaculture in such settings is vital to ensure household food security, but of limited potential for generating substantial off-farm income. In certain situations it may also be possible for communities to rely on wild capture fisheries, or at least enhanced fisheries, to meet both their individual needs and local demand. In some cases aquaculture can become a strategy to reduce or mitigate risks from uncertain natural fisheries; stocking fish becomes more popular in parts of Cambodia when the rains, and fish yields from the ricefields, are less abundant. However, as aquatic resources in even the remotest settings become privatised and access becomes restricted, many rural communities are forced to forgo traditional aquatic foods, or to invest in aquaculture, albeit of an extensive or limited semi-intensive level.

In peri-urban areas, access to larger markets and more consistent and reliable demand, mean producers are more likely to invest in a wider range of semi-intensive management strategies. The greater availability and concentration of domestic waste, in particular wastewater from urban drainage systems, and by-products from food processing and marketing, mean producers are also able to exploit such resources, reducing their expenditure on fertilisers and feeds. Apparent subsidies to peri-urban farmers in the form of waste resources appear to offer them a significant advantage over producers with limited access to such production enhancing inputs. In selected examples access to such resources has lead to dramatic growth in peri-urban aquaculture and widespread benefits for producers. A pertinent example of this is the tilapia seed producers utilising sewage near Ho Chi Minh City that have a valuable competitive advantage over other producers on the Mekong Delta, even after transportation costs (AIT/CAF, 2000).

However, despite the benefits of being located close to urban markets and being able to access waste resources, there are potential constraints associated with undertaking aquaculture in peri-urban areas. When practising extensive aquaculture, producers are often unable to exert control over the prevailing hydrology, whilst farmers managing large water

areas for semi-intensive aquaculture may find it difficult to regulate all inflows and discharges. In such circumstances, the openness of the culture system may allow contaminants, predators and diseases to enter and nutrients, food resources and stock to escape. The physical openness of many extensive and semi-intensive aquaculture systems also means there are risks from airborne pollution, particularly agrochemical spray drift, predators such as piscivorous birds, and theft by poachers. This latter problem is often exacerbated by the settlement patterns of poor people in periurban areas who often site their homes on the periphery of water bodies.

Considering that many constraints to production in extensive and semi-intensive aquaculture systems are beyond the control of the farmer, one potential management strategy to limit the risks posed by such hazards is to restrict the openness of the culture system. However, as both extensive and semi-intensive production activities depend on environmental goods and services to supplement inputs from the farmer, restricting the openness of culture systems requires the farmer to either reduce production or to compensate for the loss by increasing inputs. External pressures that lead farmers to adopt more intensive production strategies may be considered as ‘forcing mechanisms’; shifting to more intensive production often demands financial investment, acquisition of more responsive and skilled management techniques, and greater effort devoted to monitoring product health, systems functioning and potential external hazards. Therefore, although largely used to categorise aquaculture systems based on production intensity and management demands the classification presented by Coche (1982) is helpful in indicating the degree of control and surveillance operators are able to exercise, both practically and in terms of the assets upon which they have to draw.

The transition from extensive to semi-intensive may be attributed to various factors, however, greater demand from markets, combined with improved marketing channels, often constitutes an important driver for intensification. Control of resources, more access to production enhancing inputs, for example, waste resources, food processing by-products and credit to purchase additional seed, feed and labour can also stimulate intensification. In urban settings the transition from semi-intensive to intensive production appears to be driven by largely financial considerations and increased competition for resources, in particular land, but also solid organic and wastewater resources, labour, credit and markets. Intensification also appears to offer producers greater control, enabling them to better safeguard and enhance the quality of products, addressing concerns expressed by consumers regarding possible health hazards. Despite the competitive advantage associated with intensification, several barriers to such a transition can be identified; transaction costs may be high, whilst limited access to knowledge, training, credit, markets and institutional support limit the options and opportunities available to producers.

4. Prevailing characteristics of urban aquaculture

This section reviews recent accounts of urban aquaculture, assesses the scale, distribution and relative importance of urban aquaculture and describes the prevailing management characteristics of extensive, semi-intensive and intensive production systems.

4.1. Extensive urban aquaculture

Extensive aquaculture is practised in a number of urban settings; the most notable approach consists of stocking fish in reservoirs and large urban water bodies, followed by recapture after a period of 1-2 years. Accounts of stocking and harvesting fish from urban reservoirs have come from cities such as Brasilia, Brazil (Starling, 1998); Hanoi, Vietnam (Sy and Vien, 2002) and Wuhan, China (Liu and Cai, 1998). Considering Wuhan, culture-based fisheries in Donghu Lake (1,500 ha) are dependent on stocking millions of silver carp (*Hypophthalmichthys molitrix*) and bighead carp (*Aristichthys nobilis*) seed, and providing nursery areas in dammed coves, net-barred bays and net cages to ensure fingerlings are only released when they are sufficiently large to avoid predation (>13 cm). The control of predatory fish is also undertaken to help limit mortality, whilst bulk harvesting is undertaken after a year when fish are around 1 kg in weight. Owing to enhanced management, production increased from 180 t in 1971 to 1,840 t in 1995. The manipulation of fish stocks in urban reservoirs, through selective stocking and harvesting, has also been employed to control eutrophication (Starling, 1998).

A serious constraint to aquaculture in urban reservoirs is the multiple-use of such water bodies by various groups, often with conflicting interests. The openness of such systems also makes it difficult for those farming fish to monitor hazards such as possible pollution sources, or to keep an eye on the activities of other users. The use of cages or pens may constitute an opportunity for farmers to gain exclusive access to parts of common property resources, but access of this type may be difficult to negotiate and is likely to cause conflicts and possibly disadvantage poorer sections of communities. There is a growing body of literature concerning common property resources and guidelines and best management practices proposed for aquatic resources may be useful in developing equitable access and management strategies for urban aquaculture (see for example Bromley, 1992). However, the continuous cropping of tilapias and other self-sustaining fish stocks in eutrophic urban waterbodies is probably one of the most productive, and beneficial, systems accessed by the poor in Asias' cities.

Cage culture is practiced on a large scale in the Saguling-Cirata-Jatiluhur chain of reservoirs downstream of Bandung, Indonesia (Hart, van Dok and Djuangsih, 2002); estimates suggest some 4,425 fish cages, producing a total of 6,000 t y^{-1} of tilapia (*Oreochromis* sp.), are present in the Saguling Reservoir. However, cages and pens are open to the wider environment and as such susceptible to water quality problems. In the case of Saguling, large-scale fish kills during the months of January and February have been reported, although the exact cause has not been identified. This *de facto* privatisation of the common pool resource, inevitably requires capital assets less available to the poor, who can therefore be quickly excluded.

Although beyond the scope of the current review it is important to note here that urban wastewater, through nutrient enrichment of receiving water-bodies, can enhance production from wild fisheries. However, little work has been done to quantify the extent and significance of this relationship, whilst most attention is given to ensuring that nutrient enrichment in receiving water-bodies does not exceed the environmental carrying capacity, degrading the environment and actually harming capture fisheries. Considering the widespread lack of wastewater treatment facilities in many developing countries, it is likely that drainage water from cities in many countries is flowing to rivers, ponds, lakes and rice fields in urban and

peri-urban areas, however, little work has been done to document or quantify this, or to assess the costs and benefits of informal wastewater reuse through aquaculture.

4.2 Semi-intensive urban aquaculture

Unlike aquaculture in reservoirs and large lakes, pond-based aquaculture offers farmers greater control over the culture system and permits better surveillance, enabling producers to better guard against hazards such as theft, predation and contamination. Accounts of semi-intensive pond-based aquaculture in urban settings have been reported for several counties. Proceedings of the 1988 conference held in Kolkata, India dealing with wastewater aquaculture (Edwards and Pullin, 1990) provide a useful review of what in many cases may be considered examples of urban aquaculture. Cases studies presented at the conference came from several Indian States (Bihar, Madhya Pradesh, Maharashtra and West Bengal) and several countries including, China, Germany, Hungary, Israel, Nepal, Peru and Vietnam.

Around Kolkata (Calcutta), West Bengal, India urban aquaculture is practiced in ponds covering an area of ~3,500 ha, the majority of production is based on wastewater inputs from canals draining the city. Various historical reasons and government interventions have contributed to the scale and distribution of land holdings in the area, furthermore, landowners are commonly absentee landlords and management of the fisheries is largely undertaken by leaseholders; others are operated by cooperatives and groups of fishermen and a small number are under government control. Recently it was estimated that these urban ponds produce ~18,000 t y^{-1} of fish for sale in urban markets, many of which serve poor communities. A detailed account regarding the management of the system and constraints facing producers has recently been produced (Bunting, Kundu and Mukherjee, 2002). Accounts concerning the history, management, constraints and opportunities associated with urban aquaculture in Kolkata constitute perhaps the most valuable resource regarding the future management and development of urban aquaculture in other towns and cities. A similar system has evolved in Thanh Tri District close to Hanoi, Vietnam an area of ~1,100 ha is managed for urban aquaculture and some 3,000 t of fish are produced annually (Hoan, 1996).

Small ponds managed semi-intensively for aquaculture are commonly observed in the suburbs of towns and cities throughout Asia, however, production from urban aquaculture is not usually differentiated in regional or national statistics from that originating from rural areas, and consequently it is difficult to assess the overall extent of this practice. Risks, possible costs and potential benefits associated with small-scale urban aquaculture systems are poorly defined and understood and this lack of knowledge may prohibit investment of time, money or resources in developing enhanced approaches. Risk assessment in relation to household aquaculture practices in urban settings may be critical if sustainable practices are to be identified and promoted.

Describing semi-intensive aquaculture production in ponds close to Kumasi, Ghana, Agyapong (1999) noted that tilapia (*Oreochromis niloticus*) and catfish (*Heterobranchus* sp.) are farmed in ponds ranging from 12 to 54,000 m^2. Poultry manure is widely used to fertilise ponds and supplementary feeding with maize bran, groundnut husk and paste, leaves and coconut fibre is routine. Production from 94 fish farms in the area has been estimated at ~150 t y^{-1}. Edwards (1998) notes that aquaculture practices that utilise food processing and agricultural by-products, such as poultry manure, are widespread and diverse, and that

aquaculture has an important role in recycling organic wastes from industrial and urban activities.. For example, in Thailand, by-products from chicken processing plants are used to feed catfish (*Clarias gariepinus* x *Clarias macrocephalus*) grown in urban aquaculture systems stocked at high densities (Little, Kaewpaitoon and Haitook, 1994). Little and Edwards (2003) provide a framework for the interraction between livestock and fish production in peri-urban, as opposed to rural environments.

The integration of aquaculture with wastewater treatment using lagoons is also widely advocated and several operational systems have been developed; Mara, Edwards, Clark and Mills (1993) describe a rational design approach for lagoon-based wastewater treatment that optimises both wastewater treatment and fish production. Formal lagoon based systems have been developed for small municipalities in West Bengal, India (Mara, 1997); design and management approaches for these systems have been derived largely from the traditional urban aquaculture practices close to Kolkata. In Peru, treated wastewater from the San Juan stabilisation pond complex close to Lima has been used to produce tilapia (*O. niloticus*) and preliminary studies demonstrated that fish cultured in this way are acceptable to consumers and that the proposed approach was economically viable (Cavallini, 1996).

4.3. Intensive urban aquaculture

Although perhaps beyond the scope of this review, intensively managed aquaculture operations in urban areas are being developed by entrepreneurs in several countries, however, such enterprises are largely confined to North America and Europe. Although less land may be required per unit production for intensive as compared to semi-intensive production units (Bunting, 2002) investment costs associated with establishing intensive systems are comparatively high. The advantage of intensively managed farms is that operators can exert greater control over the operation of the system, regulating better factors such as water quality, feed delivery and stock management. More intensive, less open systems also offer the producer greater control over public, animal and environmental health hazards. However, due to high capital and operating costs of intensive systems, in many cases it is only feasible to produce high value products, which are often destined for specialist markets. In North America and Europe, intensive urban aquaculture systems have been used to produce high value fish such as tilapia, sea bass and eels. Although often this is only possible where investment costs are reduced through using redundant buildings or waste heat, for example from power stations, used to subsidise operating costs. In developing countries, intensive urban aquaculture systems do exist, for example, producing ornamental species for export, however, intensive farms producing food fish for local communities have not been reported.

5. Benefits of urban aquaculture

In the following sections the principal benefits associated with urban aquaculture are reviewed. Employment, income generation and food security constitute important and tangible benefits, in particular for people from poorer communities. However, wider benefits afforded to society such as managed waste reuse, leading to improved public and environmental health protection; economic benefits, such as increased tax revenue and subsidised waste management; non-renewable resource recovery; additional functional and non-functional

values may also be attributed to urban aquaculture. According to Goodland (1990) the World Bank has acknowledged the need to include a wider range of issues in economic decisions and to revise the economic appraisal of projects to include externalities and sustainability. From the review presented here it is evident that a more thorough assessment of benefits associated with urban aquaculture is needed to inform planners and policy makers as to the true value of this activity, both for poor people and society in general.

5.1. Food security and meeting market demand

The primary driving force behind the development of many urban aquaculture activities is reliable and high level demand for aquatic products in urban markets. Farmers engaged in urban aquaculture have a number of advantages over rural producers, their proximity to markets means they, or intermediaries, are able to deliver fresh products in a timely fashion to consumers, potentially securing a market premium. Consumers in many Asian countries prefer to buy live fish as a guarantee of freshness, and for urban aquaculture producers it is possible to supply live fish to the market at little extra cost. Increased supplies of aquatic products to markets from urban aquaculture can also help lower the cost of such commodities, thus making them more accessible to poorer communities. Considering aquaculture at the peri-urban interface of cities such as Hanoi and Kolkata, access to wastewater means farmers are able to supply fish throughout the year to urban markets. This is important as many of the markets supplied serve poor communities (Morrice, Chowdhury and Little, 1998). The contribution of urban aquaculture to food security in poor households and communities has not been widely considered, however, there is a growing recognition that in some areas it may play a significant role. Products from aquatic systems, particularly fish, are important in ensuring the health and nutrition of many poor people. Thilsted, Roos and Hassan (1997) noted that in Bangladesh, fish consumption makes a significant contribution to the nutrition of poor people.

Observations by Morrice et al. (1998) provide valuable information on changing demand for fish with respect to size, species and freshness depending on the wealth of the community served. Furthermore, the authors suggests reasons why operators of urban ponds managed for wastewater aquaculture tend to produce small fish, highlighting the diversity of motivations for producers and providing an insight to risk management in dynamic urban settings. Investigating the diversity and price of fish for sale in suburban markets serving the poor, Morrice et al. (1998) observed a dominance of small freshwater fish, harvested from local ponds. Despite the higher price per unit weight for larger fish, these pond operators continue to harvest their fish at a small size to reduce risks posed by flooding, poaching and poisoning, both intentionally and through contaminated wastewater inputs. Management strategies including multiple stocking, partial harvesting and the sale of live fish have been adopted to optimise the production of small fish and compensate for the price differential between large and small fish. In one market, the authors observed that small (<100g) live tilapia commanded a higher price than equivalently sized Indian major carp, furthermore, it was noted that wild fish (catfish, *Clarias batrachus* and *Hereoneustes fossilis*; snakehead, *Channa striata*; climbing-perch, *Anabas testudineus*) attracted the highest prices in both urban and suburban markets.

5.2. Employment and income

Depending on the scale and extent of urban aquaculture it has been noted that such activities can provide employment for large numbers of people (Kundu, 1994; CRG, 1997). Employment is created directly, with jobs including stocking, harvesting and maintenance, and indirectly in associated activities such as producing and supplying seed and feed, making nets and boats and transporting and marketing harvested products. For example, estimates suggest that as a direct result of urban aquaculture around Kolkata 8,000 people are employed (Kundu, 1994), whilst employment in associated sectors servicing the farms has been estimated at over 20,000 people. Employment of one family member, either directly of indirectly, as a result of urban aquaculture may provide a valuable source of income, however, inequity may result in benefits being divided unfairly amongst household members (Harrison Stewart, Stirrat and Muir, 1994). Furthermore, where urban aquaculture is practiced on family farms, inequality within households may mean the distribution of tasks unfairly burdens particular individuals. Inequitable distribution of benefits derived from large-scale urban aquaculture operations has been cited as constraining investment and innovation. As noted in the previous section, many urban aquaculture operations are able to operate throughout the year due to perennial supplies of wastewater, consequently workers employed in such activities are less vulnerable to seasonal fluctuations in labour demand. However, it should be noted that seasonal demand for additional labour does occur in some situations, and employment for even short periods may constitute an important component in the portfolio of activities that make up poor livelihoods.

Distributing benefits from urban aquaculture to the wider community can occur through the presentation of fish to family and friends as gifts; a custom which was observed to be widespread in the town of Saidpur, Bangladesh (Bunting, Edwards and Muir, 1999). By distributing some fish at harvest time to community members residing closest to the ponds, the pond owner found it was possible to reduce the proportion of unaccounted for fish. This was attributed to either a reduction in poaching by the recipients or greater vigilance on behalf of his neighbours, reducing the incidence of poaching and predation.

5.3. Household and community health

In several cases urban aquaculture is helping facilitate the managed reuse of waste resources; according to Mara and Cairncross (1989) wastewater reuse through aquaculture, which occurs predominantly in urban settings, could be an important component in the sanitation strategies of poor communities in developing countries. The World Bank estimated that in 1990, a total of 1.7 billion people were without access to adequate sanitation, and that by 2030 this could increase to around 3.2 billion (World Bank, 1992). Providing sanitation is an important development process, and is recognised as being of prime importance in improving the general health of the population. By providing sanitation, infant mortality caused by communicable diseases e.g. cholera, typhoid and diarrhoea is greatly reduced, as is the incidence of severely malnourished individuals with associated physical and mental health problems (Ahmed, Zeitlin, Beiser, Super and Greshoff, 1993). In more general terms, it has been suggested that life expectancy in communities generally increases as a result of providing sanitation (World Bank, 1992). Inadequate sanitation results in the degradation and contamination of groundwater and surface water, in such situations it is often recommended that contaminated water be boiled, a process that uses large amounts of fuelwood, the combustion of which results in atmospheric pollution and may lead to an increase incidence of respiratory disease (Birley and Lock, 1999). Possible nutritional and food security benefits associated with urban aquaculture were noted in the previous section.

5.4. Economic benefits to society

Financial returns generated by urban aquaculture, and in particular where wastewater or agricultural and food processing by-products are employed, could potentially subsidise the development and maintenance of formal collection, treatment and delivery strategies for the waste resources. For example, in Trujillo, Peru the cost allocation formula recommended for development of a lagoon-based wastewater treatment facility was to charge construction costs to the municipality and charge local farmers, who wished to irrigate with treated wastewater, with land and operation costs (Mara and Cairncross, 1989). Responding to a survey, local farmers indicated that this was an equitable solution; in some cases the cost of treated wastewater was expected to be half that paid for groundwater. The management of wastewater and by-products as inputs for urban aquaculture could be regarded as a subsidy provided by the farmers to society, reducing the demand for resources placed on local authorities. Depending on their design and operation urban and peri-urban fishponds receiving wastewater inputs are likely to facilitate a range of physical, chemical, bio-chemical and biological contaminant removal processes similar to those observed in wetlands (Watson, Reed, Kadlec, Knight and Whitehouse, 1989). Furthermore, assessments by Breaux, Farber and Day (1995) and Brix (1999) demonstrate that constructed wetlands constitute an ecologically sound and cost-effective means of sanitation, especially when compared with conventional waste treatment and management strategies. Where wastewater is reused in urban aquaculture pre-treatment is recommended to ensure products cultured are safe to eat; Mara and Cairncross (1989) provide a review concerning appropriate treatment levels for wastewater used for aquaculture. Employing lagoon-based approaches to treat wastewater prior to reuse represents a low cost solution to ensuring water is of sufficient quality for reuse (Mara, 1997).

5.5. Resource recovery

Reusing wastewater and by-products from agriculture and food processing in urban aquaculture offers a possible solution to the problem faced by many farmers in developing countries of limited access to nutrient inputs and water resources. Ensuring the maximum possible benefit is derived from appropriated water resources and nutrients contained in both solid and liquid waste will reduce pressure on the remaining renewable freshwater resource and non-renewable mineral resources. This may contribute to reduced conflict over controversial dam building and mining schemes, and limit environmental degradation. Furthermore, compared to conventional approaches to disposing of wastewater and solid organic waste, productive reuse of waste resources in urban aquaculture offers a greater degree of environmental protection.

Reusing nutrients contained within waste flows from societal systems reduces the loss of non-renewable resources; this is of particular importance where nutrients such as phosphorus may become entrained in the unidirectional flow of matter in the hydrological cycle. The assimilation of nutrients through ecological systems, as opposed to the mechanical removal of nutrients from the wastewater, avoids the problem of developing hampered effluent accumulation processes (HEAP) traps, where former point source pollution is ultimately converted into non-point source pollution' (Gunther, 1997). Urban aquaculture practices that exploit waste resources have the potential to avoid the creation of HEAP traps, nutrients

discharged within waste streams, instead being assimilated into biomass that can be harvested and either recycled through the city, incorporated into agricultural systems or removed from the watershed. Furthermore, although conventional technologies may be efficient at removing certain waste fractions depending on the design and operation of the treatment plant, discharge water may still contain significant quantities of nutrients that may result in environmental degradation in the receiving environment. The productive reuse of wastewater as a resource, as opposed to indiscriminate discharge into wetland, coastal and oceanic ecosystems, reduces the risk of cultural eutrophication (Edwards, 1993). Furthermore, the assimilation of waste through urban aquaculture would contribute to reducing the ecosystem area appropriated to supply environmental goods and services, leading to a reduction in the ecological footprint of the community (Folke, Jansson, Larsson and Costanza, 1997).

Wastewater reclamation and reuse is currently practiced in a number of countries and fulfils a wide variety of functions. With adequate treatment, water can be returned to consumers; water of a lower quality used by industry or in producing various biomass products including food, fodder, fiber, fuelwood and timber. Productive wastewater reuse in irrigation schemes and macrophyte production is of particular importance in dry climates where the production of biomass via photosynthesis consumes approximately 1,000 m^3 of water per ton of biomass produced (Falkenmark, 1989). Postel, Daily and Ehrlich (1996) estimated that in 1990, approximately 2,880 km^3 of freshwater were used by agriculture to irrigate 240 million hectares of land. Depending on climatic factors, crops being cultivated and efficiency of the irrigation system, between 50% and 80% of irrigation water is consumed; assuming a value of 65% to be representative, global agriculture consumes 1,870 km^3 of water, equivalent to 82% of water consumed directly for human purposes.

Although there is uncertainty regarding the extent of the world's freshwater resources (Rodda, 1995), evidence provided by Postel et al. (1996), supports the hypothesis that human appropriation of accessible runoff is approaching an upper limit. Alternatives to using accessible runoff include the expensive option of desalination or constructing new dams with their associated economic, social and environmental costs (Postel et al., 1996). In several arid and semi-arid regions, the freshwater resource is indeed being depleted from surface and groundwater sources at a rate exceeding replenishment; in this situation, wastewater reclamation is the most economically viable source of water (Okun, 1991).

5.6. Functional and non-functional values

Burbridge (1994) presents a valuable summary of the most important functions attributed to wetlands. These include biomass production, sediment and carbon storage, filtration and cleansing of water, providing pathways or linkages between ecosystems, acting as buffers and regulating the rate of surface-water flow and groundwater recharge within catchments. Preliminary assessment suggest that a similar range of benefits to those suggested by this author may be attributed to agro-ecosystems supporting urban aquaculture close to cities such as Calcutta, Hanoi, Ho Chi Minh and Phnom Penh. As discussed in the previous section, urban aquaculture systems receiving solid waste, agricultural by-products and wastewater assimilate nutrients contained in such resources reducing environmental degradation. Agro-ecosystems supporting urban aquaculture also represent a valuable habitat for wildlife, both aquatic and terrestrial. The ecological value of wetlands supporting urban aquaculture in Kolkata has been recognised by the International Union for

Conservation of Nature and Natural Resources (IUCN), leading to the designation of such systems as a special category of man-made wetlands due to their contribution to preserving nature (Edwards, 1996). On a cautionary note, converting natural wetlands to urban aquaculture could reduce their value as wildlife habitats.

6. Constraints to urban aquaculture

Furedy (1990) reported that wastewater aquaculture, much of which occurs in urban settings, was declining in countries such as Japan, Malaysia and Taiwan, and that in China, aquaculture using human excreta was due to be phased out. Furthermore, indicators, including the area managed for aquaculture, number of people employed and financial viability, suggest urban aquaculture in Kolkata is in decline (Kundu, 1994; Muir, Goodwin and Walker, 1994; Mukherjee, 1996). Considering traditional extensive and semi-intensive urban aquaculture practices several factors threaten their continued operation and constrain development of more refined management strategies; the main factors implicated are described in the following sections.

6.1. Urbanisation

Processes of urbanisation, in many cases, constitute the most significant threat to the viability of urban aquaculture. Rural-urban migration continues in many developing countries and migrants looking for employment increase demand for new settlements, temporary housing and slums may encroach on agricultural land, but more often become established on embankments, roadsides and derelict land. Conversion of land managed for urban aquaculture is often related to higher-value residential and industrial developments; costs associated with building on low-lying land (draining, filling and flood-proofing) are often higher than for agricultural land. Roads constructed to service new developments often greatly improve access to peri-urban areas further increasing pressure to convert agricultural land to meet the demands of an expanding urban population; the construction of by-passes and improved public transport also stimulate urbanisation.

Urban development encroaching into peri-urban areas affects the physical environment, but also leads to more subtle changes in society; noted by Iaquinta and Drescher (2000) as the third characteristic of urban communities. In the recent past the Indian government imposed compulsory acquisition on peri-urban areas used for aquaculture; this had both a direct impact on those people displaced and generated feelings of insecurity within the more general community. The largely unregulated sprawl of the urban fringe is seen as an irresistible force, once again generating feelings of insecurity; feeling which manifest themselves in what have been termed ‘law and order’ problems (Kundu, 1994). Disgruntled labourers, confused as to the legal basis of ownership, dewater the ponds and poach the fish prior to the seemingly inevitable cessation in operations. Producers in the region consider poaching a key constraint to the sustained operation of ponds managed for aquaculture. Harrison et al. (1994) considered poaching of fish from ponds in Africa in a different light, suggesting it may constitute a mechanism for redistributing benefits derived from aquaculture

to the poorer sectors of the community. However, in Kolkata poaching is often an orchestrated and frequently violent affair (Kundu, 1994), and it is doubtful that the poorest community members benefit; anti-social behaviours such as poaching, theft and vandalism can represent a serious constraint to investment in infrastructure and improved management strategies in urban settings. Feelings of insecurity engendered through the common practice of issuing short-term leases have been cited as stifling innovation and constraining investment in maintaining infrastructure that supports urban farming around Kolkata.

6.2. Labour migration

Many studies suggest that people migrate from rural to urban areas in response to a number of ‘push’ and ‘pull’ factors e.g. limited livelihood options in rural areas or opportunities for livelihoods enhancement in urban areas, respectively. However, in many cases rural-urban migration reflects traditional patterns of labour movement determined by social and cultural institutions, and societal strategies to obtain livelihoods (de Haan, 1999). Describing the status of those families involved in urban aquaculture around Kolkata, Kundu (1989) noted that a significant number of those employed were migrants from other States.

Migration within rural areas and from rural to urban areas has been documented in a number of settings. In contrast, studies focusing on micro-scale migration of individuals from peri-urban to urban livelihoods appear largely absent from the literature. The reasons for this are not clear, and it may be that this type of migration is not considered significant, or that difficulty in assessing if and where it is occurring has constrained detailed assessment. However, following an investigation of problems affecting the operators of farming systems in peri-urban Kolkata, Kundu (1994) noted that the loss of labour to more highly paid employment represented a constraint to continued operation. Experiences from other regions also demonstrate that the opportunity cost of labour is important in determining the livelihoods adopted by household members. Edwards, Demaine, Innes-Taylor and Turongruang (1996) report that low-input aquaculture is declining, as it contributes <10% to the income of small-scale farmer households in northeast Thailand, with much of the household income being derived from off-farm employment.

Enhancing benefits derived by the poor from urban aquaculture though increased wages and more secure employment arrangements may contribute to the retention of skilled labourers; an alternative would be to support the more effective transfer of skills to new employees. Where dynamic labour markets exist, with people commonly moving from farming activities to more attractive urban employment, this would create opportunities for underemployed community members and recent migrants. Permitting them to consolidate their asset base and in turn gain access to better employment opportunities in urban activities. However, de Hann (1999) suggests migration is linked to a range of factor, including access to information regarding opportunities, transaction costs, labour-intensity in rural areas, remittances and expectation of returns through inheritance or continued access to rural income generating activities. These in turn will strongly influence the potential benefit derived by the individual, household and community, and ultimately will influence the decision of whether or not an individual should migrate.

6.3. Competition for markets

When threatened by development during the 1950s, a key argument for retaining the network of ponds and paddy fields in the Salt Lake region to the northeast of Kolkata was its ideal location from which to supply fresh produce to urban markets (Kundu, 1994). With the advent of new roads and increased access to public and private transport, urban markets become accessible to more distant producers. Surveying fish markets in Kolkata, Morrice et al. (1998) noted that large Indian major carp had mostly been imported from other Sates, from Uttar Pradesh by truck and from Madras, Orissa, Gudjarat and Punjab by train.

6.4. Changing access patterns for inputs

The inadequate supply of wastewater has been identified as a major constraint threatening the continued operation of traditional urban aquaculture practices around Kolkata. Consequently it appears that producers are increasingly employing more manageable inorganic fertlisers to sustain production and limit their dependence on the unpredictable supply of free wastewater from the city. Individual farmers have no control over water levels in the canal network whilst the priority of the urban authorities is to ensure that wastewater is drained effectively and safely from the city. Local authorities responsible for urban drainage are under no obligation to supply the needs of the urban fish farmers, it has been suggested that the farmers find themselves in this position as no payment is made for the waste resource (Muir et al., 1994).

Other factors can also constrain the equitable distribution of wastewater resources amongst users, siltation has been implicated in limiting the degree of control urban authorities have over wastewater levels in canals supplying the fishponds; Kundu (1994) cites problems of maintaining pumping stations and regulating sluice gates in hampering the delivery of wastewater. This author also suggests competition between farmers exploiting the wastewater resource may be preventing effective distribution. Introducing a pricing system may be one approach to optimising waste resource use, although such a strategy would probably disadvantage the poor. The potential of developing markets for waste resources in stimulating improved supply channels has been further highlighted by Furedy, Maclaren and Whitney (1997); these authors suggested that where traditional waste reuse practices have declined, establishing markets for organic waste may promote separation and collection, increasing the value of this resource to farmers and providing income for those involved in processing. The use of livestock waste in fish culture and horticulture dominant areas to the south and east of Bangkok are examples of the networks that develop between producers and users of waste where communications and infrrastructure is well developed (Little and Edwards, 2003)

6.5. Contamination

Contamination of surface water resources with pollution from domestic and industrial sources constitutes a widespread threat to urban aquaculture. According to Biswas and Santra (1998) the heavy metal content of fish purchased from urban and suburban markets in Kolkata was higher than similar products from rural markets. Studying bioaccumulation of metals in fishponds receiving a high proportion of industrial effluents, Deb and Santra (1997) demonstrated that fish in these ponds accumulated higher levels of copper, lead, zinc and chromium than fish from neighbouring ponds; accumulation was found to vary between fish species and between tissue types. Focusing on mercury dynamics in fishponds receiving

Kolkata wastewater, Sadhukhan, Ghosh, Ghosh, Chaudhuri and Mandal (1996) found that levels in fish were not above the permissible level; highest mercury levels were recorded in sediment dwelling fish species and this may have implications for stocking and management practices. Cage culture has been undertaken successfully in ponds receiving wastewater in South Africa (Gaigher and Krause, 1983; Gaigher and Toerien, 1985) and represents a management practice to reduce the risk of fish being exposed to contaminated sediments.

Referring to urban aquaculture in Hanoi, Vietnam, Edwards (1997) noted that water from the Set River is now widely used, with water from the To Lich River no longer being suitable owing to industrial pollution. The entire wastewater reuse system in Thanh Tri district is apparently in decline, the canal network has fallen into disrepair and rubbish dumped in the canals is compounding the problem. Inadequacies in wastewater supply have resulted in fish producers purchasing fertiliser inputs and by-products from local breweries. Reduced wastewater use in urban aquaculture has resulted in increased discharge of untreated wastewater to local rivers. Problems of contamination are also reported for the Chinese wastewater aquaculture systems in Han Kou region, accounts suggested fish produced here smelt and tasted of phenols; grow-out ponds are now used as nurseries for small fish, removing problems of consumer acceptance.

Where wastewater or other waste resources are used for urban aquaculture risks posed by contaminants demand careful assessment, and in some cases a monitoring programme may be required to ensure the use of contaminated resources is restricted. For small-scale systems it may be sufficient to conduct a general survey of the catchment or surrounding area; local knowledge may be invaluable in this situation, permitting the identification of industries and activities that could pollute. Bartone and Benavides (1997) identified a range of small-scale and cottage industries associated with hazardous waste problems in developing countries; these include tanneries, textile dyeing plants, dye producers, metal working and electroplating shops, foundries, automobile repair shops and petrol stations. However, as urban aquaculture in a region increases, or residential or industrial development occurs in the catchment or surrounding area, it may become increasingly difficult to monitor potential pollution sources.

Pollution sources other than contaminated waste inputs require consideration; indiscriminant dumping of solid waste and refuse may cause serious problems. Physical filling of waterways with rubbish interferes with local drainage patterns and dumping of toxic or hazardous chemicals may contaminate urban ponds. Agrochemical drift or leaching represents a further hazard to urban aquaculture; pesticides and herbicides applied in terrestrial farming may impact severely on aquatic environments and harm plants and animals being cultured. Practical steps to safeguard against contamination with agrochemicals may include establishing buffer zones between aquatic and terrestrial farming systems, or the development of guidelines for those engaged in applying these chemicals. Buffer zones between landfill sites would also help prevent contamination, however, leachate management may require prior planning to facilitate effective collection and treatment.

Indiscriminant defecation by local residents and operators constitutes a further hazard to production through urban aquaculture, possibly resulting in pathogen loads in inappropriate places. Mara and Cairncross (1989) noted that where water supply and sanitation are not adequate, local residents are likely to use ponds for bathing and defecation, consequently, water supply and sanitation for local communities is important for human exposure control.

6.6. Public health concerns

Birley and Lock (1999) describe in more general terms health hazards associated with peri-urban natural resource development whilst Howgate, Bunting, Beveridge and Reilly (2001) review the public, animal and environmental health hazards associated with aquaculture in developing countries. A number of authors have also described potential health hazards associated with urban aquaculture systems, and in particular those activities where wastewater reuse is practised (Mara and Cairncross, 1989; Strauss, 1991; Edwards, 1992; Edwards, 2001). Although several of these reviews make hazards associated with aquaculture explicit, it is much harder to quantify the associated level of risk. For example, risks associated with products grown using waste resources vary, depending on characteristics of the waste resource, degree of treatment prior to use, design and operation of the culture system, husbandry and processing practices, subsequent handling and preparation and susceptibility of the consumer. Reviewing the health hazards associated with aquaculture employing wastewater reuse, Mara and Cairncross (1989) identified four groups of people at risk: field workers, crop handlers, local residents and consumers. The following sections discuss the hazards faced by these different groups, describe factors that influence the degree of risk and outline potential strategies for mitigation.

Ensuring the health and safety of employees engaged in urban aquaculture is an essential component in managing risks associated with such practices. Providing protective clothing and, where appropriate, regular treatment of the workers for intestinal helminths will limit the transmission and negative health impacts of parasites and bacteria (Mara and Cairncross, 1989). However, the authors note that persuading employees to follow health and safety guidelines may be difficult. The key to implementing such safeguards may be to encourage behavioural change through the education of employees. Furthermore, the need for education regarding the health risks posed by products from urban aquaculture extends to those involved with handling and processing. Although risks to these individuals may be less than those posed to farm workers, precautions such as wearing gloves and close attention to personal hygiene may be desirable. Prophylactic use of chemical control agents and the provision of adequate facilities to treat diarrhoeal disease are also recommended for highly exposed groups (Mara and Cairncross, 1989). Providing local residents with information about urban aquaculture activities, for example, the location of ponds, particularly where wastewater is reused may help them avoid these farms and prevent their children from entering these areas. Warning signs might also be considered necessary, especially where fences are absent (Mara and Cairncross, 1989).

To assess the risk of water borne diseases transfer mediated through urban aquaculture, it is important to assess the prevalence of these diseases in local population (Mara and Cairncross, 1989). Ascertaining possible pathogen levels in the waste resource will assist in deciding what level of treatment is required to safeguard health. Buras (1993) proposed that pathogen numbers should remain under a ‘threshold concentration’ i.e. the level above which the immune system of the culture organism is overwhelmed, leading to infection. Based on a review of epidemiological data, guidelines for the acceptable level of pathogens in water for use in aquaculture have been developed (Mara and Cairncross, 1989). Furthermore, following a review of prevailing practices, these authors propose that only systems incorporating pretreatment should be employed as they represent the most appropriate methodologies for safeguarding products from contamination.

Where products from urban aquaculture are not prepared and stored in an appropriate manner the risk to consumers may be increased. Failing to prepare aquaculture products in clean water may allow pathogenic microbes to colonise the final product, while storing produce incorrectly, or display on unhygienic market stalls, may permit poisonous bacteria to proliferate (Hatha, Paul and Rao, 1998). The level of risk also varies depending on the mode and degree of exposure of the consumer and the resistance of the individual to infection. Considering urban aquaculture close to Kolkata, traditional food preparation methods, in particular cooking food for long periods or at high temperatures, has provide a safeguard against the transfer of pathogens. However, responsibility for safeguarding the quality of aquaculture products must lie primarily with the producer, although the consumer and others involved in processing and marketing have a role to play in ensuring that produce is handled and prepared so as to minimise public health problems. Where contamination is a potential hazard, depuration can be employed to minimise health risks for consumers, the depuration period should be sufficient to allow gut contents to be expelled, and in an ideal situation, a longer depuration period should be provided to reduce the population of bacteria and parasites present in both external and internal structures of the culture organism. Studies have shown that concentrations of persistent chemicals and heavy metals found in tissues of catfish cultured in wastewater were lower following depuration (James, Sampath and Devakiamma, 1993). The production of intermediary products such as duckweed or tilapia for use in feeds for fish and livestock production has been suggested for aquaculture systems liable to contamination (Edwards, Polprasert and Wee, 1987). Farming intermediary products not only helps reduce both real and perceived health risks but may also help mitigate against social restrictions and aversions to reusing waste resources. Alaerts, Rahman Mahbubar and Kelderman (1996) described a farming system in Mirzapur, Bangladesh where wastewater from a hospital is used to grow duckweed, which is subsequently fed to fish grown in adjacent ponds; the local community readily accepts fish cultured in this manner.

A recent innovation for improving food safety that is preventative in nature and focused on the consumer is the Hazard Analysis Critical Control Point (HACCP) framework (Ehiri, 1995; Lima dos Santos, 1995; Thompson, 1996; Reilly and Kaferstein, 1997). The FAO Fish Utilization and Marketing Service outline a code of hygienic practice for aquaculture products, including recommendations for products cultured using wastewater (FAO, 1997). In summary, these recommendations state that only treated wastewater should be used and that the microbiological and chemical quality of products should be monitored and conform to WHO guidelines (see Mara and Cairncross, 1989).

Despite possible health hazards associated with exploiting waste resources in urban aquaculture, it should be noted that adopting formal waste reuse practices incorporating treatment components and procedures for monitoring product quality represents a significant improvement on unregulated informal waste reuse practices. Pal and Das-Gupta (1992) demonstrated that water samples and organs from fish cultured in conventional rain-fed ponds contained certain pathogenic bacteria at concentrations two orders of magnitude greater than water samples and organs from fish cultured in ponds receiving wastewater from Kolkata. However, risks posed by urban aquaculture, especially in systems reusing wastewater, should not be underestimated and those responsible for managing such farms should be provided with knowledge on limiting health risks; schema for risk identification and evaluation have been proposed by a number of authors (Blumenthal, Strauss, Mara and Cairncross, 1989; Mara and Cairncross, 1989; Strauss, 1991; Shuval, Lampert and Fattal,

1997), however, the development of appropriate materials for operators and local authorities may assist in implementing such measures.

6.7. Changing social expectations and perceptions

Changing expectations and perceptions of operators, consumers and society may be responsible for the decline observed in once productive urban aquaculture systems (see Furedy, 1990). As mentioned previously, migration of skilled and experienced employees represents a possible constraint to the continued operation of the traditional systems. However, it is important to acknowledge that the expectations of managers and employees are not limited to financial considerations; socio-cultural factors e.g. social status and conformity also demand consideration. In Zambia, Tanzania and Zimbabwe, levelling mechanisms, such as social pressure and obligation, have been identified as constraints to adopting aquaculture, an activity that reportedly has the potential to elevate individuals above their defined social role in a community (Sen, 1995). As consumers become more aware concerning the origins of food they eat, knowledge that products are derived from urban farming systems, which might be subject to even low level contamination, possibly from traffic fumes or road run-off, may negatively influence consumer perceptions, possibly restricting acceptability.

6.8. Management constraints

Constraints to urban aquaculture presented above suggest that managers face a number of hazards that are largely beyond their control, but which have a significant influence on the type of management strategies employed. Insecurity of tenure has been cited as a key factor in constraining innovation and investment, with farmers unwilling to invest in new technologies and management strategies, instead wishing to limit their exposure to financial. Limited information and access to finance can also constrain innovation by those willing to invest; Kundu (1994) noted that farmers around Kolkata were unable to access bank loans as they lacked documentary evidence of ownership and cultivation rights. Urban aquaculture producers often have limited access to information, even on fundamental aspects such as disease and pest management and seed quality, therefore, development of enhanced dissemination pathways may be an important component in ensuring farmers information needs are met.

6.9. Institutional considerations

This section presents some potential strategies for developing the capacity of local institutions to address constraints associated with urban aquaculture. Problems in accessing loans and information suggest local government institutions, CBOs and NGOs may have roles to play in providing such services. However, selection and development of appropriate extension materials and pathways and the formulation of suitable credit arrangements is likely to demand resources and require participatory approaches to working, this in turn may first demand the capacity development within local institutions. There is often the question of who is responsible for urban aquaculture, for providing support and technical advice, ensuring product safety and informing consumers and others about such activities? In urban settings aquaculture may not be recognised as a legitimate activity by planners and may not fit easily with zoning and land use plans set out by urban authorities. A primary responsibility for

institutions dealing with urban aquaculture would be to protect the health of consumers, and this may involve the implementation of standards, guidelines and regulatory safeguards. Where public perceptions of products cultured in urban environments are of concern, such measures may be instrumental in ensuring continued consumer acceptance. However, implementing such a programme, and the framework of legislation required for its support, may represent a significant cost to regional authorities, and in many situations more pressing issues may hold priority. Farming activities, including aquaculture, may also come into conflict with local and regional planning initiatives, for example the need to construct infrastructure and services to support urban growth and industrial development.

6.10. Summary

The reviewed presented above demonstrates that several constraints threaten urban aquaculture. Urbanisation leads to the physical loss of land and causes disruption in local communities, possibly engendering feelings of insecurity. Uncertainty concerning the future of urban farming activities and prospects of more rewarding employment result in the loss of experienced workers. Improved access to urban markets for rural producers diminishes the competitive advantages of urban farmers, the risk of contamination, leading to public health threats and changing consumer perceptions may further reduce demand. Operators of urban farms often have to depend on uncertain and variable waste resources and contend with limited access to finance and information. In combination these factors often result in a reluctance or inability to invest in enhanced management approaches, further decreasing competitiveness as compared with other producers, and importantly with other activities demanding space and resources in urban areas.

7. Urban aquaculture: critical gaps in the knowledge base

Building on key accounts concerning the nature, extent and management of urban aquaculture in various settings, the most significant benefits and constraints associated with this farming activity have been described. However, from the review it is also apparent that various gaps exist in the knowledge base relating to urban aquaculture; important areas requiring further consideration are discussed below.

Despite the apparent importance of this activity in certain situations, in providing employment, producing food or contributing to environmental protection and resource recovery, there is no clear picture of the overall extent of the activity or contribution of products from urban aquaculture to regional or national food supplies. To understand the situation better it would be necessary for institutions that collect and collate aquaculture production data to delineate between production occurring specifically in urban settings and that in rural areas. However, such a distinction may be difficult to make, especially where urban aquaculture is not defined in solely geographical terms.

Although various benefits are associated with urban aquaculture several factors appear to constrain and threaten the viability of existing systems. Potential public, animal and environmental health hazards constitute some of the most significant threats, however, the risk from such hazards is likely to vary depending on site specific variables. Consequently

where urban aquaculture is practiced or proposed, work should be undertaken to identify potential problems and to develop management strategies that minimise risks, however, the question of who should take responsibility for ensuring such a strategy is implemented may be difficult to answer. Although producers may be well placed to identify possible hazards, in the absence of clear incentives, farmers are unlikely to take responsibility. Instead local institutions may need to facilitate and support the identification and management of possible hazards, however, institutions in many developing countries are unlikely to have the capacity or resources to undertake such a programme.

Where generic guidelines have been developed for managing hazards in aquaculture, such as those for HACCP proposed by FAO (1997), it would be desirable to first test their appropriateness for urban aquaculture at the regional or local level. Strategies for managing hazards should also be appropriate for producers, in particular taking into account their access to resources, including finance, labour and knowledge. Development and implementation of a HACCP framework for urban aquaculture could make a significant contribution to improving both the health of workers and food safety. HACCP appears preferable to product monitoring due to the logistics of sampling and testing produce from individual farms and the often complex and disparate distribution networks that service many small-scale producers in urban settings, the limited capacity of institutions with facilities to implement such programmes also constitutes a further constraint. Although desirable, several limitations have been suggested, constraining development of HACCP for small-scale farmers, therefore, only by working together may producers be able to formulate management plans that minimise risks to the environment, workers, local communities and consumers. Furthermore, given the need to base HACCP on sound scientific principles, it is evident that local government agencies and NGOs would have important roles in monitoring the system, identifying critical control points and assessing the magnitude of risks posed.

There also remains the fundamental question, in many cases, as to whether urban aquaculture is an activity meriting support from local, national and international organisations. Ellis and Sumberg (1998) noted that ‘The significance of food production in and around towns for the overall quality of life in developing counties should not be exaggerated, and nor, too, should its claims for scarce development resources.’ Although urban aquaculture may be important to local communities, it may only play a minor role in regional food production or employment, therefore, institutions, especially urban authorities with limited resources subject to varied demands need to assess rationally the net benefit for poor communities from helping sustain or supporting the development of urban aquaculture. Such an assessment should involve a broad-based cost-benefit analysis, however, some factors may be difficult to quantify, whilst others may receive a disproportionate weighting depending on the agenda and priorities of those involved; relative merits of competing activities will also require assessment. Clearly the multipurpose roles of urban waterbodies, for flood control, amenity uses, wildlife, and broader environmental, benefits must be considered in any holistic plan that includes the promotion of aquatic food production.

Acknowledgement

This publication is an output from a project funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.

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Berg, Leo van den **(2001) Farming downstream from Hanoi. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**

aquaculture rural-urban linkages

Vietnam; irrigation; urbanisation; horticulture;

The paper outlines the nature of the land conversion processes that take place in the southern outskirts of Hanoi, in Thanh Tri District. The responses of farmers to these challenges include turning to more intensive horticultural production and fish farming on the one hand and demanding higher compensations for lost land on the other.

Duc Vien, Tran **(2001) The role of aquaculture in pollution remediation in Tay Lake and Ruc bach Lake of Hanoi. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

aquaculture R&D methodology wastewater reuse

Vietnam

In Ha Noi there are 18 lakes ranging from 1to 526 ha, with a total area of 615.4 ha. All of the lakes of Ha Noi are used for wastewater and storm water storage in the rainy season, and also as a source of livelihood for about 100 fishermen.In order to understand the role of aquaculture in wastewater – remediation, a study was carried out in Tay Lake from 1997-1998, to follow the application of the Department of Science, Technology and Environment of Ha Noi. This report describes the role of aquaculture in wastewater treatment and use. It gives an overview of the methods used, and gives recommendations to the authorities.

Edwards, Peter **(1985). Aquaculture: a component of low-cost sanitation technology. World Bank & UNDP, Integrated Resource Recovery Project Management Report no. 3. 45 p.**

aquaculture wastewater reuse

Asia; Europe; Middle East; composting; sewage; health

This paper discusses all phases of aquaculture, including commercial viability, sanitary and biological considerations, public health, financial/economic and social aspects. Studies are detailed and options are examined for their potential applicability to developing countries, considering requirements for capital and labor skills as well as physical needs. Eleven counties are included from rich Germany to poor Bangladesh. The relationship between fish and aquatic crop production and sanitation from all of the aspects listed above are clearly presented. The role of cities in aquaculture is at the core of the overview. (JS adapted from author)

Edwards P**. (2001) Public Health issues of waste water-fed aquaculture. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

aquaculture health and environment wastewater reuse
India

Fish farmed in wastewater-fed ponds provide nutritious and relatively safe food for the urban poor. In spite of most systems being developed by farmers with limited attention to either wastewater treatment or to public health, potential threats from disease causing organisms and chemical contaminants from industrial effluents are mitigated by various mechanisms. Recommendations are made by the author to further safeguard public health.

Furedy, Christine; Maclaren, Virginia; Whitney, Joseph **(1997). Food from waste: urban pressures and opportunities for food production in Asian cities. 28 p. Ryerson Polytechnic University, Toronto**

aquaculture waste recycling food security and nutrition
South Asia; South East Asia; organic wastes; composting; waste reuse; health risks

Waste reuse and recycling has a longer tradition in Asian cities than anywhere else in the world. Waste-based food production is an important source of food as well as employment to farmers, waste workers and traders involved. Within thee region, waste sources or reuse sectors are different from one country to another as a result of differences in religion and culture. Economic factors such as land, transport and cost of fertilisers also determine the type of waste which is going to be used. Other areas of concern are health and environmental regulations, due to the fact that urban waste can be hazardous to the public health. This risk is especially increasing nowadays with the changes in urbanisation and consumption habits. At the same time, changes in life style can create new opportunities for using waste. This report explores these possibilities and gives suggestions for stronger links between waste reuse and urban agriculture. Further research areas are suggested. Reference is made to different projects in South and Southeast Asia. One of the main goals of this report is to start filling the gap between the practical work done on the subject, with a long-standing tradition, and the written materials which are still lacking. (WB)

Furedy, Christine; Maclaren, Virginia; Whitney, Joseph **(1999). Reuse of waste for food production in Asian cities: health and economic perspectives..In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod**

MacRae, Luc JA Mougeot and Jennifer .Welsh (eds), p. 136-144. ISBN 0_88936_882_1. CAD 35.00
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
aquaculture; waste recycling health and environment
organic waste reuse; health; economic impact; education

Asian communities have many practices involving the reuse of organic wastes in agriculture and aquaculture, even in urban areas. This paper discusses health and economic aspects of the reuse of municipal waste in South and Southeast Asia. Recent research in Bangkok, Bandung, Bangalore, Hanoi, Ho Chi Minh City, Jakarta, and Manila is used to suggest the potential for the linking organic waste reuse and urban agri-aquaculture. Important constraints on the reuse organic waste are contamination and the greater cost of making compost compared to chemical fertilizers. The paper suggests strategies for minimizing these constraints and improving the marketability of organic wastes. Contamination can be reduced by collecting waste separately and by separating organics at source. Market research is needed to promote the use of compost. Health risks can be reduced through education and the amendment of agricultural practices. (Abstract adapted from original)

Hussain, I., L. Raschid, M.A. Hanjra, F. Marikar and W. van der Hoek **(2002), A Framework for Analyzing Socioeconomic, Health and Environmental Impacts of Wastewater Use in Agriculture in Developing Countries. Colombo, Sri Lanka: International Water Management Institute (IWMI), Working Paper 26; see www.cgiar.org/iwmi/**
aquaculture wastewater reuse
wastewater management; environmental degradation; irrigation; economic analysis; social aspects; agriculture; developing countries; policy; Pakistan, Asia (South-Central)

Wastewater use in agriculture and its land application for treatment purposes is a global practice. Rough estimates indicate that at least 20 million hectares in 50 countries are irrigated with raw or partially treated wastewater. Wastewater is a complex resource, with both advantages and inconveniences to its use. To the extent that wastewater and its nutrient contents can be used for crop production and other agricultural enterprises including aquaculture, it can provide significant benefits to the farming communities and society in general. However, wastewater use can also impose negative impacts on communities using this resource and on ecosystems. The widespread use of wastewater containing toxic wastes and the lack of adequate finances for treatment is likely to cause an increase in the incidence of wastewater-borne diseases as well as more rapid degradation of the environment. The biggest challenge faced by policymakers at present, is how best to minimize the negative

effects of wastewater use, while at the same time obtain the maximum benefits from this resource. While most of the impacts of wastewater use, both negative as well as positive, are generally known, a comprehensive valuation of the benefits and costs of these impacts has not as yet been attempted. Conventional cost benefit analysis

is not adequate to evaluate wastewater impacts due to the environmental and public good nature of the impacts. To fill this gap in knowledge, this paper attempts to develop a comprehensive assessment framework applying available and tested techniques in environmental economic analysis, for the comprehensive evaluation of the costs and benefits of wastewater. The paper presents an approach for analyzing the socioeconomic, health, and environmental aspects of urban wastewater use in peri-urban agriculture, using typical characteristics of a major city in a developing country. Peri-urban area of Faisalabad is chosen to represent this context.

Lazard, J**. La pisciculture périurbaine en Afrique. Agriculture périurbaine en Afrique subsaharienne, p. 111-121**
aquaculture rural-urban linkages
periurban agriculture; Ivory Coast; Niger

Technical and economical requirements, in terms of agricultural by-products and existence of an urban market, resulted in a concentration of pisciculture in periurban areas. The article presents a case of fish farming in Ivory Coast and one case in Niger. Both cases are set in a different environment in which fish farming is carried out and in production system. In Ivory Coast fish farming is profitable. In Niger, the need to practise pisciculture cages and (not fixed to land tenure) and as part of a commercial chain in which it is essential to organise production, means that the farmers need fairly advanced technical and management skills. As a result only a limited number of people will qualify, at least for the time being. (NB - Abstract adapted form original)

Mara, D.D; Cairncross, S **(1989). Guidelines for the safe use of wastewater and excreta in agriculture and aquaculture WHO, Geneva.**
aquaculture wastewater reuse
health; safe food

These guidelines are, in 2000, out of date but the basic formula and cautions are a good place to begin consideration of the issue, and should not be ignored. (JS)

Mukherjee, M., U. Nath, Sk.A. Kashem and M. Chattopadhyay **(2001), The Sewage Fed Fisheries in Kolkata. Office of the Deputy Director of Fisheries (M&P), Governmment of West Bengal, Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**
aquaculture wastewater reuse
wastewater; farming systems; waste recycling; India; Asia (South-Central)

The waste water farming system around Kolkata is significant because it provides employment and food security for poor communities, facilitates a well managed recycling of wastes from urban areas, thus providing an environmental service to society.

The wetlands in East Kolkata sustain the world's largest waste water fed

aquaculture, the practice of using waste water in the culture of fish has been in vogue for over 1000 years. But a proper scientific appreciation of the practice is a recent development and it has been opined by experts that the survival of these wetlands is extremely important for the well being of the city of Kolkata. But presently these wetlands are under the threat from lack of proper sewage supply and from the overexpanding urban limit of the city. It is a rather unfortunate scenario that the quality of the water there has degraded, and many aquatic species have become endangered. We have studied characteristics of Kolkata sewage, seasonal fluctuation of microbial load in sewage fed fisheries, resource recovery through aquaculture, technology of sewage fed fish culture. We have surveyed the present status of wetland, in the peri-urban area of Kolkata, characteristic of water, pollution and bio-accumulation of pollutants in the system, primary productivity and outline status report of stakeholders and status of the selected systems and factors that influence the waste water fed aquaculture.

Rocha, JL; Barahona, T **(1998). Puerto Morazan: la camaronicultura: un espejismo en tiere salada? Nitlapan-UCA, CIFOR, Proterierra-Inifom; 99 pages**

aquaculture services hydroponics

ecology; financing; cooperatives

Puerto Morazan, a town famous for its shrimp farms, was hit by Hurricane Mitch in 1998, with a devastating effect on its most important industry, shrimp production, processing and shipping. The producers are grouped into cooperatives and they have a capital demand that they can not afford, and have been forced to contract heavy debts at high interest rates. This is at a time when the price of shrimp is falling worldwide. The future of the town, closely linked to shrimp with its (negative) ecological consequences, is in a state of uncertainty. Shrimp culture can be either an oasis or an illusion. This study may have significant awareness raising capacity for other one-product urban agriculture towns and cities. (JS adapted from authors)

Smil, Vaclav **(2000). Feeding the world: a challenge for the twenty-first century. IT Press Cambridge Massachusetts; 230 p.**

aquaculture food security and nutrition

food scarcity; nutrition; resources; agroecosystems; biodiversity; pollution; climate change; fertiliser; water; precision farming; livestock; China

This book addresses the question of how best we can feed the ten billion or so people who will likely inhabit the Earth by 2050. It focuses on the complete food cycle from agriculture to eating and discarding. The outlook is constructively optimistic. A good general source. (JS)

Williams, Meryl **(1999). The transition in the contribution of living aquatic resources to food security. IFPRI Washington D.C. 41 p.**

aquaculture food security and nutrition

fish; biodiversity

A profound and dramatic change is occurring in the living aquatic resource systems of the planet Earth. This volume focuses on the research needs to steer the transition, including urban-based fish and aquatic crop production. The data and charts are particularly useful. (JS)

WHO Scientific Group **(1989). Health guidelines for the use of waste water in agriculture and aquaculture. World Health Organisation Technical reports series no. 776. WHO Scientific Group, World Health Organisation (WHO), Geneva, Switzerland**

aquaculture wastewater reuse health and environment
wastewater management; wastewater reuse

Provides a comprehensive overview of health in relation to wastewater use in agriculture. The publication starts by covering the major aspects and current practices on reuse of waste water including: wastewater as a resource, environmental control issues, chemical pollutants, economic aspects, institutional aspects and sociocultural issues. The following chapters deal more specifically with health aspects: infections caused by pathogens; factors involved in disease transmission; epidemiological evidence; health promotion and planning; and implementing safeguards. Lastly the need for further research is discussed. (NB)

3. Special subjects

3.1 Waste water reuse in Urban Agriculture

Wastewater feeds plants in an aquaculture system.

(Picture: Nico Bakker)

Reuse of urban wastewater and human excreta

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The practice of reuse of urban waste water and human excreta in urban agriculture and aquaculture[2]

All around the world, people both in rural and urban areas have been using human excreta for centuries to fertilise fields and fishponds and to maintain the soil organic fraction. Use of faecal sludge – these are sludges which are collected from septic tanks and unsewered family and public toilets – in both agriculture and aquaculture continues to be common in China and Southeast Asia as well as in various places in Africa (Cross 1985; Timmer and Visker 1998; Visker 1998; Timmer 1999; Strauss et al. 2000).

Where water-borne excreta disposal (sewerage) was put in place, the use of the wastewater in agriculture became rapidly established, particularly so in urban and periurban areas of arid and seasonally arid zones. Wastewater is used as a source of irrigation water as well as a source of plant nutrients, allowing farmers to reduce or even eliminate the purchase of chemical fertiliser. Recent wastewater use practices range from the piped distribution of secondarily treated wastewater (i.e. mechanical and biological treatment) to periurban citrus fruit farms (e.g. City of Tunis) to farmers illegally accessing and breaking up buried trunk sewers from which raw wastewater is diverted to vegetable fields (e.g. City of Lima; Strauss and Blumenthal 1990). Agricultural reuse of wastewater is practised throughout South America and in Mexico and is also widespread in Northern Africa, Southern Europe, Western Asia, on the Arabian Peninsular, in South Asia and in the United States (Shuval et al. 1986; Strauss and Blumenthal 1990; Asano et al., eds. 1998; Bahri 1998; Niang 1999; Owusu-Bennoah 1993; Khouri et al. 1994).

Vegetable, fodder and non-food crops as well as green belt areas and golf courses are being irrigated. In a few countries (such as the United States and Saudi Arabia), wastewater is subjected to advanced treatment (secondary treatment, filtration and disinfection) prior to use. Table 1 lists selected examples of wastewater reuse.

It has been estimated that in the order of 10 % of the world's wastewater is currently being used for irrigation. 100 % of the wastewater from the cities of Santiago (Chile) and Mexico City is used for irrigation, constituting some 70 and 80 %, respectively, of the irrigation waters used in the surrounding agricultural zones during the dry season. In South Africa, in the order of 15-20 % of the wastewater is reused in agriculture (Khouri et al. 1994). Morocco was using about 16 % of its wastewater in 1990, constituting some 0.5 % of the entire irrigation waters used (Benchekroun 1991). Farmers have been utilising wastewater for a long time, whether untreated or treated, in a legal or illegal manner, to compensate for scarce or costly freshwater resources. In contrast to this, planners and decision makers have only more

[2] The term 'urban agriculture and aquaculture' is used here in its broadest sense and is meant to comprise agriculture and aquaculture within or outside the administrative city boundaries, making regular and substantial use of the city's human waste water for fertilisation and irrigation.

recently become aware of the need to make wastewater reuse part of urban strategic sanitation and infrastructure planning.

Table 1: Selected Examples of Wastewater Reuse in Agriculture

Americas		**Asia**	
Mexico	- Cereals, vegetables, fodder, parks	**Kuwait**	- Cereals, fruit trees, fodder
Peru	- Vegetables, fodder, cotton	**Jordan (indirect)**	- Vegetables, crops consumed processed
Chile	- Vegetables, grapes		
Argentina	- Vegetables, fodder	**Israel**	- Cotton
U.S.A. (Calif.)	- Vegetables, cereals, fodder	**Saudi Arabia**	- Cereals, fodder
		India	- Cereals, vegetables
Europe		**North Africa**	
Germany	- Cereals, sugar beet, potatoes	**Tunisia**	- Citrus, fodder
S. Europe	- Non-food crops, parks	**Morocco**	- Vegetables, fodder

Production of fish and to some extent of water vegetables (macrophytes) in ponds fertilised by human excreta or wastewater has long been, and continues to be, practiced in many countries in South and SE Asia (e.g. India, Thailand, Indonesia, Vietnam, Taiwan, China), in Western Asia (Israel) and in Africa (Edwards 1992). Many of these schemes and practices may be designated as urban or periurban as they make use of faecal sludges and wastewater collected in urban areas. Fish production rates of 1-6 tons/ha/year are achieved, depending on the type of fish raised, pond operations and temperature. Until after World War II there was also a practice of sewage-fed fishponds in Germany. The Calcutta Wetlands, consisting of some 30 km^2 of fishponds is the world's largest sewage-fed fish production site. The wastewater from East Calcutta, composed of domestic and industrial effluents, is batch-fed to the ponds by fishermen who have developed the skills over many generations. Tilapia and carp are the two main types of fish raised. The Wetlands reportedly cover some 10-15 % of the fish consumption in Calcutta.

Waste stabilisation ponds have come into increasing use to treat wastewater in tropical areas. It is rather common that nearby dwellers make informal or illegal use of the ponds, notably the less contaminated of the 2-4 ponds operated in series to raise fish, both for consumption within the family and for sale on local markets.

Duckweed production in excreta or sewage-fed ponds has found increasing attention in recent years. In the cities of Tainan and Chiai in Taiwan, wastewater-fed production of duckweed to be used as fish and duck feed was practised on a large scale for 30-40 years until the late nineties, when the duckweed ponds had to give way, partly at least, to growing urbanisation (Iqbal 1999). Duckweed production based on fertilisation by faecal sludges was investigated in the seventies and eighties at AIT in Bangkok (Edwards et al. 1987). The pilot field research revealed that duckweed production for fish feeding might become economically viable as a part of an integrated urban excreta reuse system but less so at village level. PRISM Bangladesh has set up, with external support, integrated excreta and wastewater-fertilised duckweed-fish production projects in three towns in Bangladesh from 1989 onwards.

The economic viability of such systems is uncertain yet, although one of the systems produced net financial gains during a four-year period. The labour intensive and skill requiring operations of duckweed ponds appear to be a major cost factor. Institutional settings, entrepreneurial organisation and operating cost, might be the major factors which have prevented a larger-scale spreading of excreta/wastewater based duckweed systems to date.

The resource potential of wastewater: irrigation water, nutrients and organic matter

Excreta are a rich source of inorganic plant nutrients such as nitrogen, phosphorus and potassium, and of organic matter. Table 2 shows that the fertilising equivalent of excreta is nearly sufficient for a person to grow his own food (Drangert 1998). Excreta are not only fertilisers. The organic matter content, which serves as a soil conditioner and humus replenisher – an asset not shared by chemical fertilisers – is of equal importance. The traditional practices of recycling faecal sludges to agriculture or aquaculture (e.g. in Southeast Asia) have made use of this resource for centuries.

Table 2: The Fertiliser Equivalent of Human Excreta (Drangert 1998)

Nutrient	**Nutrient in kg**			
	In urine (500 l/year)	In faeces (50 l/year)	Total	Required for 250 kg of cereals
N Nitrogen	4.0	0.5	4.5	5.6
P Phosphorus	0.4	0.2	0.6	0.7
K Potassium	0.9	0.3	1.2	1.2

For the same reason, urban farmers in arid or semi-arid zones or during dry seasons, in addition to procuring water for irrigation, are endeavouring to get access to wastewater, raw or treated. This allows them to renounce or minimize the purchase of chemical fertiliser. It is now being postulated that sanitation systems should, whenever feasible, be conceived and managed such as to enable and maximise the recycling of organic matter and nutrients contained in human excreta (Winblad 1997; Esrey et al. 1998).

A change in the sanitation management paradigm from flush-and-discharge to recycling of urine and faeces is gaining ground in Europe (Larsen and Guyer 1996; Otterpohl et al. 1997 and 1999; Otterpohl 2000). As a consequence, treatment strategies and technological options for faecal sludges and wastewater will have to be developed which allow the optimum recycling of nutrients and organic matter to periurban agriculture, while being adapted to the local situation and needs (see also Chapter 6 below).

In arid and semi-arid areas or in seasonally dry zones, irrigation requirements make up 80-90 % of the entire demand on natural water resources. The water required for urban water supply is thus small in relative terms. Hence, recycling urban wastewater to urban agricultural soils may bring about a saving in the national water budget of some 10-20 % at most.

However, reusing urban wastewater within the urban agricultural perimeter may very well cover a substantial portion if not 100 % of the local water demand of urban agriculture, and thus contribute to farm-based income generation, socio-economic equity and urban food security (Shaat 1998). Hence, in dry areas and seasons, wastewater reuse is being practiced all over the world whether officially regulated or not (Scot et al 1999; Strauss and Blumenthal 1990; Nunan 2000).

Assuming a yearly rate of irrigation of 500 mm and a per-capita sewage production of 100 l/cap/day, a city of 1,000,000 people would produce enough wastewater to irrigate an area of 7,000 ha (70 km^2 !!), using efficient irrigation methods. The nutrient load of this wastewater would comprise about 1,800,000 kg of nitrogen, 360,000 kg of phosphorus and 540,000 kg of potassium (after Khouri et al. 1994). This may or may not fully satisfy the plant requirements, depending on the type of plants and the cultivation regime adopted.

The stakeholders in reuse of urban waste water and human excreta

It appears that only few investigations have been made to date which have attempted to assess who the stakeholders and actors are, what drives their activities, what constraints they face, and how they apply the wastes – faecal sludge or wastewater – to the fields or fish ponds.

Allison et al. (1998), Furedy (1988), Strauss and Blumenthal (1990), and Baumgartner (2000) have addressed the issue. Farmers cultivating empty plots within urban centres or near-centre zones, in many localities, belong to the group of smallholders not availing of tenure over the land they are cultivating using human wastes. They themselves or members of their families may pursue other jobs and thereby contribute to the household's income. The basis of their cultivating activities is insecure. They are little organised and therefore barely have a political voice. The land they make use of is prone to be used for urban expansion eventually. In contrast to this, agricultural land bordering cities and being farmed by the legal owners of the land provides a much more stable basis of living. The size of holdings may range from small (in the order of 1,000 m^2 or less) to large land areas (> 1 ha).

In some places, farmers have set up farmers' organisations; e.g., those sharing water delivered through a common irrigation canal system (Strauss and Blumenthal 1990). On larger land holdings, notably so in Latin America, which are irrigated by untreated or treated urban wastewater, the land is owned by landlords and cultivated by employed agricultural workers. Many of these live in rather poor conditions and may not have access to health services. In the Calcutta Wetlands (see Chapter 1), part of the fishponds are owned by "pond" lords living in the city and managed by fishing families who may have been living in the Wetland area for many generations already. Other ponds are owned and operated by fishing co-operatives, which have developed their own social infrastructure such as schools and health facilities (Strauss and Blumenthal 1990).

Other important actors are the "deliverers", i.e. those in charge of faecal sludge or wastewater collection, treatment where existing, and disposal (Harris et al. 1998; Strauss and Blumenthal 1990). Responsibility for waste collection and delivery usually rests with the municipal or provincial authorities in charge of sanitation services (technical and/or health departments). In some cities or countries (e.g. Mexico, Tunisia), regional agricultural or irrigation authorities are in charge of wastewater distribution and of enforcing the regulations restricting crop irrigation

with wastewater (Strauss and Blumenthal 1990). Usually, in such situations, the wastewater distributed through canals or pressure lines has to be requested and paid for by the farmers.

While, notably in larger cities, municipal authorities are responsible for faecal sludge collection and disposal, the actual “business” of farm side delivery might, in most cases be dealt with directly by the sludge collectors (usually suction truck drivers) and the farmers. In many Asian cities, faecal sludges are collected by small entrepreneurs and sold to farmers at the urban fringe without the involvement of public authorities. Where faecal sludges are treated prior to use, intermediary, private entrepreneurs may play a role in selling treated products to farmers. There are, moreover, examples of smaller towns where micro-entrepreneurs do the house-to-house collection of septic tank or latrine sludges and sell these to periurban farmers (Montangero and Strauss 1999). In still other places, farmers may themselves have arrangements with urban households for collecting faecal sludge from their private pit latrine or septic tank.

The above shows clearly that different modes of stakeholder interactions and collaboration for the use of human waste in the urban and periurban environment have been established which differ according to the local administrative socio-cultural and economic setting and the type of human waste being used. It is of utmost importance to carefully evaluate these interactions when attempting to bring about changes or proposed improvements in human waste use patterns, including treatment, in order to not disrupt or jeopardise the beneficial recycling of excreta and wastewater.

Planning and Economic Aspects

Planning for the securing, improving or introducing of reuse of waste water and human waste in urban agriculture encompasses a wide range of aspects and activities. These comprise, among others, stakeholders involvement (concepts and operational patterns); strategic water resources planning; institutional coordination; pricing of treated wastes; technical support to enable sustainable waste collection and treatment; health protection; enforcement of treatment and use regulations; strategic sanitation planning; marketing of treated faecal sludges and wastewater; re-thinking the policy of fertiliser subsidy; training of professionals on sound alternatives for sanitation and recycling. These subjects have been touched upon to various levels of detail and comprehensiveness by Mara and Cairncross (1989), Khouri et al. (1994), Allison et al. (1998) and Furedy et al. (1999).

Certainly, the urban farmers – smallholders and larger property holders alike – should stand at the centre of efforts to support urban agriculture. In conceiving projects and programmes involving the use of human waste in urban agriculture, planners, decision makers, engineers and extension workers in local and national level authorities, NGOs and donor agencies, should focus on the needs and constraints of the urban farmer. In some places, though, the usefulness of urban farming and use of waste water and human wastes must first be promoted among decision-makers and higher-level planners who still too often consider this as something undesirable and inferior. There is, often, a need to raise awareness among politicians and planners that urban agriculture and the judicious use of human wastes contributes greatly to the securing of socio-economic balance, food procurement and environmental integrity in a city.

Health aspects

Excreted Pathogens

In developing countries, excreta-related diseases are very common, and faecal sludges and wastewater contain correspondingly high concentrations of excreted pathogens - the bacteria, viruses, protozoa, and the helminths (worms) that cause gastro-intestinal infections (GI) in man. There are approximately thirty excreted infections of public health importance, and many of these are of specific importance in excreta and wastewater use schemes. The risks of transmission of excreted pathogens using human wastes in agriculture and aquaculture have been, and continue to be, widely studied and reported about. This may be interpreted as reflecting the growing importance of human waste and waste water use in urban sanitation programmes and, as a consequence, the increased need and interest of decision makers and planners to become informed of the risks involved in the local context and to obtain guidance on how best to protect public health.

The agricultural or aquacultural use of excreta and wastewater can **only** result in an actual risk to public health, if **all** of the following occur.

(a) That either an infection dosage of an excreted pathogen reaches the field or pond, or the pathogen multiplies in the field or pond to form an infective dosage;
(b) That this infective dosage reaches a human host;
(c) That this host becomes infected; and
(d) That this infection causes disease or further transmission.

a), (b) and (c) constitute the **potential risk** and (d) the **actual risk** to public health. If (d) does not occur, the risks to public health remain potential only.

A multitude of transmission paths exist for excreta-related infections including transmission via waste water, soil, crops and fish, as well as through person-to-person contact (for members of the farmers' families not directly involved in farming activities). Transmission via fish may encompass infections, which require fish as a compulsory host (e.g. Chinese liver flukes) or as a passive carrier (bacteria and viruses).

The actual risks to public health that occur through waste use can be divided into three broad categories: those affecting consumers of the crops grown with the waste (**consumer risk, people involved in food processing and marketing**), those affecting the agricultural and pond workers who are exposed to the waste (**workers', farmers' or fishermen's risk**), and those affecting populations living near to a waste reuse scheme (**nearby population risk**). Where night soil use and wastewater irrigation are unrestricted, so that all types of edible crops can be grown, then both consumer risk and worker risk are of interest. If use is restricted to certain crops, such as crops eaten cooked or processed, then this prevents the risk to consumers; in this situation, only the worker risk needs to be considered.

The actual public health importance of an excreta or wastewater use practice can be assessed by an epidemiological study to determine whether or not it results in an incidence or prevalence of disease, or intensity of infection, that is measurably in excess of that which occurs in its absence. Such studies are methodologically difficult, and there have been only a few well-designed epidemiological studies on human wastes reuse (see above).

Most of the available epidemiological evidence concerns wastewater irrigation.
The results of earlier studies by (Blum and Feachem 1985), Shuval et al. (1986) and of more recent work synthesized by Blumenthal (2000) can be summarised as follows:

- Crop irrigation with **untreated wastewater** causes significant excess infection with intestinal nematodes in both consumers of the irrigated crop and those who work in the irrigated fields. The latter, especially if they work barefoot, are likely to have more intense infections, particularly of hookworms, than those not working in wastewater irrigated fields.
- Cholera, and probably also typhoid, can be effectively transmitted by the irrigation of vegetables with untreated wastewater.
- Cattle grazing on pasture irrigated with raw wastewater may become infected with beef tapeworm, but there is little evidence of actual risks of human infection.
- There is limited evidence that the health of people living near fields irrigated with raw wastewater may be negatively affected either by direct contact with the soil, or indirectly through contact with farm labourers; in communities with high standards of personal hygiene such negative impacts are usually restricted to an excess incidence of benign gastroenteritis, often of viral aetiology, although there may also be an excess of bacterial infections.
- In wastewater reuse, the risks for farmers to contract gastro-intestinal infections (GI) are greatest when flood or furrow irrigation is practiced. The risks for consumers are greater, though, when the wastewater is applied by spray or sprinkler irrigation (aerosolised transmission of excreted viruses; however disease transmission is likely to be rare in practice since most people have high levels of immunity to viral disease endemic in their community).
- Children may become infected by nematodes by getting into contact through work or play with wastewater, which may not have been treated to a near-zero concentration of nematode eggs.
- Crop irrigation with adequately **treated** wastewater does not lead to excess intestinal nematode infection amongst field workers or consumers unless conditions (lower mean ambient temperature, wastewater application through surface irrigation) prevail which favour the prolonged survival of nematode eggs, which may still be contained in the irrigation water

There is much less information about waste water and excreta use in aquaculture. Blum and Feachem (l985) came to the following conclusions:

- There is clear epidemiological evidence for the transmission of certain trematode diseases, principally *Chlonorchis* (oriental liver fluke) *Fasciolopsis* (giant intestinal fluke), and for *Schistosoma* (bilharzia) (Niu and Ling 199.
- There is no conclusive evidence for disease transmission by passive transference of viruses, bacteria or protozoa by fish and aquatic vegetables, but there is a considerable potential risk, particularly through cross-contamination due to inadequate kitchen and personal hygiene.

Measures for Health Protection (pathogen risks)

It is possible to design, implement or upgrade waste water and human waste use schemes that do not pose any risk to public health, but this requires an understanding of the occurrence of excreted infections in the area of concern and an assessment of the epidemiological risks in relation to the actual use practice and exposure patterns.

On this basis sound and appropriate measures may be drawn up in a collaborative manner by the various stakeholders based on standards for the microbiological and parasitological quality of the excreta and wastewater intended for reuse or based on appropriate measures to be implemented at critical control points (e.g. waste treatment or crop restriction; see below).

There exist four basic options for health protection from excreted pathogen transmission:

- Faecal sludge and wastewater treatment
- Restriction of the crops grown
- Appropriate choice of methods of application of the waste water and human excreta to the soil or crops
- Control of human exposure, and improved personal and household hygiene

While full treatment stops excreted pathogens from even reaching the field or fishpond to which the wastes are applied, crop restriction and human exposure control act later in the pathway, preventing excreted pathogens from reaching the persons concerned, i.e. the crop consumers and the agricultural workers.

It will often be desirable to apply a combination of several methods. This will depend on the needs and conditions (technical, socio-economic, cultural, dietary and institutional) in any specific locality.

Non-Pathogenic Health Risks

Chemical contamination is another important potential risk associated with waste water reuse. Quite likely, this risk may turn out to be much more pronounced and relevant than the risk from pathogens in the long run. Chemical constituents, heavy metals in particular, but also refractory organics, accumulate in soils. This may curtail the prolonged use of waste water and hence put urban agriculture at risk.

The contamination of soils by chemicals, the potential but as yet uncertain extent of uptake by crops, which in turn may lead to chronic and long-term toxic effects in humans are discussed by Chang et al. (1995) and by Birley and Lock (1997). Contamination of plants might be caused by deposition of aerosol particles containing heavy metals, by soils, which have been loaded with toxic industrial waste, or by human wastes over long periods of time (Chang et al. 1995).

When intending to use faecal sludge or wastewater for irrigation or restoring soil fertility it is important to consider chemical constituents. A restriction in sludge application may become necessary to limit heavy metal accumulation in soils and crops through the repeated application of sludge.

It was found that faecal sludges (septage) collected in Bangkok and Manila quite surprisingly contained only non-negligible levels of heavy metals (Heinss et al. 1998).

Faecal sludges (FS) are usually “cleaner” than sewage treatment plant sludges, as they tend to contain less heavy metals or refractory organics. Exceptions may be found in places where septage is also collected from septic tanks serving cottage or small industrial enterprises.

Heavy metal loads in municipal wastewater have been declining in a number of industrialised countries in recent years due to pre-treatment at the source of industrial wastewater discharged into the municipal sewerage systems, and due to water management and process improvements in industries.

Chang et al. (1995) citing others, report that the major portions of toxic chemicals contained in wastewater are removed from the liquid fraction during treatment, adsorbing on particulate matter and ending up in the sludge. Yet, at least traces of chemicals will always be retained in the wastewater. Studies are cited which reportedly indicated that the use of wastewater treated by so-called secondary and tertiary treatment is safe regarding the trace element contamination of food. It may, however, be speculated that the use of sewage sludge, unless it is of entirely domestic origin, would, in most cases lead to levels of chemical contaminants in the soil which may in turn lead to substantial crop uptake, endanger human health and possibly threaten or at least curtail the agricultural practice making use of such human wastes.

Chang et al. (1995) address the difficult epidemiology of toxic chemicals. In contrast to pathogen-related health risks, which are characterised by causing symptoms fairly rapidly, by well-known cause-effect and dose-response relationships, and by a fairly good knowledge of the possible routes of exposure, disorders caused or assumed to be caused by toxic chemicals are much more difficult to assess. Their prevalence and cause-effect relationship is not yet well known and documented. The difficulties rest in the fact that effects are usually long-term and may involve lifetime follow-up. Disorders are often influenced by synergetic effects from various chemicals.

Treatment for Use

There exists a large array of technological and process options to achieve pathogen attenuation in faecal sludges and wastewater. The simplest option relates to the storage pits or vaults of pit or vault latrines. Where double-pit or vault toilets are in use and properly operated in an alternating manner, the faecal sludge stored in the pit at rest is likely to become fully hygenised in tropical climate before its contents need to be removed from the pit. With ascariasis being highly prevalent in most developing countries, at least so in the rural and periurban areas, and with *Ascaris* eggs being the most persistent of all pathogens, Ascaris eggs can be used as a hygienic indicator of stored excreta. It takes in tropical climates from 6 months to one year for complete Ascaris egg die-off (Feachem et al. 1983, Strauss 1985; Phi et al. 1999). Faecal sludges which have undergone this period of storage may thus be safely used on land or in fish culture, not causing excess risk of infection to either farmers or consumers.

A review of mostly low-cost options to treat wastewater and faecal sludge has been made by Rose (1999). A compilation of waster treatments systems frequently used in developing countries has been published by Von Sperling (1996). Options for faecal sludge treatment have been discussed and presented by Strauss et al. (1997) and Montangero and Strauss (2000).

Grey water treatment has not received much attention to date and only scarce literature exists on it (Del Porto and Steinfeld 1999).

The various treatment options either in use or proposed achieve pathogen inactivation to a variable degree, hence health protection of farmers, consumers and populations living near application sites, is not provided to the same extent for all treatment options. Care must be exerted when comparing various treatment options as to their pathogen removal performance vs. land use and cost. Conclusive comparisons can only be made for options, which have been conceived and designed to achieve comparable levels of pathogens in the effluent or biosolids. A planted soil filter, e.g., requires less land than a waste stabilisation pond (WSP) scheme. But then, WSP, whether including maturation ponds or not, would normally produce higher removal efficiencies for bacteria and viruses due mainly to the longer system retention time (10-28 days in WSP schemes in warm climate vs. 1-2 days in a planted soil filter).

The choice of a particular treatment option depends on various factors, viz. the objective of treatment (reuse or discharge into the environment), hence, the desired or legally stipulated quality of liquid effluents and of biosolids produced by the process; the simplicity and sturdiness of the plant and its operation; the financial and economic cost; the land requirements; the type of cultivation envisaged or being practiced; the market opportunities for the sale of treatment products; the farmers' ability to pay and lastly, the need or non-need to devise options which may be managed by rather unskilled persons on a decentralised, community-based scale.

A low-cost system proven to be most effective in removing pathogens in warm climates are waste stabilisation ponds Mara (Arthur 1983; Mara et al. 1992; Yanez 1993; Mara 1997; Mara and Pearson, 1998). They can be built and operated without much mechanical equipment, except if wastewater needs to be pumped for topographic reasons or if machinery is required to de-sludge ponds. Numerous small and large systems have been implemented throughout the world in the past decades, the effluents of which are largely used for irrigation. They may, if properly designed and operated, produce effluent meeting stringent hygienic quality standards. V

Variants of this option allow to produce effluent either for so-called restricted irrigation as well as for unrestricted irrigation, i.e. irrigation of crops eaten uncooked. Pond systems may also prove suitable to treat faecal sludges (FS) if particular precautions are taken with respect to solids separation and handling and to excessive ammonia levels in fresh, rather undigested FS (Heinss et al. 1998).

Other wastewater treatments systems which may prove suitable for effluent reuse are anaerobic filters (e.g. in combination with individual or communal septic tanks), upflow anaerobic sludge blanket (UASB) clarifiers; trickling filters, planted vertical-flow soil filters ("constructed wetlands"); and duckweed ponds. These require low to moderate construction and operating costs, but are effective in removing or inactivating pathogens to a lesser degree than waste stabilisation ponds schemes.

Otterpohl (2000) reported on a new, recycling-based system for excreta and grey water management under construction in Luebeck, Germany. Excreta are vacuum-collected from low-flush toilets and co-treated with organic kitchen residues by anaerobic digestion. The treated and hygenised slurry will be used in periurban agriculture for soil conditioning and fertilisation. Grey water will be treated by vertical-flow constructed wetlands and used for green space irrigation or allowed to infiltrate. Compared to conventional, centralised flush-and-discharge systems, this innovative solution yields considerable savings of pollutant

emissions (organic matter, nutrients) as well as energy and resource savings for fertiliser production. Rather sophisticated technology is required, though, rendering this type of excreta management system less feasible for the majority of developing countries.

Treatment options not achieving the effluent quality required for a specified use (e.g. irrigation of raw-eaten vegetables) may be complemented by suitable processes to meet the stipulated hygienic quality like polishing ponds, chlorinisation (but the latter technique is expensive and leading to the formation of chlorinated hydrocarbons, which are carcinogenic).

Biosolids produced in FS or wastewater treatment plants will under most circumstances constitute a precious agricultural resource for soil amendment and fertilisation, unless treatment plants receive toxic wastes at a regular basis and in high proportions. Biosolids produced during the treatment process contain high loads of viable pathogens. Hence biosolids need storage and sun drying for a prolonged period to achieve a sufficient die-off of pathogens, helminth (worm) eggs in particular. Desiccation to below 10 % of solids – in dry warm climates achievable within 2-4 months – will lead to complete inactivation of all worm eggs. Alternatively, the combined composting of biosolids with organic municipal waste or other organic residues may constitute an option to hygienise pathogen-loaded sludges (Shuval 1986; Obeng et al. 1995).

Guidelines and Standards

Excreted Pathogens

Following the recommendations by a WHO Scientific Group, WHO published guidelines for wastewater use in agriculture and aquaculture (WHO 1989). These replaced the previous guidelines (WHO 1973), which, in the light of then new evidence, were considered by WHO to be too strict with respect to the suggested quality parameter for pathogenic bacteria and nematode (roundworm) egg guidelines.

The purpose of the guidelines was to guide design engineers and planners in the choice of waste treatment technologies and waste management options.

Waste treatment is considered for use by category A, waste treatment and crop restriction for category B and a choice of application measures and human exposure control for category C.

Table 3: Recommended Microbiological Quality Guidelines for Wastewater Use in Agriculture [a] (WHO 1989)

Category	Reuse conditions	Exposed group	Intestinal nematodes (/litre)	Faecal coliforms (/100ml)	Wastewater treatment expected to achieve required quality
A	Irrigation of crops likely to be eaten uncooked, sports fields, public parks	Workers, consumers, public	≤ 1	≤ 1000	A series of stabilisation ponds designed to achieve the microbiological quality indicated, or equivalent treatment
B	Irrigation of cereal crops, industrial crops, fodder crops, pasture and trees	Workers	≤ 1	None set	Retention in stabilisation ponds for 8-10 days or equivalent helminth removal.
C	Localised irrigation of crops if category B exposure of workers and the public does not occur.	None	Not applicable	Not applicable	Pre-treatment as required by the irrigation technology, but not less than primary sedimentation.

Similar guidelines were developed for the use of excreta in agriculture and aquaculture (Mara and Cairncross 1989), and for the use of wastewater in aquaculture (WHO 1989).

The WHO guidelines for agricultural use of wastewater have been adopted in several countries, either directly or in amended versions to suit local epidemiological, socio-economic conditions and health policies, viz. in Mexico, Tunisia and France.

Many countries, among them also developing countries, have adopted much stricter guidelines, based on a zero-risk principle, resulting in quality standards for wastewater used for irrigation of vegetable crops, which are very close to drinking water standards.

Where such standards were enacted in developing countries, they were hardly ever enforced as compliance is economically unfeasible and enforcement institutionally impossible. Hence, wastewater reuse goes by uncontrolled, or may be entirely prohibited, as monitoring and control cannot be implemented. Achieving wastewater quality close to drinking water standards is economically unsustainable and epidemiologically unjustified in many places.

That is why the WHO guidelines, are based on another principle: the objective that there should be no excess infection in the population attributable to wastewater reuse and that risks from reuse in a specific population must be assessed relative to risks of enteric infections from other transmission routes.

Blumenthal (2000) suggests to choose an approach for setting future guidelines or standards that is based more on epidemiological evidence for excess risks due to a specific reuse

practice, and on calculations of risks from a particular practice and then comparing this to an acceptable risk definition as laid out by, for example, health authorities.

Food Hygienic Quality

ICMSF (1995) has issued quality recommendations for food. The limits stipulated for agricultural crops, applicable to raw-eaten vegetables, are 10^5/100g fresh weight ("if – possible"-limit) and 10^3 faecal coliforms/100g fresh weight ("tolerable"-limit), respectively. These limits may appear lenient. They must, however, be viewed in the light of the fact that fresh, unprocessed and unpacked vegetables that have been grown on rain-fed or freshwater-irrigated fields and sold on markets or in food stores, may easily carry faecal indicator bacteria concentrations close to the indicated quality limits! This fact is often disregarded when evaluating the potential health risks associated with the use of faecal sludges or wastewater.

Chemical contaminants

Following the publication of pathogen-related guidelines by WHO in 1989, WHO mandated a team of researchers to assess the risks related to chemical contaminants and to viruses, respectively. Chang et al. (1995) suggested tentative guidelines for chemical pollutants, assuming, based on literature evidence, that transfer via the food chain is the primary route of exposure for humans. From this, the authors adopted a maximum daily intake and then derived the maximum concentration of the respective pollutants, which may be tolerated in the soil. This inevitably leads to a limitation in the use of untreated or partially treated wastewater and of biosolids, in which the contaminants are concentrated. They stipulate, on the other hand, based again on reported evidence, that adequately (secondary or tertiary) treated wastewater may be used for edible crop irrigation without restriction.

Standard Setting

In adopting standards, many countries tend to immediately adopt the strictest standards as used in industrialised countries. This may satisfy the legal requirements of the enacting authorities and provide the prestige of "also having standards", but may often not be feasible in the local economic and institutional context. Instead of this, it would make much sense that countries would adopt a stepwise approach in setting standards, which would -if followed and enforced- already achieve a considerable advancement in terms of pollution abatement and risk prevention. Johnstone and Horan (1994 and 1996) and Von Sperling and Fattal (in press) have made sensible suggestions related to guideline setting and remind one that standard setting in industrialised countries has evolved gradually and based on scientific and economic advancement.

One should also be aware that where wastewater is now being used in an informal, de facto illegal manner, urban sanitation upgrading may lead to situations where treated human wastes might neither be affordable nor be accessible anymore by urban farmers.

Gaps-in-knowledge

- Allison et al. (1998), Birley and Lock (1999) and Rose (1999) have identified gaps-in-knowledge relating to waste water reuse in urban agriculture and are suggesting action and field research to fill them. Below is a non-exhaustive listing of identified gaps:

- Assess the health impacts from chemical constituents contained in waste water and human wastes (heavy metals; persistent organics; pharmaceuticals) in the human waste – soil – crops – food –cycle and identify strategies to avoid (e.g. through source separation) the mixing of toxic chemicals and domestic wastewater and faecal sludges
- Development of appropriate, i.e. implementable and enforceable, quality standards for treated human wastes and waste water applied in urban agriculture and aquaculture
- Technical, economic/financial, institutional, cultural and agronomic aspects of non-centralised waste water treatment and reuse ("integrated urban waste management") schemes based on domestic sources mainly, e.g. through case studies of existing schemes or components thereof or through pilot projects with stakeholder involvement
- Carbon (organic matter) and nutrient needs in urban agriculture vs. carbon and nutrient generation in the city; estimating the theoretical carbon and nutrient demand potential of urban farms; use of material flow analysis (MFA) as an assessment and planning tool
- To asses farmers' needs and constraints; methods of cultivation; organisation; tenure as well as attitudes vis-à-vis human waste use; health problems; hygienic practices and behaviour determining exposure to wastes; financial conditions; use of inorganic fertiliser
- Cost-benefit evaluation of waste management schemes with and without reuse.

Allison, M **(et al.) (1998). A review of the urban waste in periurban interface production systems. 2 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**

waste recycling wastewater reuse rural-urban linkages R&D methodology

urban wastes; organic wastes

Provides a dense overview of uses of urban waste and wastewater and examines factors affecting the use of wastes in agriculture. Attention is drawn to the fact that there are important gaps in our knowledge about the quantitative need for organic wastes in urban and periurban agricultural systems and about the potential to satisfy these needs. (WB)

Ayres, RM; Mara, D.D **(1996). Analysis of wastewater for use in agriculture: a laboratory manual of parasitological and bacteriological techniques. World Health Organization: Geneva.**

wastewater reuse health and environment

zoonoses; health; wastewater; environment

The first step that needs to be taken by any local jurisdiction or medium to large scale urban food producer using irrigation is analysis. This volume covers the parasites and bacteria; other tests are needed to define the nutrient content. (JS)

Blumenthal, U.J. **(1992). A study of the health impact of the use of wastewater in agriculture in Mexico. London School of Hygiene and Tropical Medicine: London.**

wastewater reuse health and environment
health; Mexico; livestock

Mexico has a very special historical record in the application of municipal sewage effluent to field crops for livestock and human consumption. This study is one of several that begin to define the benefits and costs from a rather narrow epidemiological point of view. (JS)

Blumenthal, U.J.., Mara, D.D., Peasey, A., Ruiz-Palacios, G., Stott, R. **(2000) Using treated wastewater: recommended changes to WHO guidelines. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment wastewater reuse
Measurement; indicators; health impact assessment; policy; WHO

Standards for wastewater reuse in many countries have been influenced by the WHO (1989) health guidelines and the USEPA/USAID (1992) guidelines (which are much stricter). The WHO guidelines are proposed as a guide for policy makers as to what wastewater treatment processes, crops and irrigation methods are appropriate for safe agricultural production. They are not meant as standards for daily water monitoring at a local level. The WHO guidelines recognise the benefits that can be gained from using appropriately treated wastewater in agriculture, and aim to promote safe use of wastewater, and take into account the social, epidemiological and economic conditions that occur in specific countries. Standards are set for microbiological indicators of faecal pollution: faecal colifom bacteria and for nematode eggs. The former are intended to protect exposed persons from bacterial and viral infections (e.g salmonella) and the latter, from helminth (and protozoal) infections. WHO are currently revising the 1989 guidelines. This paper summarises the main recommendations for of a review of epidemiological, microbiological and risk assessment studies and their implications for the WHO guidelines. The article gives recommendations for changing the guidelines and proposes appropriate wastewater treatment methods that can be used to achieve the new microbiological guideline limits. The results of the WHO official review should be available in early 2002.

Braatz, Susan; Kandiah Arumugam **(1996). The use of municipal waste water for forest and tree irrigation. In: Unasylva 185 (1996) p. 45-51.**

urban forestry wastewater reuse
wastewater; municipal management; resources; irrigation

This article discusses some of the experiences to date and various issues related to the use of wastewater for forest and tree irrigation. This combines the goals of

managing municipal effluents with those of enhancing forestry practices in periurban areas. (adapted from original by JN)

Brand, Anthony; Bradford, Bonnie **(1991). Rainwater harvesting and water use in the barrios of Tegucigalpa. UNICEF New York. 60 p.**
wastewater reuse
poverty; housing; Latin America; gender

This survey report provides basic information concerning the availability and quality of water in poor neighborhoods and therefore its limitations for urban agriculture applications. (JS)

Bruins, Hendrik J **(1997). Drought mitigation policy and food provision for urban Africa: potential use of treated wastewater and solar energy. Arid Lands Newsletter no. 42 (fall/winter 1997)**
wastewater reuse food security and nutrition
Africa; food security; solar energy; sanitation; irrigation; home gardening

Examines the possibility of reusing treated wastewater for homegardening, and the use of solar energy in the treatment of wastewater. The author concludes that solar energy has significant potential for small-scale powering of water pumps for irrigation, water disinfection and sanitary systems. (WB)

Cornish, G.A. **(2001) Assessing water quality and health implications in informal periurban irrigation. Case studies from Nairobi and Kumasi. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology wastewater reuse
monitoring; Kenya; Ghana; irrigation

This paper draws lessons from work carried out in Nairobi, Kenya and Kumasi, Ghana, where research was conducted into the nature, extent and importance of informal, irrigated agriculture in the urban and periurban zones of those cities. The research was funded by the Infrastructure and Urban Development Department of DFID. Fieldwork in Nairobi was carried out in collaboration with a number of independent consultants while in Kumasi the project collaborated with staff from the Institute of Land Management and Development at the Kwame Nkrumah University of Science and Technology. The focus of this paper and the lessons drawn concern only that part of the research addressing water quality and its potential impact on producer and consumer health. The interest of this workshop is in the validity of the methods used to obtain information but the findings of the studies, and their conclusions, are used to illustrate the points made.

Del Porto, David; Steinfeld, Carol **(1999). The composting toilet system book: a**

practical guide to choosing, planning and maintaining composting toilet systems, an alternative to sewer and septic systems. 240 p. ISBN 0-9666783-0-3, USD 29.95. The Center for Ecological Pollution Prevention (CEPP), PO Box 1330, Concord, MA 01742-01330 USA

wastewater reuse waste recycling

wastewater; graywater; composting toilets

Describes a number of wastewater management methods which may be viable and cost-saving alternatives to graywater disposal systems. Central is the design of the composting toilet, also known as dry, waterless or biological toilet. Composting toilets are not only an alternative in places where septic tanks cannot be installed but they are also one of the most direct ways to avoid pollution and conserve water and resources. A very complete manual, full of practical information. The manual contains a useful glossary and a list of USA state regulations. In spite of its apparent USA focus, the content applies equally well to developing countries. (WB)

Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ) **(1989). Community participation and hygiene education in water supply and sanitation. Deutsche Stiftung fuer Internationale Entwicklung (DSE); German Agency for Technical Cooperation (GTZ), PO Box 5180, D-65726 Eschborn 1, Germany**

wastewater reuse health and environment community development

community participation; water management; sanitation; development projects; indicators

Successful water and sanitation projects should have a community participation and hygiene education component. These aspects are addressed in this manual containing five individual course manuals, designed to be used separately, as the foreword puts it, 'for guidance and as a frame of reference in water and sanitation projects for national and international decision makers; and for field managers of water supply and sanitation projects'. This manual constitutes a great attempt to bring together and analyse this complex material. (WB)

Diop Gueye N.F. and Sy M. **(2001) The use of wastewater for urban agriculture; the example of Dakar, Nouakchott and Ouagadougou. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment wastewater reuse

West Africa

In the Sahelian zone water is the major stumbling block to developing agricultural activities, In the cities domestic needs win out over agricultural activities in the competition for water. Given this, it becomes evident that one strategy to offset the water deficit is to reuse wastewater. Such a practice has to be examined closely for its advantages and disadvantages in relation to the issue of urban and periurban agriculture. In this article an overview of constraints and opportunities is given.

Drangert, Jan-Olof; Bew, Jennifer; Winblad, Uno **(eds) (1997). Ecological alternatives in sanitation: proceedings from SIDA Sanitation Workshop, Balingsholm, Sweden, 6-9 August 1997. Publications on Water Resources no. 9. ISBN 91_586_7551_5. Department for Natural Resources and the Environment, Swedish International Development Authority (SIDA), Birger Jarlsgatan 61, S-10525 Stockholm, Sweden**

waste recycling wastewater reuse health and environment
sanitation; workshops; disease control; water management

This sanitation workshop was organised with the need to rethink and with new approaches and techniques in sanitation in mind. This document provides a comprehensive overview of ecological sanitation. Aspects like reuse and disease control are discussed. Within ecological sanitation there are a range of options for various conditions. Furthermore, case studies from several countries in the world and abstracts of background papers to the conference are included. (NB)

Duc Vien, Tran **(2001) The role of aquaculture in pollution remediation in Tay Lake and Ruc bach Lake of Hanoi. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology wastewater reuse
Vietnam; aquaculture

In Ha Noi there are 18 lakes ranging from 1to 526 ha, with a total area of 615.4 ha. All of the lakes of Ha Noi are used for wastewater and storm water storage in the rainy season, and also as a source of livelihood for about 100 fishermen.In order to understand the role of aquaculture in wastewater – remediation, a study was carried out in Tay Lake from 1997-1998, to follow the application of the Department of Science, Technology and Environment of Ha Noi. This report describes the role of aquaculture in wastewater treatment and use. It gives an overview of the methods used, and gives recommendations to the authorities.

Edwards, Peter **(1985). Aquaculture: a component of low-cost sanitation technology. World Bank & UNDP, Integrated Resource Recovery Project Management Report no. 3. 45 p.**

wastewater reuse
aquaculture; Asia; Europe; Middle East; composting; sewage; health

This paper discusses all phases of aquaculture, including commercial viability, sanitary and biological considerations, public health, financial/economic and social aspects. Studies are detailed and options are examined for their potential applicability to developing countries, considering requirements for capital and labor skills as well as physical needs. Eleven counties are included from rich Germany to poor Bangladesh. The relationship between fish and aquatic crop production and sanitation from all of the aspects listed above are clearly presented. The role of cities

in aquaculture is at the core of the overview. (JS adapted from author)

Edwards, Peter **et al (1987). Resource recovery and health aspects of sanitation. AIT Research Report No. 25 Commission of the European Communities, Brussels Belgium 225 p.**

wastewater reuse

aquaculture; sludge; sanitation; public health; duckweed; tilapia

This report is particularly useful in its precise presentation of results of long-term studies of biological treatment of human and municipal, including village, organic wastes with an economic return under consideration. It was found that substantial savings could be by the piloted biological sanitation methods compared to the currently used activated sludge method. Specifically "—septage reuse in aquaculture may be the most economically attractive option in countries with relatively low labour costs –." The excreta reuse duckweed/tilapia sanitation system was found to have great potential as part of an urban excreta reuse system. The duckweed being used in the production of high protein animal feed was found to be in some instances more profitable than using duckweed as fish food. (JS)

Edwards P**. (2001) Public Health issues of waste water-fed aquaculture. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment wastewater reuse

India; aquaculture

Fish farmed in wastewater-fed ponds provide nutritious and relatively safe food for the urban poor. In spite of most systems being developed by farmers with limited attention to either wastewater treatment or to public health, potential threats from disease causing organisms and chemical contaminants from industrial effluents are mitigated by various mechanisms. Recommendations are made by the author to further safeguard public health.

Esrey, Steve **et al (1998). Ecological sanitation. SIDA, Stockholm, Sweden. 92 p.**

wastewater reuse health and environment waste recycling

ecology; sanitation; sewage; human excreta; pollution

This short volume is focussed on providing a practicable vision of a future of ecological sanitation. It presents the theory, the history (back to the Ancients), design principles and promotion strategies. This is an excellent introduction to the precepts of eco-sanitation and its relationship to urban agriculture, public health, and healthy city and a sustainable city. (JS)

Feacham, RG et al. **(1983). Sanitation and disease: health aspects of excreta and wastewater management. Wiley, New York.**

wastewater reuse health and environment
epidemiology; sanitation; water management; health

This volume provides a historical base for considering the possible negative effects of reusing sewage effluent for nutritional, recreational and environment enhancement in and near human settlements. It follows Feacham's seminal work in the field at the "Cholera Laboratories in Dhaka Bangladesh. (JS)

Flynn, Kathleen**. An overview of public health and urban agriculture: water, soil and crop contamination and emerging urban zoonoses. Cities Feeding People Series Report no. 30. 84 p.**
Supplier: International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
health and environment wastewater reuse

Hertog, Wilfrid and Klutse, Amah (eds) **(2002) Visite d'étude et atelier international sur la réutilisation des eaux usées en agriculture urbaine: un défi pour les municipalités en Afrque de l'ouest et du Centre (Study visit and international workshop on the reuse of wastewater in urban agriulture: a challenge for the municipalities of Central and Western Africa) ETC Leusden**,

wastewater reuse health / pollution

Africa (Western); wastewater re-use; wastewater irrigation; socio-economic aspects; livelihoods; water shortage; Burkina Faso

These proceedings describe the studyvisit and workshop held in Ouagadougou from 3-7 June 2002 with 29 participants from 10 countries. The work focussed on the use of untreated wastewater use in urban agriculture looked at from three angles: health and environment; socio-economic aspects and legal, institutional and financial aspects. These themes were covered by three presentations included in the proceedings. 7 case studies from Burkina Faso, Cameroon, Niger, Benin, Senegal, Mali and Mauretania were presented also included in this document. In Ougadougou four sites were visited and interviews held with farmers. These revealed the acute shortage of water and the necessity to use wastewater. Health risks were underestimated. Water quantity not quality was their primary concern. Following the discussions, a set of recommendations were formulated aiming at the municipalities, NGO's and Institutions, consumers and producers. More needs to be known and done about paths of contamination and hygiene behaviour besides tackling the inevitable use of wastewater itself.

Hussain, I., L. Raschid M.A. Hanjra, F. Marikar and W. van der Hoek **(2002) Wastewater Use in Agriculture: Review of Impacts and Methodological Issues in Valuing Impacts. Colombo, Sri Lanka: International Water Management Institute (IWMI). Working Paper 37. see www.cgiar.org/iwmi/**
wastewater reuse
wastewater; water management; wastewater reuse; agricultural production; pollution; public health; economic aspects; ecology; developing countries; China; India; Mexico; Pakistan, Asia (Eastern), Asia (South-Central), America (Central)

The objective of this paper is to provide a review of the characteristics of wastewater used for irrigation, and the reasoning behind the international guidelines presently used in regulating wastewater reuse for agriculture. This paper presents various systems of wastewater treatment available and discusses their benefits and shortcomings. Finally, the paper provides the review of environmental valuation techniques for analysing impacts of wastewater uses in agriculture, and suggest a framework for application of some of these techniques. This framework will be applied to a developing country case study (Faisalabad area in Pakistan), in the ongoing IWMI research program.

Hussain, I., L. Raschid, M.A. Hanjra, F. Marikar and W. van der Hoek **(2002), A Framework for Analyzing Socioeconomic, Health and Environmental Impacts of Wastewater Use in Agriculture in Developing Countries. Colombo, Sri Lanka: International Water Management Institute (IWMI), Working Paper 26; see www.cgiar.org/iwmi/**

wastewater reuse

wastewater management; environmental degradation; irrigation; aquaculture; economic analysis; social aspects; agriculture; developing countries; policy; Pakistan, Asia (South-Central)

Wastewater use in agriculture and its land application for treatment purposes is a global practice. Rough estimates indicate that at least 20 million hectares in 50 countries are irrigated with raw or partially treated wastewater. Wastewater is a complex resource, with both advantages and inconveniences to its use. To the extent that wastewater and its nutrient contents can be used for crop production and other agricultural enterprises including aquaculture, it can provide significant benefits to the farming communities and society in general. However, wastewater use can also impose negative impacts on communities using this resource and on ecosystems. The widespread use of wastewater containing toxic wastes and the lack of adequate finances for treatment is likely to cause an increase in the incidence of wastewater-borne diseases as well as more rapid degradation of the environment. The biggest challenge faced by policymakers at present, is how best to minimize the negative

effects of wastewater use, while at the same time obtain the maximum benefits from this resource. While most of the impacts of wastewater use, both negative as well as positive, are generally known, a comprehensive valuation of the benefits and costs of these impacts has not as yet been attempted. Conventional cost benefit analysis is not adequate to evaluate wastewater impacts due to the environmental and public good nature of the impacts. To fill this gap in knowledge, this paper attempts to develop a comprehensive assessment framework applying available and tested techniques in environmental economic analysis, for the comprehensive evaluation of the costs and benefits of wastewater. The paper presents an approach for analyzing the socioeconomic, health, and environmental aspects of urban wastewater use in peri-urban agriculture, using typical characteristics of a major city in a developing country. Peri-urban area of Faisalabad is chosen to represent this context.

Jenkins, Joseph **(1999). The humanure handbook. 302 p. Also on:**

www.jenkinspublishing.com.
wastewater reuse waste recycling
composting; sanitation; wastewater

This manual includes easy to understand instructions on composting all organic household waste; growing a food garden with human compost and understanding the health issues. Low-cost composting toilet, grey water use, government regulations, and a list of commercial sources are included. (JS)

Journey, WK; McNiven, Scott **(1996). Anaerobic Enhanced Treatment of wastewater and Options for Further Treatment ACDI/VOCA Washington DC USA Nine figures, Three tables, Four appendices, Four case studies**
wastewater reuse
sludge; aquaculture; infrastructure; sanitation; environmental conservation

wastewater management should be viewed as an important component of water resource management, with an associated set of costs and benefits and definable linkages to the rest of the hydrological and nutrient systems. Anaerobic treatment relies on biological processes in the absence of oxygen to stabilize organic material by conversion to methane and biomass and inorganic products including carbon dioxide, ammonia and phosphate. This report describes several methods of biological waste water treatment including aquatic farming. It carefully lays out the advantages and limitations of the method for different situations. This short report is a good starting point for the student or practitioner. (JS)

Khouri, Nadim; Kalbermatten, JM, Bartone, CR **(1994). Reuse of wastewater in agriculture: a guide for planners. UNDP-World Bank, 49 p.**
wastewater reuse
planning; health

This report is a set of guidelines, which summarize information on the reuse of wastewater for irrigation, principally in periurban areas. It finds that properly designed and managed wastewater reuse is an environmental protection method that is superior to discharging treated wastewater into surface waters. wastewater reuse could also free large amounts of fresh water currently used for irrigation and make this resource available to meet the growing needs for fresh water of cities and towns. Close collaboration between sectors involved (agriculture, water and waste, environmental protection and health) is essential ad viable, given policy adaptations. The report provides guidance for choosing amongst technical and policy options and proposes a framework for inclusion of economic and financial considerations. (JS adapted from authors)

Lukman, Salifu**. Waste management issues: an integrated disposal strategy for the Kumasi metropolitan area. Waste Management Department, Kumasi Metropolitan Assembly, Ghana**

waste recycling wastewater reuse health and environment
Ghana; waste management; wastewater management; urban sanitation

Urban sanitation and waste management are given a priority by all district and municipal governments in Ghana. However, the waste management capacity of cities is deteriorating. This paper discusses the solid and liquid waste management system of Kumasi. Needs assessment and intervention schemes are presented. From there, proposals for strategies for sustainable services delivery and an integrated disposal strategy including a reality check are made. (NB)

Mara, D.D; Cairncross, S **(1989). Guidelines for the safe use of wastewater and excreta in agriculture and aquaculture WHO, Geneva.**
wastewater reuse
aquaculture; health; safe food

These guidelines are, in 2000, out of date but the basic formula and cautions are a good place to begin consideration of the issue, and should not be ignored. (JS)

Morgan, Peter **(1999). Ecological sanitation in Zimbabwe: a compilation of manuals and experiences. Harare: Privately printed.**
wastewater reuse waste recycling
Zimbabwe; eco-sanitation; manuals

This is a significant compilation, part of the emerging literature on “eco-sanitation”. While this approach arose principally in northern Europe, this book is one of the first attempts to adapt it in a significant way to developing countries. The second half of the book is devoted to the agricultural-reuse. (JN)

Mukherjee, M., U. Nath, Sk.A. Kashem and M. Chattopadhyay **(2001), The Sewage Fed Fisheries in Kolkata. Office of the Deputy Director of Fisheries (M&P), Governmment of West Bengal, Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**
wastewater reuse
wastewater; farming systems; waste recycling; India; aquaculture, Asia (South-Central)

The waste water farming system around Kolkata is significant because it provides employment and food security for poor communities, facilitates a well managed recycling of wastes from urban areas, thus providing an environmental service to society.

The wetlands in East Kolkata sustain the world's largest waste water fed aquaculture, the practice of using waste water in the culture of fish has been in vogue for over 1000 years. But a proper scientific appreciation of the practice is a recent development and it has been opined by experts that the survival of these wetlands is extremely important for the well being of the city of Kolkata. But presently

these wetlands are under the threat from lack of proper sewage supply and from the overexpanding urban limit of the city. It is a rather unfortunate scenario that the quality of the water there has degraded, and many aquatic species have become endangered. We have studied characteristics of Kolkata sewage, seasonal fluctuation of microbial load in sewage fed fisheries, resource recovery through aquaculture, technology of sewage fed fish culture. We have surveyed the present status of wetland, in the peri-urban area of Kolkata, characteristic of water, pollution and bio-accumulation of pollutants in the system, primary productivity and outline status report of stakeholders and status of the selected systems and factors that influence the waste water fed aquaculture.

Niang, Seydou **(1998). Épuration des eaux usées domestiques. Workshop on Cities feeding people: lessons learned from projects in Africa. IDRC. Nairobi. 21-25 June 1998**

wastewater reuse

Africa; development projects; impact assessment

This International Development Research Centre (IDRC)-supported project (90-0153) consisted of two parts. The first involved examining existing wastewater treatment facilities in Dakar; sampling and analyzing the quality of the outflow from the three principal treatment facilities; interviews with 360 individuals to determine their attitudes toward water use, waste disposal, etc.; and identifying suitable aquatic plants for use in experimental water treatment facilities. The second involved setting up an experimental station and running a series of water treatment procedures using various types of water plants. This document discusses the impact of the project in terms of human resource development, strengthening institutional capacity, partnership development, methodological and scientific advances, the utilization of research results by non-researchers, and the leverage of additional funds.

The most important innovation of the project was the experimental station, which allowed simultaneous comparison of different treatment processes under the same climatic conditions. The ministry of environment of the Wallonne Region, Belgium, took over the cost and operation of the station for 5 years (1992-1997). The most important impact of the project was that it sensitized decision-makers — who had up until then tended to implement expensive, European-type, water treatment facilities on a turnkey basis — to a different approach to water treatment, appropriate to the local climate and means. (HC, IDRC)

Niang, Seydou **(1999). Utilisation des eaux usées brutes dans l'agriculture urbaine au Sénégal: bilan et perspectives. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.). Institut Fondamental d'Afrique Noire (IFAN), Université Cheikh Anta Diop, Dakar, Senegal**

wastewater reuse

vegetable production; wastewater reuse; crop contamination; Senegal

Urban agriculture, mainly vegetable production is concentrated around Dakar but faces many constraints. Around 100,000 m3 domestic waste water daily is discharged in Dakar. Part of this is used untreated which has some advantages but poses health risks as well. A policy on water reuse is needed. Research showed that extensive systems of urban water purification functioned well, however without meeting WHO standards. (NB)

Niang, Seydou **(2001), Maitrise des risques dans la ré-utilisation des eaux usées en agriculture urbaine (Safe re-use of waste water in UPA). L'Institut Fondamental d'Afrique Noire (IFAN), Dakar. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings available on: www.ruaf.org.**

wastewater reuse

urban areas; periurban area, Senegal, Africa (Western)

In an unfavourable context of permanent dry seasons cycles, urban population growth, macro-economical structural adjusting and money devaluation, services are appalling in Senegal cities. Results are progressive degradation of life style and environment. For the few past years, wastewaters disposal have been rising in cities according to the population growth. Hence, a solution for water supply in urban agriculture was offered. Unfortunately health hazards attendant to this practice let policy makers to elaborate tough controls which are slowing down people's eagerness.

In order to find in a global solution including food supply, public health, improved life style, environmental quality, woman's work valorisation into development processes, but further, to make improved sanitation affordable to poor people, ENDA has set an integrated process of disposal and treatment of wastewaters and solid wastes in Castors and Diokoul districts of Rufisque (Senegal). The process consists of collecting the house wastewaters in a little settlement tank (around 8 hours of time stay), after that, they are discharged through a 110 mm pipes and treated into a macrophite's lagooning ponds. Then, treated wastewaters are reused for agriculture, and reafforestation. The system funded by CIDA was meant to create a revolving fund at the end of the project with financial participation of the stakeholders with the view to ensure sustainability of the project, through the improved sanitation in poor districts, with community contributions.

Otterpohl, Ralf; Bark, Kerstin **(1999). Sustainable sanitation systems in urban areas: source control, fertiliser and energy production. In: Gate: Technology and Development no. 2 (April-June 1999) p. 38-39**

waste recycling wastewater reuse

waste management; wastewater; source separation; composting; sanitation; biogas; fertiliser

Discusses advantages and components of sustainable sanitation systems. Sanitation can be made more sustainable by not mixing excreta and using minimal quantities of water. Basic techniques of collection and treatment are presented. The result of separated treatment of faeces and wastewater can be used for biogas production or fertiliser. (NB)

Parkinson, J. and Tayler, K. **(2001) Sanitation and wastewater Management in Periurban Areas: Opportunities and Constraints in Developing Countries.**
rural-urban linkages waste recycling wastewater reuse
waste recycling; Ghana; irrigation; decentralisation

The paper is concerned with the options for improved sanitation and wastewater management in periurban areas in developing countries, bearing in mind the fact that much of the wastewater produced in urban and periurban areas is already used, directly or indirectly, for irrigation, almost always without treatment. Options for reducing the strength of wastewater by either separating excreta from sullage water or treating wastewater to reduce its strength are explored. The focus is on the potential advantages of decentralised management, including compatibility with decentralised approaches to urban management and reuse needs, particularly those of the periurban poor, reduced costs and increased agricultural productivity. It appears that suitable technologies for decentralised treatment are available but that other barriers to the wider adoption of decentralised approaches exist. These include lack of finance, and suitable land, deficiencies in knowledge and skills and the inflexibility of official design standards. A key constraint is the limited demand for improved wastewater management. The challenge for activists and planners is to create informed demand for improved systems, focusing not only on health but also on the improvements in the local environment and household finances that may be achieved through improved wastewater management.

Pescod, M **(1992). wastewater treatment and use in agriculture. Food and Agriculture Organization: Rome. Irrigation and Drainage Paper No. 47. 125 p.**
wastewater reuse
irrigation; wastewater; aquaculture; health

This report is intended to provide guidance to national and city planners, decision makers, city managers, field engineers, health workers and farmers. The UN/FAO here presents a more positive view of the use of municipal and institutional wastewater than that presented by the World Health Organization and using the latter's 'Guidelines'. Although out-of-date in 2000, this report provides a solid foundation for study or planning action in the field. Seven country examples are cited including a range of climate typologies and economies. It explains the basis for conventional wastewater treatment and introduces natural biological treatment systems as viable alternatives in developing countries, particularly in tropic climates. Recharge of aquifers as a means of treatment and indirect use of wastewater is covered in some detail. Sewage sludge is presented as a potential agricultural resource. Suggestions are made for planting, grazing and harvesting constraints. wastewater aquaculture is presented as an economic and environmental option. Costs and benefits are clearly analyzed. (JS)

Pickford, John **(et al.) (eds) (1996). Sustainability of water and sanitation systems:**

selected papers of the 21st WEEDC Conference, Kampala, Uganda, 1995. 153 p. ISBN 1_85339_339_8. Water, Engineering and Development Centre (WEDC) Supplier: Intermediate Technology Publications, 103/105 Southampton Row, London WC1B 4HH, UK

wastewater reuse health and environment
sanitation

The conference theme was “The sustainability of water and sanitation systems in developing countries”. Most cases presented were of a practical nature. Case studies were grouped in four sections: (1) Management; (2) Water and the environment; (3) Rural water supply and sanitation; (4) Sanitation and waste. (WB)

Postel, Sandra **(1989). Water for agriculture: facing the limits. WorldWatch, Washington DC; 54 p.**

city ecology wastewater reuse
irrigation; sewage; urbanisation

This policy paper researches the global eminent shortage of water for much of the population. It suggests several means of more efficient use including urban agriculture. (JS)

PRISM **(1990). Bangladesh Shobuj Shona Project. Progress Report No. 3. Dhaka, Bangladesh: Prism Bangladesh, 51 p.**

wastewater reuse
aquaculture; Bangladesh; irrigation

This is an overview of a duck weed (lemnacae) pilot project. It examines the problems and benefits of biological wastewater production for a hospital complex in Bangladesh, at a scale of about one hectare. The health, environmental, waste management and economic returns were all in the positive column. This project served as a model of many larger projects in the 1990s. (JS)

Prudencio Boehrt, Julio **(ed.) (1997). Agricultura urbana en americana latina: memoria. 252 p. Agricultura Urbana Investigaciones Latino Americana (AGUILA), c/o ETC Andes, La Paz, Bolivia. Casilla 9355, La Paz, Bolivia**

hydroponics wastewater reuse urban livestock
Latin America; workshops

The outcome of a seminar on urban agriculture, held in La Paz in 1995, these proceedings are subdivided in a number of themes for which the situation in Latin America is analysed: (1) hydroponics; (2) waste recycling; (3) homegardens and communal gardens; (4) small livestock rearing. (WB)

Raschid-Sally, Liqa, Wim van der Hoek and Mala Ranawaka (eds.) **(2001), Wastewater Reuse in Agriculture in Vietnam: Water Managemen, Environment**

and Human Health Aspects - Proceedings of a Workshop held in Hanoi, Vietnam, 14 March 2001.
Supplier: Colombo, Sri Lanka: IWMI (International Water Management Institute) IWMI Working Paper 30.
wastewater reuse health / pollution
water management; wastewater; irrigation; agricultural development; health; aquaculture; Vietnam, Asia (South-Eastern)

This working paper contains the proceedings of the workshop that was organized on 14 March 2001 in Hanoi, gathering experts from the various disciplines such as health, environment,water resources management, irrigation, agriculture, soil sciences, water quality, etc. to discuss the findings of 16 papers on different aspects of wastewater reuse. The proceedings of this workshop are presented here in summary form, which we hope will provide a bird's-eye view of the current knowledge in Vietnam on this subject to a wide spectrum of interested persons.

Rose, Gregory D **(1999). Community-based technologies for domestic wastewater treatment and reuse: options for urban agriculture. Cities Feeding People report series no. 27, also on: http://idrc.ca/cfp/rep27_e.html. 52, 13 p. International Development Research Center (IDRC), Cities Feeding People Program, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
wastewater reuse community development
wastewater treatment; wastewater reuse; urban environmental management

Stresses the under-management of domestic wastewater in many southern urban areas. Unmanaged wastewater contributes much to the contamination of locally available fresh water supplies and can, obviously, have a negative effect on public and ecosystem health. As has been pointed out by many different authors, centralised European-style human waste management has not worked out well in developing countries. In contrast, emergent trends in low-cost, decentralised or intermediate level urban wastewater management becomes more important, creating space for innovative appropriate technologies. These often develop along the lines of planning integrated wastewater management strategies in conjunction with urban agriculture as a recipient of grey water. An important study providing a clear overview of the field.

Shirley, M. **(ed.) (2002), Thirsting for Efficiency: The Economics and Politics of Urban Water System Reform. Washington: World Bank**
Supplier: Elsevier Science B.V., The Boulevard, Langeford Lane, Kidlington, Oxford OX5 1GB, UK
wastewater reuse
drinking water; sanitation; water management; privatisation; urban areas, Argentina, Peru, Cote D'Ivoire, Guinea, Chile, America (Southern), Mexico, America (Central), Africa (Western)

One billion people in the world lack safe drinking water and almost 2 billion lack adequate sanitation services. As a result millions suffer and die every year from water and sanitation related diseases. Poor management and inefficient investment are often responsible for this situation, and countless past attempts at reform have

accomplished little. Recently some developing countries have tried to reverse years of mismanagement of their water and sewerage systems by auctioning contracts to private operators.

Why do countries that have tolerated mismanagement for decades develop a thirst for efficiency? What are the results of their efforts to change? What determines success or failure? This book fills a gap in the literature by systematically answering these important questions. It does so by analyzing reforms in six developing country capitals -- Buenos Aires, Argentina; Lima, Peru; Mexico City, Mexico; Santiago, Chile; Abidjan, Cote d'Ivoire; and Conakry, Guinea - and the United States in the 19th century. It not only assesses economic factors, but also explores the roles of laws, politics and norms. It provides an economic theory of water that encompasses institutional, political and economic aspects of reform.

Schuebeler, Peter **(1996). Urban sanitation management in developing countries: three conceptual tools. 46 p. ISBN 3_908001_69_2. GBP 5.95. Swiss Centre for Appropriate Technology (SKAT), Vadianstrasse 42, CH-9000 Sankt Gallen, Switzerland**
Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK
waste recycling wastewater reuse
urban sanitation; public health; project evaluation; participatory approaches

This booklet, with the characteristic of a small manual, is concerned with urban sanitation in developing countries. Rather than focussing on sanitation problems or possible solutions, its aim is to present three conceptual tools for assessing urban sanitation systems and illustrate the use of these tools with regard to a few selected cases. Tools discussed are: (1) Assessing modes of sanitation development; (2) Modelling sanitation management systems; (3) Analysing participatory approaches. (WB - from original abstract)

Scott, Christopher A; Zarazúa, J Antonio; Levine, Gilbert. **Urban wastewater reuse for crop production in the water-short Guanajuato river basin, Mexico. Research report no. 41. 34 p. ISBN 92-9090-404-6. International Water Management Institute (IWMI), PO Box 2075, Colombo, Sri Lanka**
wastewater reuse
Mexico; wastewater reuse; water management; irrigation; river basins; environmental degradation; public health; simulation models

There are significant trade-offs associated with using untreated urban sewage. However, there are a number of important water quality, environmental, and public health considerations. This report explores the advantages and risks of urban wastewater reuse for crop production in the water-short Guanajuato river basin in west-central Mexico. The Interactive River Aquifer Simulation (IRAS) model developed by Cornell University is applied and validated in this setting. There is special focus on siltation and heavy metal concentrations in river bed sediments.

(WB)

Shaat, Ali **(ed.) (1998). Reuse of waste water for irrigation in Gaza governorates: quantitative study. 7 p. Water and Sanitation Department, Urban and Rural Planning Directorate, Ministry of Planning and International Coorperation, Palestinian National Authority**

wastewater reuse

Palestine; water shortage; wastewater recycling; water management; irrigation

The water shortage problem in Palestine is such a major socio-economic and environmental problem to residents that water and sanitation are perceived as issues of the highest order. The author argues that recycling of wastewater would generate enough irrigation water to satisfy agricultural demands in 2015. (WB)

Shuval, HI **et al (1986). wastewater irrigation in developing countries: health effects and technical solutions. UNDP Project Management Report No. 6, New York ,. 325 p.**

wastewater reuse health and environment

irrigation; health; stabilisation ponds; economics

This is a fairly comprehensive overview. It tells the story beginning wit the 19th century in 14 developed countries and finishes with a summary of positives and negatives. It proposes effective and economic methods of control that re particularly suited to developing countries. A theoretical model is developed based on a review of credible epidemiological studies and reports, to assist in the prediction of degree of risk of disease to sewage farm workers, neighbors to the treatment plants and to the consumers of products associated with wastewater irrigation. This study provides a rational basis for the development of a sound economic approach to waste water irrigation in developing countries. Such an approach helps to conserve water and nutrient resources, promotes urban agriculture, and contributes to pollution control. It reduces the cost of inputs to urban and periurban farmers and reduces the cost of municipalities and other local jurisdictions in waste management. This report presents a concise introduction to the policy and technological aspects of recycling wastewater from urban areas for agricultural irrigation. The focus is on conserving resources, economic development and healthy cities. It is a non-technical summary of a 324-page report (World Bank Technical Paper # 51) that was the culmination of a thee-year global study of the latest developments in the field. Several eminent review panels have concluded that the principles presented in this paper provide a sound scientific and public health basis for planning wastewater irrigation projects. (JS adapted from author)

Sonou M**. (2001) Periurban Irrigated Agriculture and Health Risks in Ghana. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment wastewater reuse

Ghana; reuse; irrigation;

Most vegetable farmers in the (peri)-urban areas of Kumasi and Accra consider irrigated horticulture as their primary sources of revenues. Currently, (peri)-urban irrigation provides all-year round vegetables and contributes to the improvement of the nutritional status of city inhabitants. The nearness of the markets means a large array of fresh products of good quality. However, water remains a qualitative and quantitative constraint. Because the cost of pipe borne water makes it unaffordable to farmers, the use of untreated wastewater for irrigation has become a widespread practice with its attendant health hazards.

Todd, Nancy Jack; Todd, John **(1994). From eco-cities to living machines: principles of ecological design. 195 p. ISBN 1-55643-150-3 Supplier: Eco-logic books, 19 Maple Grove, Bath BA2 3AF, UK**
city ecology wastewater reuse
urban design; permaculture; waste recycling; urban planning

For more than thirty years, John and Nancy Todd have been advocating a new, provocative approach to urban design. The underlying book was originally published in 1984, at a time when environmental problems began to appear in their full size. The authors describe site-specific technological interventions and systems-wide ecological thinking developed in the framework of the New Alchemy Institute on Cape Cod. The book is centred around two concepts: Eco-cities, or designs for integrating agriculture and flowing pure water into green urban settings; and Living Machines, a family of technologies for purifying wastewaters without chemicals. This is a far-reaching publication destined for a broad audience. (WB)

Wegelin, Martin **(1996). Surface water treatment by roughing filters: a design, construction and operation manual. SANDEC report no. 2/96. ISBN 3_908001_67_6. GBP 10.95. SANDDEC, Swiss Federal Institute for Environmental Science and Technology (EAWAG), CH-8600 Duebensorf, Switzerland**
wastewater reuse waste recycling
water treatment

Presents water treatment alternatives particularly applicable to rural water supplies in developing and newly industrialised countries, and describes processes for solid matter separation. There are 2 parts. Part 1 contains a general description to the subject of rural water treatment. Part 2 clarifies design, construction and operation characteristics of different prefilters and roughing filters. Very complete and full of sound information, but for a technical audience. (WB)

Ul Hassan, M. **(2002), Maximising Private and Social Gains of Wastewater Agriculture in Haroonabad. International Water Management Institute, Central Asia and Caucasus Sub-office, Uzbekistan. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.29-31.**
wastewater reuse

Pakistan; wastewater; urban agriculture; wastewater reuse; irrigation, Asia (South-Central)

In many countries, using wastewater for irrigation purposes originated as and has remained an unplanned activity, practised for centuries by poor farmers in urban and periurban areas. It has also become a widely accepted, though unregulated, practice in many countries. Due to growing populations, weak financial health of municipalities and weak or non-existing institutional and regulatory mechanisms, it is likely to continue as the main wastewater treatment strategy of the developing world.

WHO Scientific Group **(1989). Health guidelines for the use of waste water in agriculture and aquaculture. World Health Organisation Technical reports series no. 776. WHO Scientific Group, World Health Organisation (WHO), Geneva, Switzerland**

wastewater reuse health and environment

wastewater management; wastewater reuse; aquaculture

Provides a comprehensive overview of health in relation to wastewater use in agriculture. The publication starts by covering the major aspects and current practices on reuse of waste water including: wastewater as a resource, environmental control issues, chemical pollutants, economic aspects, institutional aspects and sociocultural issues. The following chapters deal more specifically with health aspects: infections caused by pathogens; factors involved in disease transmission; epidemiological evidence; health promotion and planning; and implementing safeguards. Lastly the need for further research is discussed. (NB)

Wyss, Philippe **(et al.) .(1998). Extensive wastewater treatment: informations facilitating the decision of whether or not extensive wastewater treatment can be an appropriate solution in specific local situations. 55 p. EAWAG / SANDEC, Switzerland**

wastewater reuse

wastewater treatment; wastewater management

Gives a general, very complete, introduction to wastewater treatment, ranging from extensive to intensive systems, and from centralised versus decentralised systems. Requirements are discussed for the sustainable application of extensive wastewater treatment plants. This paper provides much technical information, and ('but', some would say) makes for very useful reading. (WB)

3.2 Reuse of organic wastes in Urban Agriculture

Cow dung is a valuable resource.

(Picture: B.L. Bentick)

Recycling urban organic wastes in agriculture

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Part one: Synthesis

Introduction

This part of the paper briefly examines the nature and forms of reuse of urban organic wastes in urban and periurban farming as a local solution to address municipal solid waste problems, as well as urban farmers' needs for nutrients and soil improvers. The main problems and limitations as well as main benefits and opportunities are reviewed. Also the links with other municipal systems such as public health, resource conservation, planning and employment are looked into.

The nature of waste recycling

Current situation

The reuse of urban organic wastes in urban and periurban agriculture is an age old activity in many cities in Southern countries. At the same time, it is a modern concept that is gaining increasing recognition as an important strategy for sustainable urban development.

In the cities of developing countries, significant quantities of organic waste are generated by the domestic and agro industrial activities, in the form of solid waste (excreta and pit latrine sludge) and also industrial effluents. A city with one million inhabitants is estimated to produce 5,000 tonnes of waste material per day: These figures show that waste management in urban areas is a serious task.

In fact, the waste management capacities of cities are far insufficient, especially in areas outside of the centre. In average, only 50 % of all waste generated in the city is managed by the public authorities. Cities not only have difficulties to locate, build, run and monitor a sanitary landfill facility but also to maintain the level of functioning of their existing fleet of trucks. Urban solid waste management can consume up to 50% of the operating budget of a Municipality. Therefore, Municipalities seek to reduce the costs on garbage collection and transfer which generates the proliferation of open dumps.

This situation calls for a change and Municipalities are pressurised by their citizens to give priority to sanitation and waste management, since informal open dumps constitute one of the most serious and immediate environmental /health problems faced by local communities[3].

[3] Storm drainage channel and discharged greywater drains which are clogged or totally blocked with waste can increase the risk for flooding; Wastes that are disposed in open water bodies generate surface and groundwater pollution and pathogens contamination; prevalence of parasites, tetanus, hookworm, cholera and diarrhoea are attributed to poor environmental sanitation since mosquitoes can breed in the wastewater retained in blocked drains and may transmit filariasis and viral infections such as dengue and yellow fever

Municipalities are looking for new ways to share their traditional responsibilities with community-based organisations (CBOs), micro and small enterprises (MSEs), large entrepreneurs and industries[4]. In recent times, these categories of stakeholders have gained a lot of experience and are involved in separation, collection and recycling of urban waste. In many cities, they can employ as many workers as the public sector. One big issue on the agenda remains the non-recognition of the informal sector as an institution.

Urban and rural communities in most Southern countries have a long history of resource conservation through waste recycling and the application of composted organic waste in agriculture.

Urban and periurban farmers are in need of organic matter as soil conditioner and fertilizer and as a basic resource for the production of animal feed. Because of the high prices of industrial fertilisers and animal feed, and the difficulties of having regular access to it, organic wastes are a valuable resource for urban producers. Intensive vegetable growers, plant and tree nurseries and pig growers are among the sectors that are using large quantities of urban organic wastes.

Gardeners experience that the application of processed organic waste enhances the level of organic material in the soil, stimulates soil life, improves the water retention capacity and increases the fertility of their soils, which may result in an increase in their yields.

Reduction of the costs on chemical fertilisers, by recycling urban organic wastes, is important since the costs involved in maintaining the soil fertility are estimated at around 20-25% of total production cost.

Recycled materials

The bulk of domestic waste is generated by district markets, followed by the neighbourhood markets and the high-income communities. Depending upon the conditions of temporary storage (with/without container), one large producer is more attractive than decentralised generators such as households[5]. Another interesting material is the “terreau” which is old and sieved waste, diverted from open dumps.

Farmers use a wide range of organic materials depending upon the season and their locations. Materials that are easily accessible for farmers are: household wastes, sludge from pit latrines, leaves, manure from cows, pigs, donkeys and bats, litter from chickens, paper, ashes and water jacinth. Materials that are more difficult to obtain by the farmers on a regular basis are feathers, straw from millet and maize, fish scales, bones and hair, waste from peanuts, tree and shrub clippings, a/o.

Who is recycling

A wide range of individuals handle the recycling of waste in urban agriculture.

Farmers recycle their waste crops. Women are especially active in waste collection and recycling. They are often more dedicated than other actors and see composting and recycling of material as beneficial for the soils and their family.

[4] As detailed in the Community Partnerships in Integrated Sustainable Waste Management, Tools for Decision makers

[5] For example, a district market may generate as much as 15 tonnes of organic waste per day, which is equivalent to 60,000 inhabitants

Young unemployed people are also good candidates to play a role in the collection and recycling of organic wastes. They are hard workers, very motivated and dedicated to their task.

Application of waste

Forms of reuse of urban organic waste

Garbage farming

Each urban area has its own way of applying waste. Solid waste is applied raw, sieved or after decomposition. The most risky use of urban waste (for the safety of farmers and of vegetable consumers) is the direct application of mixed municipal waste or market garbage into soil, or inadequate composting of the waste. This practice is not sufficient for complete decomposition and stabilisation of the organic material and it is not sufficient for the killing of the pathogens. Often farmers have not properly been informed of the risks associated with application of fresh wastes. Often too, there is an absence of regulating and monitoring practices. Such direct application is routinely practised in some areas in China, India and Africa because farmers need to obtain organic material and nutrients. This practice is very popular in areas where cereal growing is taking place. The price to purchase such material is very attractive and costs ten times less than compost. This practice furthermore generates environmental nuisances with the dissemination of light plastics.

Fresh human waste spread upon fields

This practise is not new and still continues. It is a common practice in many cities that mechanical suction trucks from public or private sectors discharge liquid waste from septic tanks or pit latrine on agricultural areas despite its complications (since the material is liquid) for farmers. Local NGOs, community-based organisations (CBOs) and private emptiers and transformers undertake manual emptying. It seems that there is a lack of knowledge about the risk encountered by farmers when they use this method. Some of them think that they represent the best fertiliser, others think they can kill plants. On a socio-cultural point of view, the human excreta are considered disgusting and therefore the profession of transformer is seen as degrading. At the same time, the emptying activities and the discharge are seen as unavoidable. It is also a profitable business. The risks associated with this practise are huge because the waste is usually not transformed before use (see paragraph on co-composting) and also because actors rarely take protective measures while working. In other words, groundwater and surface water are affected by human pollution and workers can get infected.

Composting

In composting different techniques can be applied (in piles, in pits, with different layers of organic materials, with preliminary sorting and final sieving).

Nowadays, the most active users of compost are the vegetable gardeners and the producers of ornamental crops, tree nurseries, etcetera.

In the past, it was mainly municipalities that operated composting facilities, but often they failed to continue the production of compost. The main reasons for this failure lay in the lack of management capacity, the wrong selection of equipment and the lack of a long-term marketing and promotion strategy and action plans.

At farmers level the use of compost may meet obstacles like the lack of space, lack of labour, fear of ejection from the agricultural area by urban developers at any time, competition with

other organic fertiliser that are more easy to obtain on a regular schedule. Nevertheless, all farmers are very interested in compost if the material looks good (without plastic) and with an acceptable price (it should at least be less expensive than chicken manure).

Co-composting

By definition, co-composting means the composting of a selection of different materials. In other words, it is often a mix of human waste with other materials being processed, or transformed. Co-composting is very attractive because the quantity of nutrients involved is high but not too high (as in the case of using human excreta only). There are three different methods to transform the mix:

- The human waste is discharged and disposed on a surface and left to dry, after being mixed with domestic waste (therefore the final product is dry),
- The human waste is left to decompose on an intermediate site and then composted with domestic waste or equivalent material,
- The human waste is directly incorporated into other materials and composted.

They are many disadvantages of co-composting human excreta, when thinking of health, environment and socio-cultural aspects. Besides, recycling of fresh excreta is not acceptable. The many problems associated with co-composting, like the transmission of diseases and pathogens can be overcome by applying an integrated and sustainable waste management (ISWM) approach which is characterised first by the analysis of the current situation and then by problem solving. WASTE and its partners in Commune IV, Bamako are launching this approach with the design and construction of a final and recycling centre for liquid and solid waste.

Preparation of animal feed

Market refuse and organic waste from food industries (wastes from breweries, expired milk) can be processed in animal feed (especially for pigs) after boiling to kill pathogens.

Problems and limitations in reuse of organic wastes

The following problems and limitations may be encountered:

The financial aspects

The production cost of composting can be substantial due to high land prices (for the composting facility), high costs of transportation of raw material and end products, the labour costs for the collection and sorting and the costs of the raw materials from markets and industries due to competition with other users. What is especially costly is the starting up of the activity and the promotion and marketing of the end products. The start up process is lengthy, involves many stakeholders with different interests, ministries and the private sector.

It is advisable to process and utilise compost as close to the sources of the waste as possible. The price of compost should not be more than the price of other fertilising inputs such as chicken manure.

The health aspects

Promoting the recycling of waste in urban cultivation on a large scale in urban areas with high population concentrations raises the issue of public health. Fresh human excreta may contain pathogens which is why the reuse of fresh human excreta in general is not recommended. Household wastes can include hazardous waste (most of the time batteries) leading to contamination with heavy metals. Since backyard and community composting in developing countries uses a high proportion of fruit and vegetable peelings, the compost may include pesticide residues. If compost is produced from more diverse organic materials that risk is substantially reduced. In order to produce the safest compost, the composting process has to be well supervised, especially the sources of the organic wastes. That is more easy for few well selected sources than for a disperse and large number of sources. Separation of organic wastes at the source and prevention of mixing with waste streams from heavy industry, hospitals and the like is crucial.

Inappropriate use

The quality of compost may vary depending on the type and mix of the organic waste materials used and the method of composting. Farmers are often unaware of the quality of the compost bought due to lack of classification and labelling and/or lack of knowledge.

Farmers should also know that composting may not be sufficient to improve the fertility of the soil if intensive year round cropping is applied and that complementary fertilization with other organic and/or mineral fertilizers may be needed.

Farmers should also know the possible consequences for the health of their family, their customers and the environment of the application of raw uncomposted or badly composted urban organic wastes.

Attitudes of officials

City authorities' negative perception of farming within the metropolitan boundaries is a constraint to the promotion of recycling of organic waste in agriculture. Authorities find it hard to accommodate urban farming in their cities because they view it as a detriment to modern urbanity and a health hazard. One consequence is that urban farmers have little land use security. This may make them reluctant to invest in the soils by applying quality compost and manure in the right quantities since they fear to be evicted from their land at any time.

Opportunities and benefits of reuse of urban organic wastes in agriculture

The following benefits of recycling organic waste are widely recognised:

- The amount of urban wastes to be transported to the landfill is decreased which saves money, saves space and decreases the greenhouse gas emission rate at landfill.
- The soil fertility management is improved since compost has beneficial effects on soil structure and soil life, moist retention capacity, soil fertility;
- Application of compost enhances plant resistance against diseases and reduces the need to use pesticides; also erosion control is facilitated.
- Food security and nutrition are enhanced since the yield of products is increased and the quality of the products is improved and the shelf life of vegetables and fruits is prolonged.

Conclusions

Recycling of organic waste in urban farming is an effective approach to addressing urban waste management problems while providing important resources for agricultural production and making urban agriculture more sustainable.

Promoting the recycling of urban wastes should be combined with dealing with the prevention of associated health risks, especially by supervision of the sources of the organic wastes and the composting process.

Also attention should be given to the creation of more favourable attitudes towards reuse of wastes in agriculture among local authorities and institutions. This can be achieved by educating all actors involved, introducing changes in the urban planning system, diffusion of “best practices”, facilitating public-private dialogue and co-operation among others.

Urban agriculture and organic waste recycling should become an integral part of the management of the urban environment. The centralised approach to solid waste management needs to be revised in order to allow an integrated and participatory approach to solid waste management planning and urban agricultural production.

In order to effectuate a decentralisation in the planning and management of the urban wastes the community level needs to be supported by local authorities regarding the primary collection, the separation and the recycling of organic waste.

Since there is little economic incentive for households to practice thorough separation of household wastes, considerable education and monitoring is necessary to enhance the ecological motivation for separating organic wastes more carefully. The participation of the women is fundamental since they are highly motivated for the preservation of earth and land for the future generations.

Part two: Literature Review

There is a rapidly growing volume of literature on the reuse of urban organic wastes in agriculture but the information is fragmented. There are few comprehensive guidelines on this subject. Studies and articles are available from many Southern countries, particularly India, West Africa, and South America.

In the second part of this paper we will briefly review the literature contained in this section of the bibliography. The review will lead to the identification of the missing elements and the identification of future challenges for research and development.

1. Social, institutional, financial and legal aspects

The main actors in the waste management system

The list of institutions, presented in the literature, that play a role in waste management and recycling is always long and attention is given to the actual division of work between them. Thorough analysis of such information is often lacking and rarely are the linkages between these institutions and the degree of co-operation and co-ordination studied in more detail.

The organisation of the waste management system is often described according to a vertical approach from national to local level and often important stakeholders are omitted on purpose or unintentionally. A lot of attention in the literature is given to actors involved in urban politics, urban planners, public health, urban environmental management, and agricultural policy.

Current literature largely ignores the importance of the informal and private sector and their level of contribution. These sectors make a substantial contribution to waste collection, transporting and recycling. Local authorities often do not or only partially give recognition to the important role of these sectors.

The tensions between different ways of thinking and different interests are not always sufficiently analysed and too little attention is given to the local level.

Peoples' Participation

Many authors deal with the participation of poorer sections of the populations (scavengers, poor farmers). However, some case studies clearly show that the type of population engaged in recycling and application of organic waste is much more varied. From this, we can gather that more attention to stakeholder analysis is required.

The issue of child labour in waste recycling is often overlooked, despite the fact that children are often involved in the collection of animal waste from farms or of the by-products from industries, the transport of wastes, as well as the distribution and the sale of organic materials.

In the literature, little attention is also paid to gender issues. Women participation is considered marginal and temporary, which is not always the case. Articles on this subject are often more anecdotal than analytical.

Cultural barriers

The literature dealing with the cultural barriers to re-using raw waste or human waste is often too theoretical and not placed in the local context. More profound analysis of this issue is needed.

Financial aspects

Literature presenting, discussing and analysing costs, expenses, prices and savings on recycling of organic wastes is rare. The literature mainly consists of case studies. There is a need to develop a more systematic approach considering the type of activities, locations and organic materials used.

There is little research done to assess the avoided costs when re-using urban organic wastes in agriculture instead of using chemical fertiliser (less transportation, lower costs of the landfill, less pesticide use, less GHG gas emission).

Some work has been done on the economical comparison between the use of chemical fertilisers, organic fertilisers or a mix of fertilisers reviewing the release of nutrients and other related benefits (increase of organic content, improvement of soil aggregation, porosity and aeration, water infiltration and retention, natural pest control) as well as on farmers' ability to pay for chemical fertilisers.

Few attempts are made to estimate the economy of scale of the recycling unit and the labour productivity for each activity in the waste recycling process.

Legal aspects

The legal aspects are not discussed by many authors and almost never by local experts. It seems that the approach to this aspect is still post colonial and western oriented.

2.Technical aspects

Wastes

There is ample knowledge about waste composition, weight, volume, organic fraction, etcetera. Details concerning the variation by season are examined as well.

Composting techniques

There are a great number of studies of good quality on the different steps in the recycling of organic wastes from the design and building of a recycling centre (often a composting or a co-composting unit) to the implementation phase. Unfortunately, most of the guidelines on composting are based on western experiences and much less so on experiences in Southern countries.

The latter mainly refer to small and medium scale of compost production. There is a great variety of recycling techniques presented according to local context. Authors have described, rather in detail, all-technical aspects related to recycling and transformation but often focusing more on animal waste than on urban waste. Since the local capacity and context are taken into account, the recommended techniques are mainly manpower oriented.

Literature available often uses drawings and figures that are very helpful for the reader.

Source separation and transfer

Much less literature is available on source separation prior to recycling and the reuse of organic waste in agriculture. Very little information and analysis is available on the aspects of source separation in the households and at market areas.

A small section of literature is dedicated to the transfer of waste (from primary to secondary collection) despite the fact that in general, sorting and recycling takes place at transfer sites.

Techniques of reuse

Detailed information is available on the techniques of waste reuse in urban farming including the pros and cons.

Many articles point out the limitations and problems linked with the recycling of raw waste upon fields.

3. Health and environmental aspects

Analysis of health and environmental risks associated with recycling and reuse of organic wastes

Potential health risks associated with the recycling of organic wastes are many. However, little specific information is available. References are scattered and often consist of vague generalisations. There is a need for studies that specify the main health risks associated with the various steps in the recycling and reuse of urban organic wastes, also detailing the conditions under which disease incidents occur and the people most affected, and identifying the most effective preventive and mitigating measures.

The study of the risks associated with the recycling of garbage has not been yet explored as much as the risk associated with the use of human excreta and waste water.

There is little information on the accumulation of pesticides in organic residues and the contamination of organic wastes by biomedical, heavy metals and other toxic substances in the waste stream and along the food chain.

Some papers attempt to formulate rules on “how to” in order to control health risks. Their effectivity depends on the local capacity to monitor and anticipate problems during the transformation processes.

Risk perception and behaviour of groups involved

There are very few surveys and findings available on how the health risks are perceived and tackled by the human groups involved (waste workers, children, farmers, food handlers, livestock and the consumers).

Perception of decision makers

Among city policymakers there appears to be a lack of systematic thinking about the health and environmental risks related with the issue. This often results in unnecessary restrictions on the development of waste recycling in urban agriculture.

Ecological foot print

Some studies have been done on the management of the nutrient balance of cities. However, few of these are actually looking at the material flows in detail, specific for each activity.

Challenges for further research and development

- Institutional capacity building on strategic and integrated urban planning has to be developed in the following manner: a. the consideration of urban agriculture in the planning process, b. the economics of organic waste management , c. the participation of the stakeholders.
- More research is needed on the institutional requirements of waste management and planning. The specific topics of interest can be: the role of the Municipality and other main stakeholders, especially the growing role of the private sector in recycling of waste, the benefits of partnerships with community actors, the partnership process and the raising of ecological awareness in urban communities.
  Also the effectiveness of the informal sector activities in recycling, the economic

impacts thereof, and the expectations and needs of the people involved should be analysed in more depth.

- There is need for a comprehensive and strategic approach to planning and management of urban wastes. The current approach based on the rational planning paradigm, that excludes important actors and stakeholders in the waste management planning should be changed for more integrative and participatory modes involving citizens and other stakeholders. In order to have greater engagement and quality of information it is very important to involve all important stakeholders in the preparation of waste management studies, plans and projects. Improved access to the literature and pooling of complementary expertise are crucial for dialogue and negotiation between the various stakeholders.
- The time is ripe for a systematic documentation of “best practices” regarding organic waste recycling and for dissemination of this among city administrators. The expected outcome will be that recycling of organic waste becomes a normal feature in their planning activities.
- More research and support is needed for the organisation, monitoring and implementation of composting programmes with participation of the various stakeholders, like waste management, urban agriculture, animal production, transportation, health and veterinary management. Preparation of impact assessments should be made mandatory at project design stage.
- Research into the health and environmental risks associated with recycling and reuse of organic wastes in agriculture needs to be strengthened. It is important to develop an adequate framework for the assessment and monitoring of environmental and health risks together with the direct stakeholders likewise for the development of preventive / mitigating measures. The cooperation between waste management experts, scholars in urban agriculture and public health experts should be strengthened.
- More research and actions are needed in the field of source separation. Priority to be given to the analysis for source separation at markets and households. Together with improving access to recyclable fractions of urban waste, research on how to tackle the management of waste generated by primary health care, private clinics and laboratories is necessary. Also more analysis of the network of distribution and storage of organic wastes need to be given priority, including all available and potential links and locations without excluding any areas at the first assessment. The spatial and land planning implications are also of concern.
- There is a need to create a data base and model on biomass, which looks at the flow of waste generated by activity and location, the fraction recycled, the equivalent in terms of nutrient (carbon, nitrogen and phosphorous) as well as at the flow of goods and consumption patterns.
- There is a need to increase the knowledge about the safe use of compost and application methods, including the monitoring of pathogenic contamination due to the use of non-matured compost.

Another area for research and development is the use of advanced tools such as GIS for waste management, urban agriculture and city planning.

Allison, M., Harris, P.J.C.., Hofny-Collins, A.H. and Stephens, W. **(1998) A Review of**

the use of Urban Waste in Periurban Interface Production Systems. HDRA, Ryton Organic Gardens, Coventry, UK. P. 34
waste recycling
recycling

This publication was written as an output of a research project funded by the Natural Resources Systems Programme of the UK Department for International Development (DFID). It is a review of urban waste and its potential use in periurban agriculture. Salvage and recycling of metals and other materials of valueis common in manu developing countries and partly accounts for the fact that organic wastes make up 50-75% of urban waste, compared with 16% in Europe. In addition to domestic refuse, urban wastes include nightsoil or sewage sludge and, increasingly, agro-industrial wastes from processing and livestock.

This publication reviews the types of waste available at the periurban interace and assesses factors affecting the use of wastes in agriculture including types of farming system, crops and livestock involved, farm and household economies, markets, availability and use of alternatives, priority of use, farmer knowledge and perceptions, cultural aspects, gender, land availability and tenure, institutional support, and the ability to tolve technological constraints including collection and separation, transport, processing, availability and quality, health and safety, and environmental concerns.

Adam-Peters, Kim**. (1996). Community-based waste management for environmental management and income generation in low-income areas : a case sudy of Nairobi, Kenya. Masters Thesis, York University, Canada, 104 p.**
waste recycling
Kenya; youth, wastes; Africa; sustainable development; informal sector; environment; community development; gender; composting; rural-urban linkages

This research document reports on the success of community-based waste management in a large African City. It describes and recommends roles for the public, private and civic sectors. It concludes that profit is necessary for community-based waste management in East Africa. (JS)

Allison, M; Harris, P.J.C. **1996 A review of the use of urban waste in periurban interface production systems. The Henry Doubleday Research Association, Coventry, UK.**
waste recycling
waste; periurban agriculture; planning; pollution

This overview is based on a global study funded by DFID. The authors tapped many sources to assemble a very sound description of how urban waste is being applied in urban and periurban agriculture. This is the place to begin, follow-up on the Web. (JS)

Agbola, T. **(2001), Turning Municipal Waste into Compost: The Case of Ibadan. Centre for Urban and Regional Planning, University of Ibadan, Nigeria. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 69-81, 2001**.

waste recycling
Nigeria; wastes; composting, Africa (Western)

This chapter gives an introduction into the problems of solid waste management in Ibadan, Nigeria and describes the Bodija compopsting plant, which started operation in 1998.

Allison, M **(et al.) (1998). A review of the urban waste in periurban interface production systems. 2 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**

waste recycling wastewater reuse rural-urban linkages R&D methodology
urban wastes; organic wastes

Provides a dense overview of uses of urban waste and wastewater and examines factors affecting the use of wastes in agriculture. Attention is drawn to the fact that there are important gaps in our knowledge about the quantitative need for organic wastes in urban and periurban agricultural systems and about the potential to satisfy these needs. (WB)

Asomani-Boateng, R; Haight, Murray **(1999). Reusing organic solid waste in urban farming in African cities: a challenge for urban planners. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes - Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 14 p. School of Urban and Regional Planning, University of Waterloo, Ontario, Canada**

waste recycling health and environment
waste management; composting; wastewater reuse; urban planning; Africa; organic wastes; solid wastes; waste reuse

Describes urban farming systems based on reuse of organic waste and examines possibilities and constraints in the light of urban planning. Apart from health hazards and economics related to production cost, which can be high as compared to chemical fertiliser if production uses inappropriate technology, official attitude towards urban farming is often negative. Solutions are to be found in proper planning of waste reuse including all stakeholders involved and in source separation. (WB)

Association of Cities for Recycling **(1997). (Issue on waste recycling), Association of Cities for Recycling Newsletter no. 13 (Oct 1997). Association of Cities for Recycling, Gulledelle 100 1200 Brussels, Belgium**

waste recycling
organic wastes

Notably contains articles on biological treatment of green household waste and on the recycling of plastic waste. (WB)

Azas, T.N., Ahmad Safrudin **(2001), A long way to zero waste management, A country report Indonesia dor Global Anti-Incinerator Alliance (GAIA). WALHI Jakarta (Indonesia Forum for environment - Jakarta region). www.no-burn.org.regional/pdf/country/indonesia.pdf. new from Waste not Asia conference Taiwan, 26-30 july 2001 Walhi Jakarta**
waste recycling city ecology
waste collection, Indonesia, city ecology, urban wastes

Waste management in Jakarta are still oriented to how does it make clean city through how local government clean waste in the city. The policy is how to make clean Jakarta city where 25 824 cubic meters per day waste are produced. So, the waste policy is how the local government could move the waste from interim disposal to the final disposal. It is related to how local government has to prepare (how many) trucks, (how many) waste carriages, (how many) waste workers; that will be used to move waste from Jakatya Municipal to final disposal in LPA Bantar Gebang. There is no policy how to reduce volume of waste as a substance of zero waste management.

Batac, J.H.,. **(2001) Performance Measurement within the Municipal Solid Waste/Urban Agriculture Continuum: A Practical Local Governance Methodology. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology waste recycling
Philippines; compost; monitoring; municipal government

The model of the municipality of Marilao has been presented in three conferences of the League of Municipalities of the Philippines (LMP) involving 1,500 member municipalities. As a result of the presentation, the mayors were able to identify and agree on the indicators for good governance, the replication process in their municipalities, the role of the LMP in the replication, and the policy issues and constraints. Based on the experiences of Marilao on waste management, treatment and reuse for urban agriculture, and assessment procedure is proposed. This assessment covers the existing capacity or strengths, the gaps or weaknesses, issues, challenges and opportunities in the realisation of managing solid waste and the eventual program of urban agriculture by the municipal or city organization. The assessment will involve both formal and informal sector stakeholders. Such an assessment can evolve the existing dynamics of physical resources, cultural or attitudinal mind sets and actions, and, power sharing and motivations among institutions and their actors. These dynamics are necessary in the identification of strategic thinking of positive goals directed at the improvement of service resulting to a favourable impact on the quality of life in an urban setting.

Baud, Isa; Schenk, Hans **(eds) (1994). Solid waste management: modes, assessments, appraisals and linkages in Bangalore. 168 p. ISBN 81_7304_082_6. Rs. 200**

waste recycling

solid wastes; waste management; Bangalore; India; urban livelihoods

Provides a detailed description of actors and factors involved in solid waste management in Bangalore, India. One of the main issues raised in this book is whether local authorities should create a complete new network for handling solid waste, or improve the already existing one. There are many actors in the network of solid waste production, collection, reuse and recycling, and their roles are described in detail in the book. The authors highlight the status of city waste pickers, mainly poor woman and children. The future of these people, whose survival largely depends on the way the future waste network will be organised. The attitude of local authorities with regard to waste problems is examined. The authors stress the need for better networking and information exchange. (WB)

Bertolini, Gérard **(1992). Gestion-Recyclage des déchets a Kigali: étude de faisabilité. Centre National de la Recherche Scientifique, Université Lyon I, France. Submitted to the International Labour Organisation. 46 p.**

waste recycling

Rwanda; solid wastes; waste reuse; composting

This is a funding proposal for a project to improve the reuse of solid waste in Rwanda's capital. The first half presents a picture of the management system (formal and informal) in place. In the second half, a range of reuse options are presented. (JN)

Binder, C. and N. Patzel **(2001), Assessing the Potential of Organic Waste Recycling through the Analysis of Rural-Urban Carbon Fluxes, Swiss Federal Institute of Technology (EAWAG), Dubendorf, Switzerland. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 141-149, 2001.**

waste recycling

Colombia; organic wastes; recycling; organic matter, America (Southern)

To estimate the order of magnitude of the biomass and carbon fluxes between rural and urban areas a material flux analysis was carried out in a case study from Columbia. The analysis includes estimations of the amount of organic waste generated and its potential for fertilization.

Brook, Robert M.; Dávila, Julio (eds) **(2000) The periurban interface: a tale of two cities. 251 + vii p. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK; Development Planning Unit, University College London, UK London: DFID**

city ecology land use planning waste recycling

natural resources; periurban agriculture; Geographic Information Systems; Ghana; India

A publication written in the framework of research conducted by the Natural Resource Systems Programme of the UK Department for International Development (DFID) on natural resources in the 'periurban interface'. It describes research conducted in two city-regions: Kumasi, Ghana, and Hubli-Dharwad, India. An exhaustive comparison is made between the national development of India and Ghana and between the two cities, in terms of spatial, human and economic development, but also with regard to the institutional framework under which the periurban interface has developed in recent years and to the decision-making processes that are likely to shape the future of the interface. The resources base of the two cities is examined considering cropping and livestock systems, and soil, water and waste management, and how the urbanisation process has affected these. Also, there is a chapter on comparing livelihood strategies of poor families in the two cities. Geographical Information Systems (GIS) play an important role in the research conducted by the NRS Programme and receive much attention in this publication. The strength of this tool for planning and analysis in a rapidly changing environment is clearly demonstrated, notably for the case of Kumasi. (WB)

Del Porto, David; Steinfeld, Carol **(1999). The composting toilet system book: a practical guide to choosing, planning and maintaining composting toilet systems, an alternative to sewer and septic systems. 240 p. ISBN 0-9666783-0-3, USD 29.95. The Center for Ecological Pollution Prevention (CEPP), PO Box 1330, Concord, MA 01742-01330 USA**

wastewater reuse waste recycling

wastewater; graywater; composting toilets

Describes a number of wastewater management methods which may be viable and cost-saving alternatives to graywater disposal systems. Central is the design of the composting toilet, also known as dry, waterless or biological toilet. Composting toilets are not only an alternative in places where septic tanks cannot be installed but they are also one of the most direct ways to avoid pollution and conserve water and resources. A very complete manual, full of practical information. The manual contains a useful glossary and a list of USA state regulations. In spite of its apparent USA focus, the content applies equally well to developing countries. (WB)

Drangert, Jan-Olof; Bew, Jennifer; Winblad, Uno **(eds) (1997). Ecological alternatives in sanitation: proceedings from SIDA Sanitation Workshop, Balingsholm, Sweden, 6-9 August 1997. Publications on Water Resources no. 9. ISBN 91_586_7551_5. Department for Natural Resources and the Environment, Swedish International Development Authority (SIDA), Birger Jarlsgatan 61, S-10525 Stockholm, Sweden**

waste recycling wastewater reuse health and environment

sanitation; workshops; disease control; water management

This sanitation workshop was organised with the need to rethink and with new approaches and techniques in sanitation in mind. This document provides a comprehensive overview of ecological sanitation. Aspects like reuse and disease control are discussed. Within ecological sanitation there are a range of options for various conditions. Furthermore, case studies from several countries in the world and abstracts of background papers to the conference are included. (NB)

Drechsel, P.; Kunze, Dagmar **(1999). International Workshop on Urban and Periurban Agriculture, 2-6 August 1999, Accra, Ghana. Urban Agriculture Notes http://www.cityfarmer.org/africaworkshop.html. 8 p. IBSRAM Regional Office for Africa, Ghana; FAO Regional Office for Africa, Ghana**
Supplier: City Farmer, Canada's Office of Urban Agriculture
health and environment waste recycling economic impact
food security; environment; West Africa; health; urban planning; economic aspects

Concisely presents the results of the International Workshop on Urban and Periurban Agriculture in Accra. The main theme of the conference was Closing the nutrient cycle for urban food security and environmental protection. Within this theme four sub-theme were distinguished with background papers and working groups: (1) Environment and public health; (2) Nutrient recycling; (3) Policy, Planning and Economics; (4) Farmers' point of view. For these themes priority actions and main constraints were identified. (NB)

Drechsel, P.., Abaidoo, R.C., Amoah, P. and Cofie, O.O.. **(2000) Increasing use of poultry manure in Ghana: Is farmers' race consumers' fate? In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock waste recycling
Ghana; manures; waste; reuse

Livestock production is a vital part of urban and peri-agriculture in Kumasi, where many farmers benefit from large amounts of cheap manure. However, with increasing competition for this resource the manure is seldom stored long enough to prevent the contamination of food and water with pathogens as farm gate and market analyses show. Interventions to prevent the spread of infection should focus first of all on the consumer household. Farmers' access to clean irrigation water can only be secured if their own practices do not contribute to water pollution. The authors describe the importance to farmers and the problems faced by the City authorities.

Drechsel, P.., Cofie, O.O.., Vázquez, R. and Danso, G.P.. **(2001) Technology development for municipal organic waste recycling for urban and periurban agriculture - A holistic approach.. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya.**

Proceedings, available On: www.ruaf.org.
R&D Methodology waste recycling rural-urban linkages
poultry; Ghana; nutrient recycling; sanitation; FAO; IBSRAM; West Africa

One of the challenges of rapid urbanisation is how to make sufficient food available on a sustainable basis for the increasing urban population. The increase in urban food demand is giving way to intensive food production systems in and around cities often specialised on perishable crops or poultry, and also to export-oriented agriculture using the advantage of urban infrastructure. These types of agriculture require large amount of inputs, including plant nutrients. Once the food is consumed or processed in the city, related market and household refuse as well as human excreta contribute to urban pollution due to the common lack of adequate sanitation services or end in landfills. In both cases large amounts of nutrients are simply 'wasted'. This situation calls for an analysis of options for municipal organic waste recycling for the benefit of agricultural and environmental sustainability in the rural-urban continuum. An international workshop on (peri)-urban agriculture and nutrient recycling was organised for Africa in 1999 by FAO and IBSRAM, where knowledge gaps in waste recycling were analysed and recommendations developed. Many scientists, farmers and decision makers emphasised the need for more information on viable and acceptable options for the recycling of municipal and agro-industrial waste, especially for farmers in urban and periurban areas. Subsequently, the Canadian donor IDRC agreed to co-sponsor a corresponding project in three agro-ecological zones of West Africa addressing variations in organic waste generation, quality and availability. The project is an attempt to develop recycling strategies that should result in closing the rural-urban nutrient cycle as well as preserving the quality of the urban environment by reducing the (pollution effects of) waste accumulation. The analysis and its different components are described in this paper.

Drechsel, P.; Kunze, Dagmar (eds) **(2001) Waste composting for urban and periurban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa. ca 200 p. ISBN 0-85199-548-9. CABI, Wallingford, UK; IBSRAM Regional Office for Africa, Ghana; FAO Regional Office for Africa, Ghana**
health and environment waste recycling economic impact

Rapid urbanisation has created a major challenge with regard to waste management and environmental protection. However, the problem can be ameliorated by turning organic waste into compost for use as an agricultural fertiliser in (peri-)urban areas. The forthcoming CABI hardcover (May/June 2001) provides an African perspective on potential and constraints of urban waste recycling for soil amelioration (and integrated pest management) as well as on urban and periurban farming systems as beneficiaries. Most papers derived from an IBSRAM - FAO workshop held in Ghana in August 1999 with authors from several European, as well as African, countries, representing various disciplines. The book will appeal to a readership in soil science, urban and rural planning, environmental science, waste management, developing studies and farming systems.

Contents include:

· Potential use of waste stream products for soil amelioration in periurban

interface agricultural production systems

- Economic, sociocultural and environmental considerations
- Turning urban waste into fertilizer: Case studies from East and West Africa
- Modelling urban and periurban biomass and nutrient flows
- Urban agriculture: International support and capacity building in Africa

(PD)

Drescher, Axel W. **(1994). Gardening on garbage: opportunity or threat? In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 20-21. Institute for Physical Geography, Werderring 4, D-79098 Freiburg, Germany**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
waste recycling horticulture
community health; health; health hazards; home gardening; organic wastes; toxic substances; urban environment; waste management; Zambia

Gardening on waste disposal sites is common practice in many developing countries. Such sites offer fertile land not used for other purposes, but toxic wastes and heavy metal pollution may threaten human health. Axel Drescher presents a case study of such a periurban garden in Zambia. (ILEIA)

Drechsel, P., C. Quansah and S. Asante-Mensah **(2001), Assessing Farmer's Perceptions of Organic Wastes as Nutrient Sources. IWMI, Kumasi / Department of Crop Science / Department of Agricultural Economics and Farm Management (KNUST), Kumasi, In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 43-54, 2001.**
waste recycling
Ghana; periurban area; farmers' perspective; composting; organic wastes; nutrient balance; poultry; manures, Africa (Western)

Are farmers' concerns towards the use of compost, night-soil or poultry manure more economic than cultural or vice versa? What are farmers' initial impressions of new nutrient sources? How much would they pay for them? Did farmers' attitudes change during on-farm trials? This chapter presents procedures and methods used to assess farmers' perceptions of compost and poultry manure as sources of plant nutrients in peri-urban Kumasi, Ghana.

Esrey, Steve **et al (1998). Ecological sanitation. SIDA, Stockholm, Sweden. 92 p.**
wastewater reuse health and environment waste recycling
ecology; sanitation; sewage; human excreta; pollution

This short volume is focussed on providing a practicable vision of a future of ecological sanitation. It presents the theory, the history (back to the Ancients), design principles and promotion strategies. This is an excellent introduction to the

precepts of eco-sanitation and its relationship to urban agriculture, public health, and healthy city and a sustainable city. (JS)

Esrey, Steve and Andersson, I. **(2001) Ecological Sanitation - Closing the Loop. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**

health and environment waste recycling city ecology sanitation

Today, half of humanity does not have access to any type of sanitation. This is a fundamental denial of human dignity and threatens human well-being. The rest of humanity relies on conventional approaches to sanitation, which fall into one of two categories: waterborne systems and pit latrines. Both “flush and discharge” and “drop and store” technologies were built on the premise that the nutrients we excrete have little value, and the waste is suitable only for disposal. Consequently, the environment is polluted, nutrients are lost, and a wide array of health problems result. The authors argue that a different approach is needed to both sanitation and agriculture. The approaches are non-polluting, rely on biological processes, recycle nutrients, and can be safe and effective in promoting health and nutritional well-being. Ecological sanitation is given here as a representation of that shift in the way people think about and act upon human excreta.

Etuah-Jackson, W.P. Klaassen and J.A. Awuye **(2001), Turning Municipal Waste into Compost: The Case of Accra. GROWTH Integrated Development Programmes, Accra / Accra Metropolitan Assembly (AMA), Waste Management Department (WMD), Accra. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 94-110, 2001.**

waste recycling

Ghana; wastes; composting, Africa (Western)

This chapter reports on solid waste management in Accra, Ghana, with a foucs on experiences so far with two different approaches to urban waste composting. It also describes briefly the urban farming systems with reference to a study carried out by the Noguchi Memorial Institute in Accra.

Faerge, J., J. Magid and F. Penning de Vries **(2001), Estimating Rural-Urban Nutrient Flows for Mega-cities. Department of Agricultural Sciences, Royal Veterinary and Agricultural University, Denmark / IWMI Bangkok. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 163-175, 2001**.

waste recycling

Asia; Thailand; nutrient balance; food supply

To explore the potential for recycling of nutrients 'wasted' in mega-cities, a nutrient balance model mostly based on secondary, statistical data was developed. The magnitude of nutrient flows (N, P) into and out of the city was established for

Bangkok Province, Thailand, indicating large losses into its central river.

Foeken, Dick and Owuor, S.O.. **(2000) Livestock in a middle-sized East-African town: Nakuru. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock waste recycling
Kenya

In 1999, a general survey among a representative sample of almost 600 households was held in the Kenyan town of Nakuru. During the survey, basic information was collected on urban farming practices by the Nakuru population, with the aim to obtain a general overview of urban agriculture in this town. Part of the survey covered several aspects of livestock keeping. This article is based on a larger report by the same authors entitled *Urban farmers in an East African town: the case of Nakuru, Kenya*.

Furedy, Christine **(1988). Enterprise with urban wastes. In: D+C vol. 1988 no.6 p. 18-19**
waste recycling
urban wastes; waste management; India;

Another account of waste pickers using Calcutta as an example, this paper looks at the composition of waste picker groups and existing hierarchy. Competing for this surprisingly lucrative job can lead to violent clashes between competing gangs. (WB)

Furedy, Christine **(1988). Natural recycling in Asian cities. In: Planet Drum Review no. 13 (1988) p. 6-7**
waste recycling
Asia; political aspects; food production; informal systems

Gives an overview of the role urban agriculture plays in waste management in Asian cities highlighting the importance of informal systems. The author concludes it will require great creativity from Asian city administrators to strengthen links between urban food production, waste disposal and treatment, environmental quality, and other factors such as income generation. What is necessary, she argues, is a fundamental change in attitude and policies in which authorities look upon cities as ecosystems rather than continue issuing bylaws that go against the spread of urban agriculture. (WB)

Furedy, Christine **(1989). Social considerations in solid waste management in Asian cities. In: Regional Development Dialogue vol. 10 no. 3 (autumn 1989) p. 13-41**
waste recycling
solid waste management; Asia; informal systems; urban poor; social strata

Pleads for a socially-aware approach to solid waste management. The article suggests how concepts pertaining to solid waste management should be reformulated in such a way as to include the social contexts of waste recovery in Asia. The distinction between a formal and informal system, so important in employment, marketing and housing, also applies to waste management, distinguishing between officially sanctioned or mandated city systems and those systems that develop in the margin of 'normal' collection and disposal procedures, e.g. street pickers. The underlying article looks at this informal resource recovery, in particular. A key publication. (WB)

Furedy, Christine **(1990). Urban wastes and sustainable development: a comment on the Brundtland report. In: Maintaining the biosphere, Appendix IV. N. Polunin & John Burnett (eds), p. 213-218 York University, North York, Ontario, Canada**

waste recycling

urban wastes; sustainable development; India; urban poor; informal systems; social aspects; health hazards

Describes waste management in Calcutta characterised as a largely informal system of 'garbage farms' and sewage-based fish ponds. Pickers remove synthetic materials from the dump heaps so thoroughly that the remainder can be used as organic compost by farmers without much further picking or reworking. The author poses the question whether, with this system in mind, one can call Calcutta's waste handling system sustainable or not. For this to be so from the social point of view, it would be necessary to bring about positive societal attitudes to waste reuse in order to remove the stigma associated with waste handling. Also, city administrators will have to accept the complementarity of the formal and informal system. (WB)

Furedy, Christine **(1990). Women and solid wastes in poor communities. In: Proceedings of the 16th WEDC Conference Infrastructure for Low-Income Communities / Michael Smith (ed.), p. 25-27. Water, Engineering and Development Centre (WEDC)**

waste recycling gender

waste management;women’s role; solid wastes

Deals with the use of waste materials by women to meet basic needs and generate income and work. As the author argues, this informal system of waste gathering goes well beyond household needs and represents important savings for poor households. An analysis as to gender is made of the composition of these waste picker groups. Areas for further research on this issue are suggested. In the field of solid waste management, one cannot deny the crucial role played by women in this low, polluted, yet crucial work. (WB)

Furedy, Christine **(1998). Appropriate technology for urban wastes in Asia:**

avoiding past mistakes. In: Biocycle (July 1998) p. 56-59
waste recycling horticulture
urban wastes; Asia; appropriate technology, case studies

Compost-making is widely considered as a suitable way of reducing solid waste disposal problems but has become controversial in Asia as it is mostly based on waste treatment in complicated mechanical plants. Though these are easy to administer for municipalities with relatively few parties involved, they are often built without proper cost-benefit studies, and perform badly as a consequence. When looking, however, at composting taking place in community settings, one comes across flourishing composting systems. Among the many examples cited in this highly interesting article, we mention here the garbage farms in Calcutta, described as a model for community-based approaches to composting. Here, the wastes are used in situ, with a host of waste pickers sieving through the materials plots of mature dump land are leased out, thus avoiding the costs and complications of transportation, at the same time giving rise to a flourishing vegetable production on the dump sites. Apart from such economic or ecological arguments there is the argument of employment: an estimated 20,000 people find work as a result of this intensive farming. (WB)

Furedy, Christine; Maclaren, Virginia; Whitney, Joseph **(1997). Food from waste: urban pressures and opportunities for food production in Asian cities. 28 p. Ryerson Polytechnic University, Toronto**
waste recycling food security and nutrition
South Asia; South East Asia; organic wastes; composting; aquaculture; waste reuse; health risks

Waste reuse and recycling has a longer tradition in Asian cities than anywhere else in the world. Waste-based food production is an important source of food as well as employment to farmers, waste workers and traders involved. Within thee region, waste sources or reuse sectors are different from one country to another as a result of differences in religion and culture. Economic factors such as land, transport and cost of fertilisers also determine the type of waste which is going to be used. Other areas of concern are health and environmental regulations, due to the fact that urban waste can be hazardous to the public health. This risk is especially increasing nowadays with the changes in urbanisation and consumption habits. At the same time, changes in life style can create new opportunities for using waste. This report explores these possibilities and gives suggestions for stronger links between waste reuse and urban agriculture. Further research areas are suggested. Reference is made to different projects in South and Southeast Asia. One of the main goals of this report is to start filling the gap between the practical work done on the subject, with a long-standing tradition, and the written materials which are still lacking. (WB)

Furedy, Christine; Maclaren, Virginia; Whitney, Joseph **(1999). Reuse of waste for food production in Asian cities: health and economic perspectives..In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod**

MacRae, Luc JA Mougeot and Jennifer .Welsh (eds), p. 136-144. ISBN 0_88936_882_1. CAD 35.00
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
waste recycling health and environment
organic waste reuse; health; aquaculture; economic impact; education

Asian communities have many practices involving the reuse of organic wastes in agriculture and aquaculture, even in urban areas. This paper discusses health and economic aspects of the reuse of municipal waste in South and Southeast Asia. Recent research in Bangkok, Bandung, Bangalore, Hanoi, Ho Chi Minh City, Jakarta, and Manila is used to suggest the potential for the linking organic waste reuse and urban agri-aquaculture. Important constraints on the reuse organic waste are contamination and the greater cost of making compost compared to chemical fertilizers. The paper suggests strategies for minimizing these constraints and improving the marketability of organic wastes. Contamination can be reduced by collecting waste separately and by separating organics at source. Market research is needed to promote the use of compost. Health risks can be reduced through education and the amendment of agricultural practices. (Abstract adapted from original)

Furedy, Christine**. (2001) Reducing health risks of Urban Organic Solid Waste Use. In: *Urban Agriculture Magazine*, no 3, Health , March 2001, RUAF, Leusden The Netherlands.**
health and environment waste recycling community development
India; health risk management, organic wastes, compost, informal practices, community-based composting, composting.

Health concerns received minimal attention at the beginning of the recent thrust to promote urban and periurban agriculture, but progress has been made recently in articulating the health issues, especially in developing countries. Some aspects of the risks of urban organic solid waste reuse are discussed in this paper. The focus in this article is the relation of health risk management to informal or community-based practices, with particular reference to composting and the use of decomposed organic wastes. Because the capacity of governments to intervene in most urban agriculture related activities is limited, it is argued that a gradual progress in self-regulation or self-limitation of risks is necessary and external assistance is needed for assistance with setting appropriate standards, promoting practical measures and stimulating research.

Furedy, Christine, **(2002), Urban Waste and Rural farmers: enabling low cost organic waste reuse in developing countries. York University and Furedy Research and Advising Inc. www.cityfarmer.org/urbanRuralWaste.html**
waste recycling health / pollution city ecology
Asia (Eastern), Asia (South-Central), Asia (South-Eastern), Asia (Western incl. Middle East), composting, organic waste recycling

Compost making, promoted as a waste reduction strategy has had little impact on

the quantities of organic wastes at dumpsites in developing countries. In addition, the most immediate, numerous, and needy of waste reusers - periurban farmers - cannot afford the products of compost plants. Asian farmers customary use of low cost organic matter from garbage dumps has declined steeply with contamination of refuse. Design of organics - rich disposal areas and recovery from less contaminated levels at dumps couild rejuvenate periurban waste reuse.

Gardner, Gary **(1997). Recycling organic waste from urban pollutant to farm resource, WorldWatch, Washington DC; 59 pages, 8 tables, 86 notes**
waste recycling
sanitation; manures; wastes; urbanisation

This policy issue paper presents a broad picture of the environmental issue of urban waste and its potential s an input to urban and periurban agriculture. (JS)

GFA Infrastruktur und Umweltschutz GmbH **(1998). Utilisation of organic waste in (peri-) urban centres. 316 p. GFA Infrastruktur und Umweltschutz GmbH, Koenigswinterer Strasse 827, 53227 Bonn, Germany; IGW Ingenieurgemeinschaft Witzenhausen Fricke & Turk GmbH, Witzenhausen, Germany**
Supplier: Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Postfach 5180, 65726 Eschborn, Germany
waste recycling
organic wastes; composting; economic aspects; legal aspects; health; environment; waste collection

A source book providing the important technical aspects (problems, solutions and requirements) and their relevance for projects dealing with composting of organic urban waste. Modules deal with 1. Organic waste, 2. Treatment of organic waste for compost 3. Marketing and distribution of compost, 4. Economic aspects, 5. Legal aspects. An additional module presents a collection of short case studies from Benin, Burkina Faso, Germany, Indonesia, Poland and Tunisia. (NB)

Global Facility for Urban Agriculture **(1997). Urban agriculture for food security, jobs and waste recovery: roundtable of top local government officials. Second International Colloquium of Mayors on Governance for Sustainable Growth and Equity (UNDP). 10 p. Global Facility for Urban Agriculture**
food security and nutrition waste recycling R&D methodology
municipal policies; urban planning; open spaces

This roundtable took place in the framework of the Second Colloquium of Mayors on Governance for Sustainable Growth and Equity, held at UNDP, New York, July 28-30, 1997. A number of city case studies were presented by mayors outlining the status of urban agriculture in their cities. In a plenary discussion, challenges and benefits of urban agriculture were discussed. (WB)

Haan, Hans Christiaan; Coad, Adrian; Lardinois, Inge **(1998). Municipal solid waste management, involving micro and small enterprises: guidelines for municipal managers. 154 p. ISBN 92-9049-365-8 ; USD 20. Publications Department, International Training Centre of the ILO, Viale Maestri del Lavoro 10, I-10127 Turin, Italy**
Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK
waste recycling services
waste management; solid wastes; appropriate technology; micro- and small enterprises

Solid waste management in cities in low-income countries face ever increasing problems in solid waste management services because of the uncontrolled growth of these cities. Not surprisingly, poor city areas are first and most affected. Causes are manifold: lack of funds; low workforce productivity; inadequate management, often through failing bureaucratic procedures; and inappropriate equipment given the existing infrastructure. By involving the private sector, however, a number of successes have been obtained, resulting in higher quality of services in connection with lower costs, e.g. in Guatemala City, Harare and Dakar. The focus of this publication is on micro- and small enterprises (MSEs) which have the advantage that their appropriate technologies allow them to provide low-cost services at places where larger scale operations either are too expensive or make use of inappropriate equipment. At the same time, a number of restricting conditions are given that concern the extent to which SMEs can be involved in these operations. The current trend, the authors argue, is toward a mixed system of small and larger enterprises working together with municipalities. (WB)

Harris, P.J.C., M. Allison, G. Smith, H.M. Kindness and J. Kelley **(2001), The Potential Use of Waste-Stream Products for Soil Amelioration in Peri-Urban Interface Agriculture. School of Science and the Environment, Coventry University / Henry Doubleday Research Association / Natural Resources Institute / CABI Bioscience. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 1-28, 2001.**
waste recycling
organic waste recycling; soil remediation

This chapter discusses the opportunities and constraints that influence the use of organic waste-stream products for soil amelioration. The information is given as a checklist to aid decision-making, illustrated where possible by examples from developing countries.

Hart, Doortje 't; Pluimes, J **(1999). Wasted agriculture: the use of compost in urban agriculture. WASTE-UWEP Working document no. 1. WASTE Consultants, Nieuwehaven 201, 2801 CW Gouda, The Netherlands**
waste recycling

composting; waste management; pollution; health

A literature review, questionnaires to 20 organisations and interviews with resource people provide the basis for this report. It provides an inventory on what is actually being done in composting organic waste for urban agriculture. Qualities, advantages and constraints as well as examples of experiences in using organic waste in cities are discussed. A comparison is made between composting for urban agriculture as a spontaneous activity and as an activity induced by a project or organisation. (NB)

Holmer, R.J., A.B. Mercado and W.H. Schnitzler **(2001), Integration of Peri-Urban Food Production into Solid Waste Management Programs: A Case Study from the Philippines. Xavier University College of Agriculture, Cagayan de Oro / Institute of Vegetable Science, TU Muenchen. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001.**

waste recycling food security and nutrition

Philippines; solid waste management; vegetables; food production; waste management; food security; enterprise development, Asia (South-Eastern)

Different survey data pertaining to vegetable production and solid waste management in Cagayan de Oro are presented. Special emphasis is given to the potential of integrating periurban food production into improved solid waste management programs and its contribution to food security. Business opportunities for micro- and small-sized enterprise development in urban farming in connection with sustainable waste management strategies as well as issues and actions to further enhance urban and periurban agriculture in the Philippines are formulated.

International Institute for the Urban Environment (IIUE) **1996. Sustainable urban development in the Third World: proceedings of a seminar held in Utrecht, September 12, 1996. 27 p. International Institute for the Urban Environment (IIUE), Nickersteeg 5, 2611 EK Delft, Netherlands; Nijmegen Urban Health Group (NUHG), Nijmegen, Netherlands; WASTE Advisers on Urban Environment and Development, Gouda, Netherlands**

city ecology waste recycling

urban development; Habitat 2; sustainability indicators; integrated waste management

In the wake of the Habitat II Conference in Istanbul, this seminar dealt with urban livelihood issues in developing countries. A good diagnostic approach to urban development is no easy undertaking in the light of its multidisciplinary character. During the seminar were addressed: indicators for urban sustainability, the integrated relationship between health, environment, culture and political development, and the role of different actors in integrated waste management. (WB)

Jenkins, Joseph **(1999). The humanure handbook. 302 p. Also on: www.jenkinspublishing.com.**

wastewater reuse waste recycling

composting; sanitation; wastewater

This manual includes easy to understand instructions on composting all organic household waste; growing a food garden with human compost and understanding the health issues. Low-cost composting toilet, grey water use, government regulations, and a list of commercial sources are included. (JS)

Kessler, A. and J. Helbig **(2001), Adding Value to Compost from Urban Household and Market Refuse in Lome. Humboldt-University of Berlin, Institute of Agricultural Sociology / Humboldt-University of Berlin, College of Agriculture and Horticulture, Department of Phytomedicine. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 133-136, 2001.**

waste recycling

Togo; composting; waste management; urban wastes; farmers; pest management, Africa (Western)

Since September 1999, a pilot compost station using organic wastes from households and markets has been running in Lome, Togo. The station aims at the production of compost for vegetable farmers, not only for soil amelioration but also for phytosanitary purposes. Similar stations have also been established in Senegal and Guinea.

Kiango, Suzan and J. Amend **(2001), Linking (Peri-)urban Agriculture and Organic Waste Management in Dar es Salaam. Urban Vegetable Promotion Project, Ministry of Agriculture and Co-operatives / Urban Vegetable Promotion Project, German Technical Co-operation (GTZ), Dar es Salaam. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 115-128, 2001.**

waste recycling

Tanzania; urban agriculture; waste management; organic wastes; composting; nutrient balance, Africa (Eastern)

The chapter gives an assessment of the nutrient flows into Dar es Salaam, Tanzania, and within the city. It documents that there are large amounts of nutrients remaining in the city, but only a minor share is used productively for urban farming. Thus most nutrient flows end without recycling despite the fact that there are significant agricultural activities with a potential to produce and use for, example, compost.

Klundert, A. van der, M. Muller, A. Scheinberg, N. Dulac, J. Anschutz and L. Hoffman **(2001), Integrated Sustainable Waste Management: A Set of Five Tools for Decision-Makers. Experiences from the Urban Waste Expertise Programme (1995-2001).**
Supplier: WASTE Advisers on Urban Environment and Development, Nieuwehaven 201, 2801 CW Gouda, The Netherlands

waste recycling

waste management, developing countries

This series of Tools for Decision-makers on Integrated Sustainable Waste

Management (ISWM) presents a unique approach to municipal waste management. Integrated Sustainable Waste Management is a concept, analytic framework and assessment that pays attention to aspects often neglected in conventional municipal waste management. It covers institutional, social, environmental, political, technical and financial aspects, while emphasising the critical role that a variety of stakeholders - including waste pickers, women and micro- and small enterprises - play every day in waste management operation such as collection, treatment, reuse, recycling and prevention. This series of Tools for Decision-makers is based on lessons learnt in the Urban Waste Expertise Programme, a six-year research and pilot project programme (1995-2001) on urban waste in Africa, Asia and Latin America. Experiences from similar initiatives outside the UWEP programme which support the intergrated ISWM concept have been included where appropriate.

The tools are written for city and town mayors, municipal managers, members of city councils and other decision-makers in local authorities. They are designed to be of assistance to those concerned with inproving their municipal waste management services in a sustainable manner. The focus is on situations in low- and middle-income countries in the South, but the content can also be of interest to decision-makers in countries in transition. This series is compiled of a set of 5 tools:

- Integrated Sustainabe Waste Management - the Concept

- Micro- and Small Enterprises in Integrated Sustainabe Waste Management

- Community Partnerships in Integrated Sustainabe Waste Management

- Financial and Economic Issues in Integrated Sustainabe Waste Management

- The Organic Waste Flow in Integrated Sustainabe Waste Management

Lardinois, Inge, Klundert, A van der **(1994). Recovery of organic waste in cities. In: ILEIA Newsletter vol. 10 no. 3 (September 1994) p. 6-8. WASTE Consultants, Crabethstraat 38F, 2801 AN Gouda, The Netherlands**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
waste recycling
case studies; organic wastes; solid wastes; urban wastes; waste recycling

In many cities in low and middle income countries, municipal refuse collection and disposal services are woefully inadequate and thus, waste accumulates in the streets and at transfer stations. Large scale high-tech recycling projects have failed because installations were too complicated, too expensive to run and not suited for local conditions. Consequently, some facilities have been closed down and many operate well below their planned capacities. Alternative methods are sought to utilise this important resource more effectively. At the request of the Undugu Society of Kenya (USK), a comprehensive research was carried out (1991-1993) in Africa and Asia to study options for solid waste recycling appropriate for small-scale enterprises. Organic waste was one of the ten materials researched. (ILEIA)

Lardinois, Inge; Furedy, Christine **(1998). Source separation of household waste materials: analysis of case studies from Pakistan, the Philippines, India, Brazil, Argentina and the Netherlands. UWEP Urban Waste Series No. 7.**
waste recycling
wastes; organic wastes; environment; composting; periurban agriculture; urban management

The studies reported in this book assess the costs and benefits of both collectively organized (e.g., by municipalities or NGOs) and 'customary' systems. There are discussions of the environmental and social benefits, with some comparison of the source separation schemes. Keeping organic wastes pure by practicing separation at the source is seen as the best procedure in the composting of urban organic wastes. Such compost, if efficiently produced and marketed, can be a valuable resource in urban and periurban agriculture, while contributing to more effective urban solid waste management. Cities included are: Karachi, and Faisalabad, Bangalore, Metro Manila, and Armstrong, Chabas, Canada de Gomez, Firmat and Las Rosas in Argentina and San Francisco, Belo Horizonte, Porte Allegro, and Angra dos Reis in Brazil. (JS from authors)

Lardinois, Inge; Furedy, Christine **(2000). Source separation of household waste materials: analysis of case studies from Pakistan, the Philippines, India, Brazil, Argentina and the Netherlands. Urban Waste Series no. 7**
Supplier: Waste, Nieuwehaven 201, 2801 CW Gouda, the Netherlands
waste recycling
household wastes; waste management; waste separation; case studies; organic wastes

In the context of sustainable development, separation at source has proven to be valuable in many reuse and recycling programmes. Separation systems exist in many Northern cities, and 'wet-dry' separation (involving the collection of separated organic wastes) are now being promoted in a number of cities. Collectively organised separation (involving, for instance, municipal councils and/or NGOs) are in pilot stages in several towns and cities in the South. Many cities have customary systems of separation based on the sale or donation of household materials and goods which could be expanded to wet/dry separation. Keeping organic wastes pure by practising 'separation at source' is seen as the best procedure in the composting of urban organic wastes. Such compost, if efficiently produced and marketed, can be a valuable resource in urban and periurban agriculture, while contributing to more effective urban solid waste management. The book is based on case studies of research and projects pertaining to the separation of household materials, in the interest of waste reduction in cities. The book consists mainly of a series of case studies. Both organic and inorganic post-consumption materials are covered. The cities included are: Karachi and Faisalabad, Bangalore, Metro Manila, and Armstrong, Chabas, Canada de Gomez, Firmat and Las Rosas in Argentina and San Francisco, Belo Horizonte, Porte Allegro, and Angra dos Reis in Brazil. The Netherlands' approach to waste reduction is also included. The benefits and challenges of separation at source have so far hardly been documented in low- and

middle-income countries. The studies reported in this book attempt to assess the costs and benefits of both collectively-organised (e.g. by municipalities or NGOs) and customary systems. There are discussions of the environmental and social benefits, with some comparison of the source separation schemes. (from original abstract)

Leitzinger, C. **(2001), The Potential of Co-composting in Kumasi - Quantification of the Urban and Peri-urban Nutrient Balance. Entsorgung + Recycling Zurich (ERZ). In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 150-162, 2001**.

waste recycling

Ghana; composting; food consumption; urban agriculture; nutrient balance; nitrogen; phosphorus, Africa (Western)

A material flux analysis was used to study the fate of organic matter (carbon), nitrogen and phosphorus in the rural-urban nutrient cycle of Kumasi, Ghana. The assessment included market and consumption surveys, and an estimate of the amounts of organic wastes available and that could enter the co-composting process taking intoaccount the actual collection capacity if the waste management authority. Finally, the amount of nutrients that could theoretically be reintroduced into the nutrient cycle has been estimated.

Lewcock, Chris P **(1994). Case study of the use of urban waste by near-urban farmers of Kano, Nigeria. Natural Resources Institute. Chatham, Maritime, UK, 45 p.**

waste recycling

Kano; Nigeria; wastes; fertiliser; surveys; periurban agriculture

This report and it attachments well presents the network of physical flows of organic urban waste used in fertilizing soil in periurban areas, it establishes the economic viability of urban waste as a source of fertilizer. It describes the constraints of poor farmers in accessing this input. And considers possible management strategies, particularly public-private interaction. The author finds: substantial demand, undercollection, financial sustainability, inefficient throughput, inadequate policy perception of the potential, a lack of knowledge of what is urban waste, lack of awareness of the safety issues. (JS)

Lewcock, Chris P **(1995). Farmer use of urban waste in Kano. In: Habitat International vol. 19 (1995) no. 2 p. 225-234**

waste recycling

Nigeria; Kano; urban wastes

Near-urban farmers in Kano, Nigeria, have collected urban solid waste over several centuries as a means to retain and enhance soil fertility in this densely populated and intensively cultivated area. Recently, with the advent of paid delivery of the waste, their access to waste has become more difficult and more expensive. This

paper describes causes and remedies. (WB)

Losada, Hermenegildo **(et al.). Recycling of solid wastes in the east of Mexico City by livestock and agricultural production systems. On: http://www.ias.unu.edu/proceedings/icibs/ic-mfa/losada. Animal Production Systems Area, Department of Biology of Reproduction, Division of Biological and Health Sciences, Universidad Autónoma Metropolitana, Iztapalapa, Mexico**
waste recycling
Mexico; Mexico City; waste management; organic wastes

The Central Food depot of Mexico City (Central de Abastos) is the largest market in the world, receiving 24,000 tons of food products daily, some 40% of the Mexican national harvest. It generates 800 tons of waste per day, mostly organic, of which 100 tons are used as a forage source to feed the 2500 dairy cattle maintained in urban stables in the east of Mexico City, constituting an significant flow of otherwise waste material. A wide range of products are used as feed for the cows, including parts or whole of the following: broccoli, cauliflower, lettuce, carrot, corn, pumpkin, cabbage, turnip, radish and sugar beet. In turn, excrement from the dairy stables is removed weekly and used entirely for crop production in periurban areas. The most significant crop by far is the nopal (Opuntia ficus indica) grown on terraced fields in Milpa Alta, in the south-east of the city with an annual production of over 200,000 tons of leaves. Some 75% of these are consumed within Mexico City, the rest in neighbouring states (Puebla, Hidalgo, Mexico, Queretaro, etc), and a small proportion exported to USA and Japan. Dairy manure is applied for organic matter and nutrients as well as a source of moisture and heat counteracting the effects on both the lack of water or frosts on the plant. Up to 600 tons of fresh manure may be applied per hectare, and the crop produces leaves weekly, all the year round. (original abstract)

Lukman, Salifu**. Waste management issues: an integrated disposal strategy for the Kumasi metropolitan area. Waste Management Department, Kumasi Metropolitan Assembly, Ghana**
waste recycling wastewater reuse health and environment
Ghana; waste management; wastewater management; urban sanitation

Urban sanitation and waste management are given a priority by all district and municipal governments in Ghana. However, the waste management capacity of cities is deteriorating. This paper discusses the solid and liquid waste management system of Kumasi. Needs assessment and intervention schemes are presented. From there, proposals for strategies for sustainable services delivery and an integrated disposal strategy including a reality check are made. (NB)

Magid, J., A. Dalsgaard and M. Henze **(2001), Optimizing Nutrient Recycling and Urban Waste Management - New Concepts from Northern Europe. Department of Agricultural Sciences / Department for Veterinary Microbiology, Royal Veterinary and Agricultural Univeristy, Denmark / Department for**

Environmental Science and Engineering, Danish Technical University. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 137-139, 2001.

waste recycling
nutrient balance; urban areas; waste management, Europe (Western)

Night-soil together with solid organic household waste constitutes about 1% of total household waste volume, but contains 82-87% of the nutrients. The NUTRAP centre in Denmark is working on concepts to recycle these nutrients into fertilizer.

McDougall, F.R. **(2001) Integrated Solid Waste Management: A life cycle inventory.**
www.scientificjournals.com/db/pdf/lca%2F6%2Flca6_320.pdf
waste recycling
solid waste management, waste recycling, modelling

The first edition described the concept of Integrated Waste Management (IWM) and the use of the life cycle inventory (LCI) to provide a way to assess the environmental and economic performance of solid waste systems. Actual examples of IWM systems and published accounts of LCI models for solid waste are now appearing in the literature. To draw out the lessons from these experiences a significant part of this 2nd edition focuses on case studies - both of IWM systems - and of where LCI has been used to assess susch systems. It includes updated chapters on waste generation, weaste collection and, central sorting, biological treatment, thermal treatment, landfill and materials recycling. It also provides a more user friendly model (IWM-2) for waste managers. To make it more widely accesible, this edition provides the new tool in windows format, with improved input and output features, and the ability to compare different scenarios. A detailed users gyuide is provided to take the reader through the use of the IWM-2 model, step by step. IWM-2 is designed to be an entry level of LCI model for solid waste - user friendly and appropriate to users starting to apply life ccycle thinking to waste systems - while more expert users will also find many of the advanaced features of the IWM-2 model helpful.

Mensah, E., P. Amoah, Drechsel P. and R.C. Abaidoo **(2001), Environmental Concerns of Urban and Periurban Agriculture: Case Studies from Accra and Kumasi. Agricultural Engineering Department, KNUST, Kumasi / IWMI, Kumasi / Department of Biological Sciences (KNUST), Kumasi. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 55-68, 2001.**
waste recycling
Ghana; urban agriculture; irrigation; composting; poultry; manures; food contamination; pesticides, Africa (Western)

Using results from case studies from Accra and Kumasi, Ghana, this chapter gives examples of environmental concerns related to: (I) water quality; (ii) the quality of waste stream products; (iii) food contamination; and (iv) the use of pesticides in urban and periurban agriculture.

Moningka, Laura; Muller, maria; Laroui, F. **(2001), Community participation in solid**

waste management : factors favouring the sustainability of community participation : a literature review. WASTE, Gouda, Netherlands
waste recycling
gender, communication;

The document stresses the importance of communication, the intermediary role played by respected community members, attention paid to gender, financial viability to prevent dependence

on external sources. Copies of the document can be ordered from WASTE. (UWEP)

Morgan, Peter **(1999). Ecological sanitation in Zimbabwe: a compilation of manuals and experiences. Harare: Privately printed.**
wastewater reuse waste recycling
Zimbabwe; eco-sanitation; manuals

This is a significant compilation, part of the emerging literature on “eco-sanitation”. While this approach arose principally in northern Europe, this book is one of the first attempts to adapt it in a significant way to developing countries. The second half of the book is devoted to the agricultural-reuse. (JN)

Nederlandse Ontwikkelingsorganisatie (SNV) **(1998). Uitdagingen voor het stedelijk milieu. 38 p. Nederlandse Ontwikkelingsorganisatie (SNV), Bezuidenhoutseweg 161, 2594 AG The Hague, The Netherlands**
city ecology waste recycling
urban environment; urban planning; waste management

Contains papers presented during a series of study meetings organised by Dutch development organisations in 1997-98. Papers deal with the various aspects of urban environment, notably waste management, urban agriculture and the role of NGOs in urban planning. In Dutch. (WB)

Newcombe, K **(1977). Nutrient flow in a major urban settlement: Hong Kong In: Human Ecology vol.5 (19077)no. 3 p. 179-208. Human Ecology Group, Centre for Resource and Environmental Studies, Australian National University, Canberra, Australia**
city ecology waste recycling
Australia; ecosystems; China; Hong Kong; nutrient balance; nutrient cycling; nutrient transport; phosphorus; recycling; urban environment

The flow of minerals is examined including current and potential nutrient recycling patterns. The flow of mineral phosphorus in the Hong Kong food system is examined in detail. A comparison is made between the land based forage area demand of the population of Hong Kong and the similar population of Sydney, Australia. It is estimated that the average Hong Kong person has a diet which requires only half of the land area needed for a Sydney inhabitant. However, Hong Kong relies on the ocean for 25% of its protein intake whereas a Sydney inhabitant only for 2.5%. Patterns of food production and nutrient recycling are proposed, with the aim of

optimising resource utilisation. (NB - adapted from original abstract)

Niemeyer, Rolf; Sanders, Stephan **(1999). Organic matter composting in urban waste management: how urban agriculture can benefit from organic wastes. In: Gate: Technology and Development no. 2 (April-June 1999) p. 28-33**
waste recycling services
waste management; composting; organic wastes

The article looks at the potential for transforming organic wastes into a valuable product with considerable benefits for urban agriculture. The different aspects of collection, composting and marketing of organic waste in (peri-)urban centres are discussed. (NB)

Niemeyer, Rolf, H. Litterscheid and S. Sanders **(2001), The Economic Viability of Organic Waste Composting. GFA-Infrastruktur und Umweltschutz (GMBH), Bonn. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 29-42, 2001**.
waste recycling
economic aspects; organic waste recycling; composting; monitoring & evaluation; decision-making process

This chapter concentrates on the essential elements of economic decision-making with respect to urban waste composting. The decision-maker should be able to identify suitable alternatives for both technical and economic services within a particular project. Finally, a tool is presented to gain a rapid overview over expected innvestment and operating costs.

Nunan, Fiona **(1997). Improved utilisation of urban waste by near-urban farmers in the Hubli-Dharwad City-region. In: Urban Agriculture Notes. 3 p. School of Public Policy, University of Birmingham Edgbaston, Birmingham, B15 2TT, UK; Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling rural-urban linkages
waste management; India

Description of research on the problems in connection with access to urban waste by small and marginal farmers, including transportation costs and the poor quality of the mixed municipal waste from the dumpsites in Hubli and Dharwad. This summary gives details about the design of the research and a number of preliminary findings. (WB)

Nunan, Fiona **(2000). waste recycling through urban agriculture in Hubli-Dharward. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 429-452. DSE, GTZ, CTA, SIDA**

waste recycling
food security; nutrition; health; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; India; rural-urban linkages

Urban agriculture in India refers almost exclusively to cattle buffalo and pig keeping. Apart from tradition urban centres provide incentives for keeping livestock, such as sources of fodder and accessible markets. There is however also some horticulture and some sewage based farming activities. Rural-urban linkage are a crucial part of urban and periurban agriculture in the region. Animals are kept for income generation, for asset development and fuel from cow dung. Farming is an important source for nutrients. Organic waste plays a key role in urban agriculture. There are no policies in Hubli-Dharward regarding urban agriculture but zoning of land occurs and authorities maintain a green belt around the city. There is also legislation regarding livestock in the city. However no officials are charged with facilitating agricultural activities in the city. Constraints and opportunities are further assessed and perspectives are discussed which hinges on the necessity of a dialogue between urban livestock breeders and municipal authorities. (NB)

Obeng, Letitia; Wright, Frederick **(1995). The co-composting of domestic and human wastes. World Bank technical paper No 57.**
waste recycling
solid wastes; refuse; environment; composting; waste management

This report defines the benefits that accrue to families, governments and the environment from separation/compost operations. The authors emphasize the importance of analyzing the waste material, the market, transportation, land requirements and the plant. Waste management is identified as one of the major problems facing cities and one of the “opportunities missed”. Large-scale composting plants are not recommended. (JS)

Otterpohl, Ralf; Bark, Kerstin **(1999). Sustainable sanitation systems in urban areas: source control, fertiliser and energy production. In: Gate: Technology and Development no. 2 (April-June 1999) p. 38-39**
waste recycling wastewater reuse
waste management; wastewater; source separation; composting; sanitation; biogas; fertiliser

Discusses advantages and components of sustainable sanitation systems. Sanitation can be made more sustainable by not mixing excreta and using minimal quantities of water. Basic techniques of collection and treatment are presented. The result of separated treatment of faeces and wastewater can be used for biogas production or fertiliser. (NB)

Owusu-Bennoah, E; Visker, HJAM **(1993). Study on the reuse of organic waste materials and agro-industrial by-products. 7 p. International Fertilizer**

Development Center (IFDC), BP 4483, Lomé, Togo
waste recycling
agricultural residues; biological fertilising; agricultural byproducts; Ghana; human wastes; organic wastes; soil fertility

Draws the picture of organic waste recycling in Northern Ghana and identifies sources and relative importance of agro-industrial by-products and waste products in this region. In addition, the nutrient content of the different by-products is given. (WB)

Parkinson, J. and Tayler, K. **(2001) Sanitation and wastewater Management in Periurban Areas: Opportunities and Constraints in Developing Countries.**
rural-urban linkages waste recycling wastewater reuse
waste recycling; Ghana; irrigation; decentralisation

The paper is concerned with the options for improved sanitation and wastewater management in periurban areas in developing countries, bearing in mind the fact that much of the wastewater produced in urban and periurban areas is already used, directly or indirectly, for irrigation, almost always without treatment. Options for reducing the strength of wastewater by either separating excreta from sullage water or treating wastewater to reduce its strength are explored. The focus is on the potential advantages of decentralised management, including compatibility with decentralised approaches to urban management and reuse needs, particularly those of the periurban poor, reduced costs and increased agricultural productivity. It appears that suitable technologies for decentralised treatment are available but that other barriers to the wider adoption of decentralised approaches exist. These include lack of finance, and suitable land, deficiencies in knowledge and skills and the inflexibility of official design standards. A key constraint is the limited demand for improved wastewater management. The challenge for activists and planners is to create informed demand for improved systems, focusing not only on health but also on the improvements in the local environment and household finances that may be achieved through improved wastewater management.

Peters, Kim **(1999). Community-based waste management for environmental management and income generation in low-income areas: a case study of Nairobi, Kenya. Urban Agriculture Notes.**
http://www.cityfarmer.org/NairobiCompost.html. 36 p. Mazingira Institute, Nairobi, Kenya
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling community development gender
waste management; composting; Kenya; gender; organisation; environmental aspects; rural-urban linkages

The paper focuses on community based waste management in Nairobi, Kenya. Women groups started composting organic waste as a means of improving community environmental conditions and generating income through the sale of compost. Through this composting, significant environmental improvements have

been achieved including health, agricultural opportunities, improved drainage. It is recommended that local authorities should focus on regulation and co-ordination while NGOs could provide advice and training for local authorities. (NB)

Pitot, Hanss-André **(1999). Le compostage comme modèle de gestion des déchets dans la banlieue de Delhi. In: Echos du Cota no. 82 p. 3-5**
waste recycling
composting; India; New Delhi

Describes a project implemented by the NGO ACORD in New Delhi. Purpose is to organise composting of the organic fraction of the huge mass of urban waste of this megacity. A pilot project was started in the densely populated area of Harkesh Nagar. The paper contains a break-down of costs involved in the composting process. The author concludes the described method has enough perspective to be applied on a larger scale. Some flaws remain in the set-up, however. For instance, the issue of selling the produced compost has been insufficiently examined. Also, more qualified personnel for handling waste and supervising the process ought to be trained. (WB)

Rajvanshi, Anil K **(1997). Useful wastes: agricultural residues could help in the making of energy sufficient talukas. In: Down to Earth no. Apr 30 (1997) p. 48-49. rs 20.00**
waste recycling
India; biomass production

Pleads for a reduction of India's dependence on imported fuels through the creation of biomass-based systems of energy generation. This is certainly a promising idea given the fact that India has abundant biomass reserves. (WB)

Rodrigues, MS; Lopez-Real, JM **(1999). Urban organic wastes, urban health and sustainable urban and periurban agriculture: linking urban and rural by composting. In: Urban agriculture notes, http://www.cityfarmer.org/urbanwastes.html**
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling health and environment rural-urban linkages
organic wastes; waste management; public health; periurban agriculture; horticulture

Looks at waste management systems, and at public health as a result of poor refuse disposal. The paper also examines the absorption capacity of both urban and periurban agriculture of this organic waste. (WB)

Santandreu, A.., Castro G. and Ronca, F. **(2000) Urban Pig Farming in Irregular Settlements in Uruguay. In: *Urban Agriculture Magazine*, no 2, urban livestock,**

October 2000, RUAF, Leusden The Netherlands.
urban livestock waste recycling
Uruguay; waste; poverty;

One of the survival strategies developed by the residents of urban settlements in Montevideo, Uruguay, is the collection and sorting of household solid waste (organic and inorganic), which constitutes one of the most widespread activities. While inorganic waste is sorted and sold to the local recycling industry, in most cases organic waste is used as animal feed, mostly for pigs.

Pig farming is a widespread practice in the Department of Montevideo, both in rural and in urban areas. Among urban solid waste sorters, pig breeders constitute a distinct group. This explains the high incidence of health (transmission of diseases from animals to people) and environmental impacts (people living next to pigsties, inadequate final disposal of waste, food preparing systems) that are worsened in the case of pig farming in urban and periurban areas.

The Municipality of Montevideo has developed several strategies aimed at regularizing the status of waste sorters – pig breeders and improving the conditions in which the collection and sorting of food is carried out.

Schillhorn, T; O'Connell, P **(1997). Urban waste and rural soil management. In: Agriculture Technology Notes. Agricultural and Forestry Systems Division, World Bank.**
waste recycling
urban wastes; composting; periurban agriculture; organic agriculture

This short report follows a workshop on the topic at the World Bank, and presents a good overview of both thinking at practice focussed on the economic and environmental aspects of urban waste reuse in agriculture. (JS)

Schreurs, M.E.A. and H. van Reuler **(2001), Urban agriculture in Lome. International Institute for Soil Fertility Management (IFDC-Africa), Lome, Togo. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 129-132, 2001.**
waste recycling
Togo; urban agriculture; socio-economic aspects, Africa (Western)

Urban agriculture in Lome produces vegetables, spices and herbs on the shoreline and maize and cassava on elevated parts of the city. Soil amelioration with organic and inorganic fertilizers is highly recommended, but only small amounts of agro-industrial waste are recycled. As urban vegetable farming has developed with insufficient support, guidelines for adequate crop management and site adapted use of inputs are required.

Schuebeler, Peter **(1996). Urban sanitation management in developing countries: three conceptual tools. 46 p. ISBN 3_908001_69_2. GBP 5.95. Swiss Centre for Appropriate Technology (SKAT), Vadianstrasse 42, CH-9000 Sankt Gallen,**

Switzerland
Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK
waste recycling wastewater reuse
urban sanitation; public health; project evaluation; participatory approaches

This booklet, with the characteristic of a small manual, is concerned with urban sanitation in developing countries. Rather than focussing on sanitation problems or possible solutions, its aim is to present three conceptual tools for assessing urban sanitation systems and illustrate the use of these tools with regard to a few selected cases. Tools discussed are: (1) Assessing modes of sanitation development; (2) Modelling sanitation management systems; (3) Analysing participatory approaches. (WB - from original abstract)

Smit, Jac; Nasr, Joe **(1999). Urban agriculture for sustainable cities: using wastes and idle land and water bodies as resources. Originally published in: Environment and Urbanization 4, No. 2 (1992): 141-151. Reprinted in The Earthscan Reader in Sustainable Cities / David Satterthwaite (ed.) p. 221-233. London: Earthscan, 1999.**
waste recycling land use planning
resources; waste management; wastewater; solid wastes; land use; vacant lands

This paper describes how cities can be transformed from being only consumers of food and other agricultural products into important resource-conserving, health-improving, sustainable generators of these products. In particular, agriculture in towns, cities and metropolitan areas can convert urban wastes into resources, put vacant and under-utilized areas into productive use, and conserve natural resources outside cities while improving the environment for urban living. Agriculture within urban and periurban areas defined as a common and beneficial land use. This paper also gives examples of urban agriculture programs that help alleviate poverty while creating these benefits. (JS)

Spiaggi, E.P.; Biasatti, N.R.; Marc ,L.B. **(2000) Minilivestock in cities: vermiculture as biotechnology for organic waste processing and its transformation into fertilisers for its use in UA. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock waste recycling
Argentina; vermiculture; compost

The issue on the treatment and final disposition of garbage constitutes a challenge to be faced during the next decades in which an answer to the expectations on minimising the environmental impact of human activities will have to be given. The organic separation of garbage at present seems to be the most accessible in the application of compatible practices with environmental criteria on re-utilisation, in different ways. Vermiculture is an answer, because of its high organic waste degradation capacity, while at the same time providing by-products of immediate use

and commercialisation. An experience of organic waste re-cycling for red-earthworm production (Eisenia foetida) and vermicompost used as fertiliser in family and community farms in Rosario, Argentina is presented.

Spiaggi, E.P. **(2000) Urban Agriculture and Local Sustainable Development in Rosario Argentina. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning city ecology waste recycling
Argentina; Rosario; vermiculture; education

Experiences are given of an project, in a poor neighbourhood (Empalme Graneros) of Rosario city, Argentina on urban agriculture, in operation since 1996. 40 families are participating of the project. In 1998 support came from de Organisation of American States (OAS), and the project collaborated with institutions from Chile Centro de Educación y Tecnología (CET), and Canada Environmental Policy Institute (EPI). One of the aims was to compare the state of UA in those countries.

Stanhill, G **(1977). An urban agro-ecosystem: the example of nineteenth-century Paris. In: Agro-Ecosystems no. 3 (1977) p. 269-284. Institute of Soils and Water, The Volcani Center, ARO, Bet Dagan, Israel**
city ecology horticulture waste recycling
France; Paris; ecological systems; waste recycling; horses; manures

One hundred years ago a sixth of the area of Paris was used to produce annually more than 100,000 tons of high-value, out-of-season, salad crops, grown on very heavily manured 'hotbeds', partly under glass or protected from the winter cold by straw mats. The cropping system was sustained by the use of approximately one million tons of stable manure produced each year by the horses who provided the power for the city's transport area. This article gives a very detailed, quantitative account of this unique farming system, with a wealth of figures demonstrating its extent and importance. In the first quarter of the 20th century, the system declined rapidly, as a consequence of the replacement of the horse by the motor car, competition for land within the city, and competition from areas with a more favourable climate outside the city, facilitated by improvements in the transport system. A fascinating description of an outstanding system that once was known to the English-reading world under the name of 'French gardening'. (WB)

Trivichien, Somchitt **(1989). Composting of municipal solid waste in Bangkok. In: Regional Development Dialogue vol.10 (Autumn 1989) no. 3**
waste recycling
solid wastes; waste management; composting; Thailand; Bangkok

Gives the characteristics of solid waste in Bangkok and reports on the production from compost plants. (WB)

US/EPA **(1999). Climate benefits from reducing waste. Environmental Protection Agency. On: www.epa.gov/mmmswclimate.**
waste recycling
wastes; composting; periurban agriculture; United States

This report provides a comprehensive look at the link between municipal waste and climate change. It describes American economic incentives to reduce waste. Composting for urban horticulture is identified. (JS)

Waas, Eveline **(1996). Valorisation des déchets organiques dans les quartiers populaires des villes africaines. s FNRS module 7. Développement et Environnement. 143 p. ISBN 3_908001_53_6. GBP 9.95. Alter Ego, 21, Avenue Montchoisi, CP 151, CH-1000 Lausanne 19, Switzerland; SANDEC-EAWAG, Ueberlandstrasse 133, CH-8600 Duebendorf, Switzerland; CREPA, 03 BP 7122, Ouagadougou 03, Burkina Faso; IAGU, BP 7263, Dakar, Sénégal**
Supplier: SKAT, Centre de Cooperation Suisse pour la Technologie et le Management, Vadianstrasse 42, 9000 St.Gallen, Switzerland
waste recycling
Africa; organic wastes; waste management

Examines the organic waste cycle in African cities. This study looks at the whole of the urban cycle starting with all its inputs, be it energy, raw materials, food or information. Reusing organic matter, making up for 30-80% of household waste, is obviously the aim of all recycling. Reducing the volume of urban wastes is a major objective of Third World municipal services, both for lack of proper infrastructure, funds and technical facilities. This monograph primarily aims at improving urban livelihood in densely populated areas by creating a more efficient and performing organisation of waste management. Very complete and very useful. (WB)

Wegelin, Martin **(1996). Surface water treatment by roughing filters: a design, construction and operation manual. SANDEC report no. 2/96. ISBN 3_908001_67_6. GBP 10.95. SANDDEC, Swiss Federal Institute for Environmental Science and Technology (EAWAG), CH-8600 Duebensorf, Switzerland**
wastewater reuse waste recycling
water treatment

Presents water treatment alternatives particularly applicable to rural water supplies in developing and newly industrialised countries, and describes processes for solid matter separation. There are 2 parts. Part 1 contains a general description to the subject of rural water treatment. Part 2 clarifies design, construction and operation characteristics of different prefilters and roughing filters. Very complete and full of sound information, but for a technical audience. (WB)

Winblad, Uno **(1997). Towards an ecological approach to sanitation. Publications on Water Resources no. 5. 13 p. Department for Natural Resources and the Environment, Swedish International Development Authority (SIDA), Birger Jarlsgatan 61, S-10525 Stockholm, Sweden**

waste recycling health and environment

waste management; sanitation; wastewater

Waste management and reuse is an important element in urban agriculture. This paper presents an ecological approach to sanitation and challenges the flush and discharge systems as these create problems with sewage disposal, water scarcity, ecosystem overload and waste water treatment. Central in the approach is how to achieve safe, non polluting sanitation for all habitants in the rapid growing cities, short of money, water and institutional capabilities. Principles (keep wastes separate, dehydrate, don't flush and don't waste fertiliser) plus practical examples are presented. (NB)

WASTE Consultants **(1993). UWEP: Urban Waste Expertise Programme W057801/WW57803, annual plan 1996 summary. 41 p. WASTE Consultants, Nieuwehaven 201, 2801 CW Gouda, The Netherlands**

waste recycling

urban waste management; solid wastes; plastic recycling; organic wastes; community participation; income generation; small- and medium-sized enterprises; environment; economic aspects

The annual plan provides an overview of organisations and activities of the Urban Waste Expertise Programme (UWEP). Activities in the programme comprise neighbourhood-based collection of household excreta, waste collection enterprises in Latin America, plastic recycling, composting of organic waste, income generation out of harbour and ship wastes, environmental and economic analysis of urban waste and treatment of latrine pit septage at neighbourhood scale, medical waste and community participation in waste management. (NB)

3.3 Urban Agriculture and Land Use Planning

Integrating agricultural land use in Beirut City.

(Picture: Henk de Zeeuw)

The integration of Urban Agriculture into urban planning – An analysis of the current status and constraints

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Introduction

> "The process of formulating and implementing land policies is not only politically and technically difficult, it can also be costly. However, the costs of not formulating and implementing them are much higher" (Dowall, David & Clark Giles, 1997).

Cities do not develop according to planners' wishes – to the contrary, in the present and past, cities have always shown their own dynamic of development. In many cases this has led to crowded, ill-ventilated, unplanned, unwieldy, unhealthy cities – "ulcers on the very face of our beautiful island" as expressed by Howard (1902) for the situation in Britain (Howard Ebenezer, 1902). Howard's Garden City proposals addressed many aspects of the food system --production, distribution, collective preparation and consumption, and waste recycling-- as integral to the city (Pothukuchi, Kameshwari & Jerome L. Kaufman 2000) an idea that only now is recovering again (Groppo, Paolo (ed.) 1997). In many reports on urban planning in developing countries the rapid urban development and population increase are highlighted which make the recent trend different from what happens in the western world. Harare's infrastructure, for example, has been unable to cope with this influx of people (Dengu, Ebbie & and Alex Mugova 1996). Rapid, largely unchecked, urbanisation like for example in Kumasi, Ghana, has called an end to its claim of being the 'Garden City of West Africa'. As a result, land use patterns have become very complicated and no good concepts are in sight (Pender, Judith 1998). Therefore, urban planning instruments need to be adapted to the relatively new situation instead of using out-dated, old-fashioned, post-colonial planning instruments, which are not even used anymore in the countries of origin (Dowall, David & Clark Giles 1997). Conflicts between customary and modern land tenure systems cannot be avoided. Most of the conflicts have to do with the transition from communal land to freehold land tenure. This leads to fundamental changes in land use. The role of Land Boards and traditional authorities in manipulating and interpreting local land rights is unclear, (Richard, Matthew J. 1991).

Key problems identified are for example:

- Urban poverty and food security
- The urban land market, and
- Issues related to sustainable urban development.

A basic question is: how to increase access to land for the poor or how to integrate the urban poor into the urban land market?

The dilemma is: Recognition of and interest in urban and periurban agricultural (UPA) production is generally low among planners and politicians. Thus, a consistent approach to UPA is rarely found, (FAO 2000). Little international co-operation in the field of land legislation

is happening and innovative approaches from developing countries are missing. There is a lack of both international comparative studies on land legislation as well as internationally knowledgeable advisers (Österberg, Tommy 1998).

Although public awareness for farming activities in cities is slowly increasing, agriculture is still in many cases “by definition” not practised in cities, and is often seen as “economically unimportant” or “a temporary phenomenon”. The terms “agriculture” and “urban planning” seem to be incompatible. What we find in literature on urban agriculture in western countries refers to allotment garden schemes mostly.

High costs of green open space management tend to modify thinking of planners and authorities: a more “agricultural” approach or an approach to public-private partnerships can help to reduce costs. Agricultural activities tend to be shifted to outskirts of cities, far away from markets and infrastructure without analysing economic, environmental and interrelation with other sectors. Urban agriculture is often informal. This refers to the land occupied, the labour market, and the sales of the produce. No official authority deals with informal activities. For one or another of these reasons, urban planners tend to exclude agriculture from their terms of reference. Nevertheless, leaving the urban farming sector out of planning activities creates many problems in the cities of the South. Urban agriculture is a reality and in many cases a response to crisis and a coping strategy of the urban poor, (Jacobi Petra, Axel Drescher & Jörg Amend 2000). As reported from Mozambique for example, uncertainties about property rights affected land outside the state farm sector, and had an impact on investment, productivity, and social relations throughout the country (University of Wisconsin 2000). In many countries best and highly productive soils are gradually becoming built-up areas, thereby losing the potential for food production forever, (Pujol, D. & M. Beguier 2000). Urban agriculture is often shifted to marginal soils and therefore can never meet the goal of high productivity.

Land remains one of the controversial issues related to Urban Agriculture, (Webb, , N. 1998) but *access* to land is mostly more crucial than the *availability* of land, (Mougeot, Luc 1994). Urban land management (as any other land management) should aim to put urban land resources into efficient and sustainable use (FAO 2000). This requires, first of all, recognition of the prevailing problems and acceptance of urban livelihood strategies including urban farming, but also realization of benefits and opportunities created through productive use of green open spaces in cities.

The challenge for urban planners is to integrate coping strategies of the urban poor -- which are closely related to the informal land market in many countries-- into their planning strategies. This requires the definition of rules and standards but also ways to increase the supply of and access to land by the poor and implementation of land legislation to enable sustainable urban development. Recently, gender aspects have entered into the discussion of planning and agriculture in cities. Women, as major players on all levels of the urban food system, in production, marketing, processing and street food vending have a basic interest in being considered as an important interest group for urban planners, (Tinker, Irene 1997). Children as another important urban dweller group are hardly ever mentioned in the planning process. Urban farms could play an important role in community building and the education process, (Ginsberg, Oliver 2000). In spite of little recognition of urban agriculture in literature on urban planning, urban planners are dealing with other issues closely related to urban agriculture, e.g. squatter settlement development and urban poverty alleviation. We can learn from the experience.

Understanding the importance of urban agriculture in the planning process

> *"Urban agriculture is a practice widely used in the past, and is still in common use in many urban areas around the globe. Urban agriculture is one of the most exciting concepts of sustainable development since it addresses almost all areas of sustainability. It promotes self-reliance, community, and local economy while reducing many environmentally harmful practices from modern farming practices" (*Hsin, Robert 1996).

In view of the sustainability discussion, and recent serious, worldwide problems in agriculture, especially in animal farming, urban and periurban agriculture offer at least partly, a solution. Growing crops and breeding animals near the consumer avoids waste of energy and long transport distances.

Evidence suggests that UA complements rural agriculture and increases the efficiency of the national food supply in that it:

- provides products that rural agriculture cannot supply as well, e.g. perishable products, export crops that require rapid delivery upon harvest;
- can substitute for food imports intended for urban consumption and thus save on foreign exchange;
- can release good rural agricultural land for export-oriented production;
- can reduce pressure to cultivate new rural land, relieving stresses on marginal rural lands;
- can contribute to the generation of income in the rural sector by various and multiple interactions between the areas and their inhabitants, (IDRC 1998).

UPA is a reality and has to be considered as an important activity near and inside cities. Cities obtain their food from a variety of sources, from rural, periurban and urban areas but also from imported food. Therefore urban and periurban food production is, in many cases, a response to various factors:

- inadequate access of the urban poor to rural food supplies;
- inadequate measures to support food production;
- problems of transport and distribution of food in both rural and urban sectors;
- insufficient purchasing power of the urban poor.

Taking the highly complex urban-rural linkages into consideration, it is important to direct future development efforts towards improved urban food security through strengthening the rural - periurban - urban network, (Drescher, A.W. & D. Iaquinta 1999). This principle is becoming more and more important in the ongoing Agenda 21 discussion.

Basic principles of and tools for urban planning

> *"Urban planners shape patterns of land use and the built environment in and around cities to solve and prevent challenges of urbanization, including providing shelter, food and other basic necessities of life, protecting and conserving the natural environment, and assuring equitable and efficient distribution of community resources, including land. Planners in less-developed countries*

experience the added challenges in practice of sometimes chaotic planning policy, an outdated planning legacy with European origins ill-suited to less-developed country communities" (Quon, Soonya 1999).

The most commonly used planning tools include comprehensive general plans, master plans, strategic plans and structure plans (Dowall, David & Clark Giles,1997).

- Master plans
- Structure plans
- Land zoning
- Land subdivision regulations

Experience has shown that ***general and master plans*** tend to be static or assume slow-growing cities. They also tend to ignore how households and the commercial sector alter their demand for land as prices change. Even when such master plans have taken substantial time and effort to make they could hardly be relevant to real developments on the ground if not at least the most powerful stakeholders are willing to adhere to them. In other words, the authority of a master plan can vary a great deal (Berg, Leo van de, 2000).

A more appropriate and dynamic planning tool for developing countries is ***structure planning*.** It provides a broad framework for local decision-making and it involves public participation (Dowall, David & Clark Giles, 1997). The Structure Plan sets out a framework for development of a community. It requires projections of future demands and needs of the community such as housing, infrastructure, employment, transport, local markets etc., but also environmental aspects like waste management. As for master plans the long-term planning approach is a disadvantage in rapidly growing cities of developing countries.

Land zoning

Land zoning dictates to the landowner for what purposes he or she can use the land and what can be built on that land. Zoning regulates the use of land in areas for residential, commercial, industrial, agricultural or other land use (Dowall, David & Clark Giles, 1997). Zoning is a means to control urban sprawl, population density, traffic, and other urban problems. The strict zoning as practised e.g. in European countries is not applicable to many developing countries. Land in Asian cities is frequently used for other or mixed purposes such as residential and commercial use. Especially with regard to the clustered type of development --whereby working sites and residential areas are planned to be near together-- mixed zoning has to be applied. In many developing countries the spontaneous setting of squatter settlement are mixed zoning models, where housing, small-scale industries ***and*** agriculture are located near to each other.

Nevertheless, urban agriculture needs guided development through zoning measures with respect to plot sizes.

Land subdivision regulations define standards for plot sizes and layout, street improvement and procedures for assigning private land for public purposes. Subdivisions provide the essential characteristics of land uses, street patterns, and public utilities. Especially in the periurban and peri-rural areas of developing countries subdivision regulations do not work. Uncontrolled housing schemes and unclear roles and responsibilities of local authorities hamper proper planning and law enforcement (Dowall, David & Clark Giles, 1997).

In the light of sustainable city development urban agriculture best takes place near the people. In most developing countries, transport is a serous constraint and people tend to be immobile because transport costs are not affordable or no public transport system exists. The affected groups are for example located in squatter compounds with little or no access to infrastructure. Access to food is limited due to the non-availability of supermarkets or shops. Only one case from St. Petersburg is known, where public transport for urban farmers is subsidised by the city council, (Moldakov, Oleg, 2000).

Urban land markets

Urban and periurban land is always under the pressure of change. Fast growing economies, normally going hand in hand with urban growth, place demands for making land available for new purposes with a totally different structure (Österberg, Tommy, 1998). Balancing environmental and economic objectives requires a land management strategy that facilitates the land market and protects sensitive land and cultural resources, (Dowall, David & Clark Giles, 1996).

The availability of land and access to land are crucial for agricultural activities. Even when land is available and production allowed, land tenure arrangements and culturally rooted inequalities may limit the effective acreage available. Thus, productivity can be restricted either by reducing the actual acreage available or reducing the effective acreage available due to land use limitations. Insecurity of tenure also influences crop and animal husbandry selection and soil conservation, discouraging investments and land improvements and leading to erosion and depletion of resources (Drescher, A.W. & D. Iaquinta,1999).

Land legislation is one tool to regulate rights of landowners and land users in the urban setting and comprises various sub-packages of legislation, among which the land registration legislation and the land management legislation. Threats to environmentally and socially sound land development are land speculation, high-speed, uncontrolled urbanisation, missing land legislation or centralized, top-down planning approaches. Urban land management legislation is a public tool to avoid uncontrolled and inappropriate land use in cities. Housekeeping with natural resources, protection of open spaces, efficient and appropriate land use, and protection of land for public purposes (parks and recreation) falls under these laws (Österberg, Tommy, 1998). The proper analysis of land markets is a key issue in understanding the problem of how to integrate urban agriculture into urban planning policies. This mainly refers to inefficiencies, distortions, and inequalities caused by the land market and the question of who suffers from it, which ultimately are political questions (Dowall, David & Clark Giles,1997). This is also a major reason to discuss the role of urban agriculture in the light of the political economy.

Different approaches to urban and periurban agriculture

In this context two different aspects need to be considered: the intra-urban and the periurban land-market. They are different in their actual settings, development perspectives, and regulation needs. While intra-urban land is often scarce due to extensive build up and other uses, in the periurban setting rapid structural changes take place, (Mbiba, Beacon, 2001).

Table 1: Differences between "urban" and "periurban" (Drescher and Iaquinta, 1999)

Characteristics of "urban" and "urban agriculture"	Characteristics of "periurban" and "periurban agriculture"
attitudes differ between urban and periurban dwellers	periurban production is economically dependent on the city
different kind of people	lower population density than urban
different activities	more land/space available
concept of "urban" varies a lot cross-nationally	PU area has more natural resources
UA is part time job	PUA is a full time job
UA technology is different from PUA	PUA technology is different from UA
knowledge of urban farmers is different	knowledge of PU farmers is different
UA approach is different	PUA approach is different
UA is less commercial than PUA	PUA is more commercial than UA
urbanised	land under threat of urbanisation
more infrastructure/construction	less infrastructure/construction
more services (banks, schools, medical centres etc.)	fewer services (banks, schools, medical centres, etc.)
different landuse than in periurban areas	different landuse than in urban areas
differences in natural resources availability	differences in natural resources availability
differences in policies/incentives/disincentives	differences in policies/incentives/disincentives
easy access to markets	less access to markets
poor air quality	better air quality
high cost of labour and land	lower cost of labour and land
primarily subsistence production	primarily market oriented production
management strategies different from PUA	management strategies different from UA
small-scale, scattered and low-value crops produced in cities	intensive, market-oriented, high value crops
practised by poor urban dwellers for survival purposes	practised by groups and individuals with ready access to capital markets

The differences between urban and periurban agriculture require different planning approaches, e.g. with regard to size of plots, access to inputs, provision of water, etc. This situation calls for different strategies to land development, legislation, and planning. While in the urban environment, land allocation or land adjudication is required, periurban land needs protection through fore-front appropriate zoning measures and land acquisition. Land allocation is a process where a land owner, the state or council, allocates land for long-term stable use to individuals or organisations, while land adjudication is the process of placing existing records on formal or customary land rights into a formal land registration system.

Land acquisition is a means to protect periurban land from being unguidedly misused for urban functions. Governments buy land to create land banks for guided development, to avoid

land speculation and, for example, to re-distribute it to the poor. All those measures are important in view of protecting marginalized groups from land grabbing (Österberg, Tommy,1998).

Conversion of agricultural land to urban uses is a particular concern, as rapid growth and escalating land values threaten farming on prime soils. Existing farmland conversion patterns often discourage farmers from adopting sustainable practices and a long-term perspective on the value of land. At the same time, the close proximity of newly developed residential areas to farms increases public demand for environmentally safe farming practices. Comprehensive new policies to protect prime soils and regulate development are needed. By helping farmers to adopt practices that reduce use of chemicals and conserve scarce resources, sustainable agriculture research and education can play a key role in building public support for agricultural land preservation. Educating land use planners and decision-makers about sustainable agriculture is an important priority (University of California, 2000). The question of how to implement proper land market management is of particular interest for former socialist countries (Bertaud, Alain. 1994).

Leasehold versus land ownership

Land allocation seems a practicable strategy to protect open urban spaces for agriculture provided that this kind of land-use is on the agenda of planning policy. Land allocation requires fore-front land evaluation, zoning and a strategic development plan – otherwise it might end up with undesired results. Experiences in site-and-services schemes and upgraded squatter settlements show that the poor tend to gradually improve their housing, provided they have land security. Similar observations are true for urban agricultural activities, as shown in South African Townships, (Small, Rob 2001). On the other hand, the experience is made that the poor, because of high costs, often tend to sublet or sell the site and move back to the original squatter settlement (Dowall, David & Clark Giles, 1997). Also, secondary gradual densification of sites can be observed causing lack of agricultural land in such areas. Sometimes in-town or rural-urban chain migration is the cause of this, but often the owner of the plot sublets part of the plot to strangers to make money. With respect to the public interest in conservation of open spaces in cities, this is a strong argument not to give land ownership to urban agricultural land but rather leasehold. Leasehold is a limited right to use land for a specific time and a specific purpose often including protected tenure with the right for prolongation and the right of transfer (Österberg, Tommy, 1998). Contrary to land ownership, leasehold prevents land speculation, thus protecting public interest in open spaces. Proper leasehold is closely related to customary tenure, which, for example in Africa, often includes land use for specific purposes. Another model is the community leasehold whereby land is given to a community or association to use it for specific purposes. The European allotment systems work along this line. Nevertheless this requires the establishment of management associations, garden clubs or similar community based groups (Drescher, A.W. 2001).

Land markets and poverty alleviation

Land tenure and, even more so, security of land is a crucial point in the discussion, rather than the availability of land—as pointed out above. Nevertheless there are big regional differences.

The key question is how to bring the poor into the formal land market (Fernandes, Edésio & Ann Varley (eds) 1998). The past approaches of poverty alleviation did not aim to increase

the flexibility of the poor but rather led to dependence on government and non-government organisations (Dowall, David & Clark Giles, 1997). Urban planners do tackle this question but rather in connection to housing schemes than to agricultural land use. We learn form this example that sometimes we need to take existing thought and strategies as a valuable starting point and try to incorporate agricultural land use into those. Site-and-services schemes and squatter settlement upgrading are common measures taken by councils to provide or improve housing for the poor.

Site-and-services schemes provide the target group with a plot and basic infrastructure like water, roads, and sanitary facilities. Upgrading of squatter settlements provides an opportunity to build on existing structures, already partly developed, and does not interfere with building communities and social structures.

In Thailand and the Philippines, land sharing has also been implemented with respect to housing schemes. Land sharing is based on an agreement between the landowner (private or state) and the land occupants to develop the land according to their specific interest. Land sharing is a means to increase land tenure security and land value (Dowall, David & Clark Giles, 1997).

As we can see, existing tools can be modified to help incorporate urban agriculture into planning. In many cases it might even be easier to implement agricultural land-use than housing schemes. Land sharing could be a model for public-private partnerships as well. These can be partnerships between electricity companies, waste and health departments or councils and community gardeners.

Power lines are non-housing areas in most countries and are known to be potential illegal waste disposal sites, similar to riverbanks. Community gardens can prevent such areas from pollution as examples form Tanzania prove.

Recycling of organic solid waste is an effective and sustainable way of improving soil fertility and minimising disposal space and costs as well as creating income and as such reducing poverty. Decentralised composting facilities may constitute another form of public private partnerships that would be most desirable (Drescher, A.W., 2001).

Participatory planning

> *"In order to understand the urban and periurban planning process one needs to know who the stakeholders are and how they manage to have their interests reflected in the plans that are implemented after all. Some stakeholders are always stronger than others and though one tends to think that big real estate development agencies, public or private, tend to be the strongest this is not necessarily the case. Individually weak stakeholders such as small-scale market gardeners have often proved to be able to get organised around a common interest. This enabled them to have plans revoked that ignored their interests and have these adjusted to their needs" (van den Berg, Leo, 2000).*

It is proposed that the focus of planning for cities should shift from central government control and the international realm to local personnel and institutions concerned with urban issues who should be given a greater say in decision-making and policy implementation. Towards

this end, a balance between public and private sector initiatives, along with local responsibility and central control should be forged. (United Nations Population Division, 1996).

Participatory urban planning is a new, most complex and difficult process. Many stakeholders have to be involved. Experience from many cities in Europe show the difficulties of this process, now embedded in the Local Agenda 21. Communities often organize themselves when they face a common threat or need. As soon as the threat is over the community organisation falls apart (Dowall, David & Clark Giles, 1997). Nevertheless community organization, capacity building, and access to finance remain the two key issues in participation. To provide means for land development, communities could be supported through the establishment of savings and credit schemes e.g. “mini banks for the poor” (Dowall, David & Clark Giles, 1997) or community based saving agreements[•)].

Participation requires extensive information and communication, as well as consultation and moderation. There is a need to develop platforms for all stakeholders, which should, at least initially, be of an informal nature. The primary goal should be to define their common problems and seek solutions that would bring about improvement to all (van den Berg, Leo, 2000). Often stakeholders have different priorities from urban planners[••)]. With regard to urban agriculture, in most countries urban farmers are not at all organised and therefore do not have political power. Women farmers have other interests and approaches than male farmers. Agricultural production by women is often household-based and therefore less market oriented. Agriculture in cities is often scattered over small areas, which makes it even more complicated to get the farmers organised. Major activities should therefore be directed towards the empowerment of urban farmer groups. The international support group for urban agriculture (SGUA) and the national networks on urban agriculture (e.g. the Latin-American Network AGUILA) might play a key role in the formation of national urban farmer associations.

Technical tools for land use planning

In spite of all ongoing research on urban agriculture, little is known, in most of the world’s cities, about the actual extent of urban agriculture in terms of inner city areas used for agricultural purposes. Also, little is known about the spatial distribution of urban agriculture in the cities. Many questions arise: Where do urban agricultural activities concentrate and why, who is involved, what kinds of crops are grown and by which groups of city dwellers, which kinds of soils are occupied, how is water availability and quality, what is the distance to markets?

Therefore we face a lack of data and knowledge concerning the extent, the importance, the development and the output of urban agriculture. Geographical Information Systems (GIS) have been widely used for urban planning purposes for decades.

Some limited experience with the application of GIS to urban food production activities is already existent, e.g. from Santiago de los Caballeros (Dominican Republic), Hubli-Dharwad (India), Kumasi (Ghana) and Dar es Salaam (Tanzania), (Del Rosario, P. J. , Y. Cornelio, L.Y. Polanco, A. Russell, H. López & P. Escarramán 1999). GIS are used for urban planning and

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[•)] These are observations made in Dar es Salaam

[••)] This is an observation from the Dominican Republic: First and most important goal was the improvement of the social capital of the community in order to keep the youth staying within the community. Another important goal was raising awareness of the cultural capital of the community.

open space mapping but also for monitoring loss of agricultural land within city boundaries or measuring urban greening indicators, (Idbamerica ONLINE 1998). GIS will allow planners to monitor changing urban food production trends more easily as cities continue to undergo rapid changes, (Dongus, S. & A.W. Drescher, 2000).

Nevertheless the institutional problem of planning becomes obvious when using GIS. Efficient planning requires the linkage of different data on space, infrastructure, markets, health, soils, water, waste, socio-economy, agriculture etc. that operate under the responsibilities of different, separate departments. Furthermore, the technical premises are often missing and users of the GIS lack know-how. Another interesting open question in this context is if the use of GIS can increase participation in the planning process, (Nedovic, Zorica . 1999).

Programmes and concepts which could facilitate the integration of urban agriculture into urban land use planning

> *A fundamental step in order to set the right conditions for city farming is to develop an urban agriculture plan and policy, recognising the interrelated nature of food, agriculture, health and ecology by forming a municipal working group that can deal with food issues from a total system perspective. This could involve, among others: the health department, planning department, engineering, local economic development, water management and waste management. Following this, the urban agriculture plan should be incorporated into the land-use planning system. This implies that urban agricultural activities are recognised as major components of green zoning systems, for which a dedicated policy must be formulated, developed and implemented. (Deelstra, Tjeerd and Herbert Girardet .1999)*

Sustainable urban development

The discussion on sustainable development is mainly based on the 1992 UN Rio Conference and includes urban areas. This has resulted in various programmes for sustainable urban development like HABITAT and the Urban Management Programme (UMP).

The international justification for the integration of agriculture into urban planning is laid down in the 1992 Rio Conference and the Local Agenda 21. Especially the land tenure aspects in poverty alleviation and the gender perspectives of sustainable development are developed in some detail.

Agenda 21: Human Settlement (1992)

- Strengthen community-based land-resource protection practices in existing urban and rural settlements;
- Establish appropriate forms of **land tenure which provide security of tenure** for all land-users, especially indigenous people, women, local communities, **the low-income urban dwellers** and the rural poor;
- Accelerate efforts to promote **access to land by the urban and rural poor,** including credit schemes for the purchase of land and for building/acquiring or improving safe and healthy shelter and infrastructure services;

- Develop and support the implementation of improved land management practices which deal comprehensively with potentially competing **land requirements for agriculture**, industry, transport, **urban development**, green spaces, **preserves and other vital needs;**
- Promote understanding among the policy makers of the adverse **consequences of unplanned settlements** in environmentally vulnerable areas and of the appropriate national and local land use and settlements policies required for this purpose.
- "Support, inter alia, community projects, policies and programmes that aim to **remove all barriers to women's access** to affordable housing, land and property ownership, economic resources, infrastructure and social services, and ensure the full participation of women in all decision-making processes, with particular regard to women in poverty, especially female heads of households and women who are sole providers for their families."
- "Promote awareness campaigns, education and enabling practices regarding, in particular, **legal rights with respect to tenure, land ownership and inheritance for women,** so as to overcome existing barriers."
- Governments also committed themselves to the goal of gender equality in human settlements development, including "**integrating gender perspectives in human settlements related legislation, policies, programmes and projects** through the application of gender sensitive analysis".

Urban agriculture could play a major role in sustainable city development by creating open green spaces, increasing the urban habitat diversity and thereby biodiversity in cities, reducing noise and pollution, closing the energy loops and making cities more habitable. On the other hand, the negative impact of urban food production on the environment is seen as a major constraint to this type of activity. The impacts, negative or positive, are dependent on the type of production, the intensity and the degree of linkages between production types. Urban livestock production, if not integrated into urban horticulture or forestry, can harm the environment through the accumulation of animal wastes. Misuse of fertilisers and pesticides in intensive production systems are likely to pollute consumers, water and soil resources (Drescher, A.W. & D. Iaquinta,1999).

Table 2: Dimensions of sustainability of Urban Agriculture (van den Berg, 2000)

	Environmental	**Economic**	**Social**
Synergy	- plant nutrients in urban waste & sewage; - health aspect in context of 'urban greening'	- access to inputs & markets - amenity - employment & poverty alleviation	- meeting human needs for green (recreational) urban space
Conflict	- urban pollutants in agricultural produce - agrochemicals in urban environment - urban greening & nature-borne diseases	- competition from urban land use systems - vandalism & theft	- negative perceptions of (peri-) urban farming

Negative effects of urbanisation on UPA are obvious: Pollution of production sites by solid and liquid waste, air pollution, occupation by buildings, deforestation, soil compaction and ground water depletion are major threats to urban food production. As opposed to other commercial or private activities in cities, urban food production has never been addressed properly by legal regulation and planning. One vision of a sustainable city results in the concept of the "Ecopolis" strategy which can be understood as an extension of the Garden City concept. In the Netherlands for example, the Ministry of Agriculture propagates "green strategies for the urban landscape", including the introduction of urban agriculture, (Trenaor, Paul. 1998). Positive experience has been made by the Latin American Urban Management Programme (UMP-LAC), which recently started municipal consultations on urban agriculture.

“New Urbanism” and the Urban Greening concept

The goal of “New Urbanism” is to reverse the trend of "urban sprawl" by learning from traditional urban development patterns and thereby preserving open spaces for natural habitats, active recreation, and productive agriculture, (Mclaughlin, Richard, 1997). While urban greening is often understood as the re-establishment of trees in cities e.g. to reduce heat island effects and to improve the urban microclimate, a more comprehensive understanding of the concept needs to incorporate urban agriculture. The Japanese government, for example, passed a law in 1991, recognising the advantages of open spaces, on the 're-establishment of green spaces'. Recently, more local government bodies and farmer associations have declared an interest in working together with city dwellers to reinvigorate urban agriculture (Akemine, Tetsuo, 1999).

Planners’ support to urban food production

The little information available on the thinking of urban planners with respect to urban agriculture identifies at least some key issue felt to be important to them (Pothukuchi, Kameshwari & Jerome L. Kaufman 2000), (van den Berg, Leo 2000), (Quon, Soonya, 1999).

- The preservation of agricultural land,
- Changing land use and zoning related to food access,
- The integration of food issues into economic development activities and
- The mitigation of the environmental impacts of the food system.

The World Bank recently tackled the question of urban agriculture within the discussion on urban poverty. Urban agriculture can be supported with respect to planning by Baharoglu (Kessides, Deniz & Christine, 2000):

- Reviewing the land-use planning and zoning decisions and adopting more flexible regulations. Regulations may need to be reviewed to see the extent to which they are relevant to urban poor and the city’s current economic and social context. In cities where urban agriculture is a common subsistence strategy, more flexible regulations could be adopted to help the poor develop urban agriculture rather than prohibiting it.
- Developing and disseminating information on land tenure and land capacity.
- Providing basic infrastructure, and developing and implementing environmental/public health measures against parasites and pests.

Additionally the North can assist the South by:

- Mobilizing the well organized urban agricultural associations in Europe and North America to take a more active part in Third World development by:
    - Lobbying in their respective national donor agencies to become involved in this field; and
    - Building links with non-governmental organizations in developing countries and offering institutional advice and support (Greenhow, Timothy, 1994).

> *"Urban agriculturalists are a creative and ingenious group of people, with or without support of planners and other institutions, they will continue to garden, either out of necessity, or out of the sheet joy of it. It would be better to recognize, support, and direct their contributions to sustainable communities than to pretend they are not there, or worse, to deliberately undermine them" (Greenhow, Timothy, 1994).*

Some approaches have been made e.g. by the American Community Garden Association which has developed guidelines to implement allotment gardens (American Community Garden Association, 1998). Part of these guidelines might be useful for developing countries as well. The transferability of the European allotment systems is recently propagated at various conferences in developing countries and countries of transition (Drescher, A.W., 2001), (Chatwin, Mary Ellen, 1998).

To achieve better recognition and protection of allotments, local authorities need to keep better information about the demand for, and supply of, allotments. Planning departments and allotments management services need to work more closely together and planners need to prepare more proactive allotment strategies to demonstrate commitment to allotments. They also need to include indicators on allotment provision in state of the environment and other environmental audit reports (Local Government Association, 2001).

"Planning needs pressure". This is a major outcome of the planning workshop of FAO/ETC Electronic Conference on "Urban and periurban Agriculture on the Policy Agenda" (Drescher, Axel W., Rachel Nugent & Henk de Zeeuw, 2000). Experience shows that a strong interest group should be involved in the protection ***and*** retrieval of open urban space. Legal regulations are needed to achieve land-security for urban farmers. In many European Countries and North America this was achieved through the formation of urban farmer associations. Nevertheless the conservation of urban open space for cultivation and recreation involves a continuous battle with an expanding city and different interest groups.

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land use planning

Dominican Republic

Urban agriculture is a new element in the discussions with city government officials in Latin America. Scaling up of activities requires land-use planning municipal policies, as well as specific technical, financial and legal incentives, laws or regulations related to land tenure, access and land taxation. The municipality of Santiago de los Caballeros, in the Dominican Republic, aims to promote a more coherent and effective inclusion of urban agriculture citywide through municipal

management and land-use planning policies, mechanisms and instruments, with the objective to support local environmental management, and strategies for poverty reduction.

Akemine, Tetsuo **(1999). Alternative urban development and farming: the role of urban agriculture in Japan. In: Gate: Technology and Development no. 2 (April-June 1999) p. 21-24**
land use planning
Japan; urban planning; multifunctional land usee; urban policies

Urban planning and industrialisation have had a huge impact on Japan's farmland. Nevertheless, a patchwork of urban spaces and farmland remains within many built-up areas. These spaces are not only used for agricultural production but also offer vital opens spaces in the case of earthquakes and fires and places of refuge in the case of a major conflagration. The government passed a law in 1991, recognising the advantages of open spaces, on the 're-establishment of green spaces'. Recently, more local government bodies and farmer associations have declared an interest in working together with city dwellers to reinvigorate urban agriculture. (NB)

Bernstein, Janis **(1994). Land use considerations in urban environmental management. Urban Management Programme Policy Paper no. 12. Washington, D.C.: The World Bank, 1994. 99 p.**
land use planning
land use; urban development; environmental management; land tenure; land use policies

Balancing environmental and economic objectives requires a land management strategy that facilitates the land market and protects sensitive land and cultural resources. The paper presents the most promising land management approaches and instruments for protecting sensitive resources, managing hazard-prone areas, conserving open space, discouraging excessive urban sprawl, and managing prime agricultural land. Of particular relevance is an annex that reviews land management instruments to meet environmental objectives, including regulatory and economic instruments, property rights, and land acquisition alternatives. (adapted from original by JN)

Berg, Leo van den **(2000) Urban Agriculture as the Combination of two Impossible, though Sustainable Trends.**
land use planning
Netherlands, sustainability

Despite the increasing attention to urban agriculture world-wide, there is a great deal of scepticism surrounding the concept. This paper gives a review of recent studies in The Netherlands and some African Countries. The two trends refer to urban growth through which rural agriculture becomes urban and urban residents turning to

farming as a niche in urban survival. The question is why these trends, which have been there for a long time, suddenly become fashion.

Blake, B; Adam, M.; Pender, J **(1998) Where land is gold: natural resources under pressure around Kumasi, Ghana. 2 p. Department for International Development (DFID), Natural Resources Systems Programme.**
land use planning
Ghana; urbanisation; sustainable development; natural resource management; economic marginalisation; urban poor

Rapid, largely unchecked, urbanisation of Kumasi has called an end to its claim of being the 'Garden City of West Africa'. As a result, land use patterns have become very complicated. This paper examines how sustainable management of natural resources together with improvements in agricultural productivity and energy recycling might be achieved. The conclusion is gloomy: a troubled situation that is increasingly unfavourable to poor people who inhabit city limits. (WB)

Blanc, Cyril **(1998). Les espaces agricoles et naturels dans les schémas directeurs: gros plan sur 14 agglomérations. Rambouillet, France: Bergerie Nationale, Département Périurbain. Looseleaf collection of 16 booklets.**
land use planning
France; metropolitan area; master plans; land use policies; agricultural zones; natural spaces; agricultural preservation

This collection of reports is a unique document. It brings together in one collection an evaluation of how the master plans that govern the metropolitan areas surrounding fourteen selected French cities (not including Paris) take into account non-built land uses. The two main categories considered are agricultural spaces and green open (“natural”) spaces. The 14 cities are: Brest, Clermont-Ferrand, Le Havre, Le Mans, Lille, Lyon, Marseille, Nancy, Nantes, Orléans, Rennes, Tarbes, Toulouse, and Tours. Each document (ranging from four to twelve pages) includes a brief historical evaluation of how this consideration has evolved in time across different master plans. The four booklets are complemented by a synthetic booklet of sixteen pages and a booklet containing 25 pages worth of illustrations from the 14 cities. The latter demonstrate vividly, not only the variety of ways in which agriculture (and its conservation) have been regarded in different agglomerations, but also the range of graphic techniques used to represent this consideration in master plans. (JN)

Bourque, Martin **(2000). Policy options for urban agriculture. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 119-145. DSE, GTZ, CTA, SIDA**
land use planning
urban policies; urban planning; policy tools; planning processes; international development policies

Urban farming is in most cities a relatively new trend providing jobs, food and green spaces. Urban farming is especially growing in the poorest sections of towns as a direct result of increasing disparity between the rich and the poor. The initiative for urban agriculture has come almost entirely from communities where it is found, while in some cases e.g. NGOs aid agencies provided important resources. The paper explores policy options for urban agriculture and useful tools. It examines policy conception and constraints of modern planning processes and strategies overcoming them. Lastly international development policies at the root of the problems urban agriculture addresses are discussed. (NB)

Boyd D., Deelstra, Tjeerd. and Biggelaar, M. van den **(2001) Opportunities for Integrating Urban Agriculture into Urban Regions in Developed Countries. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning

Netherlands; zoning; multifunctional land use

Politicians and planners are faced with many competing claims for the use of scarce land in and around cities in industrialised countries. Multifunctional land use – combining different functions within one area – offers a solution. The sole function of agriculture in industrialised countries has until recently been seen as food production. On the basis of a case study in the heavily populated west of the Netherlands, the authors demonstrate that urban agriculture can be promoted in industrialised countries by regarding it as one element of a land-use combination that offers other valuable functions to society.

Brook, Robert M.; Dávila, Julio (eds) **(2000) The periurban interface: a tale of two cities. 251 + vii p. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK; Development Planning Unit, University College London, UK London: DFID**

city ecology land use planning waste recycling

natural resources; periurban agriculture; Geographic Information Systems; Ghana; India

A publication written in the framework of research conducted by the Natural Resource Systems Programme of the UK Department for International Development (DFID) on natural resources in the 'periurban interface'. It describes research conducted in two city-regions: Kumasi, Ghana, and Hubli-Dharwad, India. An exhaustive comparison is made between the national development of India and Ghana and between the two cities, in terms of spatial, human and economic development, but also with regard to the institutional framework under which the periurban interface has developed in recent years and to the decision-making processes that are likely to shape the future of the interface. The resources base of the two cities is examined considering cropping and livestock systems, and soil, water and waste management, and how the urbanisation process has affected these. Also, there is a chapter on comparing livelihood strategies of poor families in

the two cities. Geographical Information Systems (GIS) play an important role in the research conducted by the NRS Programme and receive much attention in this publication. The strength of this tool for planning and analysis in a rapidly changing environment is clearly demonstrated, notably for the case of Kumasi. (WB)

Brouwers, Joost; Harms, Eric; Juffermans, Jan; Koetsenruijter, Willem; Perebooms, Harrie **(1998). De duurzame stad.131 p. ISBN 90_75365_11_X. De Kleine Aarde**
city ecology land use planning
urban transport; wastewater; waste recycling; sustainable building; renewable energy; green management

In 50 cases from Holland and elsewhere in Europe sustainability in urban development is discussed. Themes included are spatial use, traffic, water, climate policies, waste, sustainable building, use of solar energy and green space management. In the last chapters exemplary municipalities and promising developments are presented. (NB)

Buceo, A **(2001) The Political Ecology of Urban Agriculture in Mexico City: An actor-oriented Approach to Explore the Links with Urban Planning. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology land use planning
Mexico; actor oriented approach; urban planning

In Mexico, lifestyle and culture rooted in prehispanic traditions have survived through activities such as agriculture. The new urban environment has transformed the spatial and political conditions upon which such agriculture takes place. In this paper a framework is presented to point out the relevance of a political ecology of urban agriculture, in other words to highlight the importance of an actor oriented approach in understanding the link between urban planning and urban agriculture. Secondly this approach is used to refer to Mexico City's farmer's interplay in the context of a local and global politicised environment.

Cabannes, Y and Dubbeling, Marielle. **(2001) Urban Agriculture and Urban Planning: what should be taken into consideration to plan the city of the 21st century? In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning food security and nutrition
Latin America; poverty; municipal planning

This is a synthesis paper, providing elements for discussion on the topic of urban agriculture and urban planning, what should be taken into consideration to plan the city of the 21st century. The paper will be based on research currently going in 10 Latin American cities, systematising and analysing experiences with municipal urban agriculture policies and its recommendations regarding policies, norms, mechanisms or structures as well as technological options to transfer or adapt these initiatives elsewhere in the Latin American and Caribbean Region. The analysis will be differentiated per ecosystem and city size involved.

Visual (video, slides) documentation supporting the synthesis paper In its programme “Urban Agriculture and Feeding the Latin American and Caribbean Cities” the Urban Management Programme for the LAC Region and IDRC-Cities Feeding People, are systematising 6 successful city experiences with municipal urban agriculture policies (as well as describing the conditions and processes that contributed to the success of these municipal policies and interventions) and implementing 4 baseline studies on the presence, potentials and obstacles to a sustainable UA development in the 4 cities.

Cavric, B.I., Mosha, A.C. **(2001) Incorporating Urban Agriculture in Gaborone City Planning and Development: A Case Study of Glen Valley. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning
planning; Botswana; zoning

Today, the scale of urban agriculture (UA) in Botswana’s urban settlements is very limited comparing to the intensive agricultural practices found in other Southern African cities like Nairobi, Dar Es Salaam, Lusaka, Harare or Johannesburg. Current UA activity can be traced in the form of keeping small livestock, chicken, piggeries or limited arable farming in residential areas or much-larger along river valleys traversing periurban areas of the major towns. However, in the capital of Gaborone, one of the fastest growing cities in Africa, a few agricultural projects have been started and integrated into its urban development. The aim of this article is to give more details on this improvements using a case study of Glen Valley that is a typical example of urban agriculture integration into urban planning.

Chaipa, I. **(2001) The Urban Planning Dilemma in Harare, Zimbabwe. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning
Zimbabwe, planning

The growth and geographical spread of urban agriculture in Zimbabwe is largely attributed to the harsh effects of economic structural adjustment programmes (ESAP). The negative impact of ESAP has been manifest by the erosion of basic wages, escalating prices of basic commodities and the widening of the gap between rich and poor households. Studies by ENDA-Zimbabwe indicated that the total land under cultivation in the City of Harare increased dramatically, by 92.6% between the

years 1991-1994. This period coincides with the early phases of ESAP launched in 1991. The land under cultivation has also increased under the economic hardships of the last years. The paper argues that responsiveness and actions of urban local authorities in addressing the pressing needs of the urban community has become of utmost significance.

Clichevsky, Nora**, (2002), Tierra Vacante en Las Ciudades Latinoamericanas. (Vacant Land in Latin American Cities) National Council for Scientific and Technological Research of Argentina, ISBN 1-55844-149-2; Supplier: Lincoln Institute of Land Policy, Information Services, 113 Brattle Street, Cambridge, MA 02138-3400 USA**

land use planning

vacant lands; cities; urban planning; urban management, Argentina, Brazil, Peru, El Salvador, Ecuador, America (Southern), America (Central)

This book identifies the many problems related to vacant urban land, as well as the opportunities that it presents. The anthology is the culmination of an Institute-sponsored research project coordinated by the editor between 1997 and 1999. Using a common methodology, researchers analyzed and compared the issues around vacant land in five cities: Buenos Aires, Argentina; Rio de Janeiro, Brazil; Quito, Ecuador; Lima, Peru; and San Salvador, El Salvador.

A great variety of vacant land situations coexist in Latin American cities, but there are common threads throughout the region. The problems derived from vacant lots include increased costs for the provision of infrastructure in low-density areas, as well as long commutes and high transportation costs related to growth further from the urban center. Additionally, as long as significant amounts of urban land remain unoccupied, equally important numbers of poor urban residents will continue to occupy land lacking infrastructure of services, located in areas not appropriate for urban development. This pattern both creates precarious habitats and deepens the processes of socio-spatial segregation.

This anthology is an important contribution to incorporating this topic into the urban policy debate in the region. The essays suggest that, at this moment when urban planning and management are being refined in many Latin American countries, vacant land could play an important role in the dynamics of cities and metropolitan areas. The creative use of vacant land could be beneficial to all social sectors, if its management forms part of the society's broader policies of urban equity. The editor formulates a number of recommendations toward this end.

Darmajanti, Erwina **(1994). Integrating informal city farming practices into green space management: a study of the case of Jakarta, Indonesia. York University Canada; Masters thesis, 96 p.**

land use planning

Indonesia; land use; periurban agriculture; forestry; pollution; informal sector; policy

This study has an overarching aim of integrating urban agriculture into the open

space and ecology systems of the metropolis, and considers its role in the lives of the urban poor, particularly migrants. It defines as policy areas: (i) employment, (ii) nutrition, (iii) food security, (iv) urban greening, (v) prevention of squatting. (JS)

Dengu, Ebbie; Mugova, Alex **(1996). Urbanization and land policy in Zimbabwe. In: Appropriate Technology vol. 23 (1996) no. 1 p. 5-8. Intermediate Technology Zimbabwe, PO Box 1744, Harare, Zimbabwe**
Supplier: Intermediate Technology Publications
land use planning rural-urban linkages
housing; urban infrastructure; land tenure; tenure rights

In the light of the recent events in Zimbabwe with regard to land tenure rights, this article gives important background information. The land division dating back to the land Apportionment Act of 1930, has led to deterioration of agricultural productivity of the Tribal Trust lands and, hence, to urban migration. The article describes how Harare's infrastructure, especially, has been unable to cope with this influx of people. (WB)

Deswarte, Daniel **(1999). Le devenir des espaces agricoles et naturels en zone périurbaine. Paris: Conseil économique et social de la région Ile-de-France. 305 p.**
land use planning
France; ; agricultural preservation; land use policies; agricultural zones; natural spaces

This important document is exemplary of how agricultural zones (as well as “natural” open spaces) have entered into a new phase of being seriously taken into account – and in a complex, nuanced way – by public authorities in certain metropolitan areas in Europe. The document hence combines a thorough report prepared on behalf of the Commission for Agriculture, Rural Planning and Environment for the Ile-de-France (France’s capital region) with an official decree by this region’s Economic and Social Council, based directly on the report. The report itself (305 p. + 8 p. of cartographic annexes) is in three parts. Part 1 assesses the current conditions of periurban agricultural and natural spaces around Paris. Part 2 evaluates the context (demographic, economic, social, the actors, legislation, regulations, national policy, European policy) for these spaces; a typology is developed based on this. Part 3 then develops proposals for how these spaces can best be maintained and used (including a ranges of instruments to that effect). (JN)

Dimanlig, Horacio C **(et al.) (1979). Urban agriculture: an approach to landscaping for marginal settlements. 36 p. United Nations Environment Programme (UNEP) , National Housing Authority (NHA)**
land use planning city ecology
Philippines; settlement areas; urban planning; urban landscaping; urban vegetation; planting materials

A landscaping manual dealing with physical aspects of the housing landscape in the Philippine setting and with applying urban agriculture or, more generally, introducing vegetation into the urban environment, 'the soft landscape'. There is a detailed descriptive list of suitable plant materials for this purpose. (WB)

Dixon, J. and A. Gulliver with D. Gibbon **(2001) Farming Systems and Poverty: Improving Farmers' Livelihoods in a Changing World. FAO and World Bank.**
land use planning
livelihoods; farmers; poverty; farming systems

The book Farming Systems and Poverty: improving farmers' livelihoods in a changing world presents the results of a joint FAO and World Bank study which contributed to the updating of the World Bank Rural Development Strategy. Small farmers produce much of the developing world's food. Yet they are generally much poorer than the rest of the population in these countries, and are less food secure than even the urban poor. Furthermore, although rapid urbanisation is taking place in many developing countries, farming populations in 2030 will not be much smaller than they are today. For the foreseeable future, therefore, dealing with poverty and hunger in much of the world means confronting the problems that small farmers and their families face in their daily struggle for survival. Investment priorities and policies must take into account the immense diversity of opportunities and problems facing small farmers. The resources on which they draw, their choice of activities, indeed the entire structure of their lives, are linked inseparably to the biological, physical, economic and cultural environment in which they find themselves and over which they only have limited control. While every farmer is unique, those who share similar conditions also often share common problems and priorities that transcend administrative or political borders.

Donadieu, Pierre **(1998). Campagnes urbaines. École Nationale Supérieure Du Paysage. Arles: France, Actes Sud. 219 p.**
land use planning city ecology
France; periurban agriculture; landscape; leisure; neighbours; multifunctionality; urban planning

This book on “urban countryside” addresses the central question: rather than to seek to no avail to control the growth of the city through webs of belts, barriers and green spaces, why not construct the urban fabric *with* agricultural and forested spaces? It therefore proposes that periurban agriculture could be considered by metropolitan planners as a planning tool that is capable of organizing sustainably the territory of cities. Widely illustrated with color photos and examples from across France, the book (by the co-director of the Urban Agriculture Program at the *Ecole Nationale Supérieure du Paysage* in Versailles) is exemplary of contemporary French literature on urban agriculture, particularly appropriate more developed countries. (adapted from original by JN)

Dowall, David; Giles, Clark **(1997). Urban Land Policies for the Uninitiated.**

Economic and Social commission for Asia and the Pacific (ESCAP). Also at: http://www.unescap.org/huset/land_policies/
land use planning
land use; policy; urbanisation; planning; poverty alleviation planning

This publication is meant for administrators and decision-makers that are no expert in urban land management. It focuses on concepts and issues in urban land and on possible policy tools to address these issues. A special emphasis is placed on increasing the access of the poor to the formal land and housing markets. It explains concepts and terminologies such as, land markets in the urban economy, political aspects of land development and management, land development and poverty alleviation, land tenure, land speculation and land registration, planning tools, legislative and fiscal tools, slums, squatter settlements, illegal subdivisions, increasing supply of and effective demand for land for the poor, objectives of urban land policies. This paper provides very useful information on the different terms and strategies used in urban planning [from original by AD and comments added]

Dowall, David; Giles, Clark **(1991). A framework for reforming urban land policies in developing countries. UNCHS/UMP Nairobi, Kenya 53 p.**
land use planning
land use; policy; urbanisation; planning

This report presents a global overview and specific cases of the range of policies and legislation involved in urban land use regulation. It outlines a variety of guiding principles and offers a six-step framework for reforming urban land use policy and management. (JS)

Governments around the world pursue urban land policy objectives, and they rely on a vast range of policy tools and institutions to achieve them. Many cities use master plans, zoning, subdivision regulations, building codes, and other public policies to shape development. These regulations are normally adopted to help protect the urban and natural environment, gear infrastructure investments with development, and maintain and enhance property values. Other objectives are more difficult to achieve; providing the poor with access to land, controlling land speculation, and land inflation. In the minds of many policy makers achieving these goals requires stronger medicine; nationalization of land, public land development, and highly centralized property registration systems to control and monitor land ownership.

The purpose of this paper is to challenge much of the conventional wisdom about the indisputable desirability of government intervention into urban land markets and to argue for a reduction in the scope and direction of public policies and actions. It is written for a wide audience of policy makers concerned with urban development. The paper concentrates on defining the critical land policy issues and offering what can be only considered a preliminary set of guidelines for carrying out urban land policy reforms. Most of the guidelines imply major political decisions and commitments on the part of governments, especially clear support for deregulation and privatization. The steps to reform include: land market assessment, decentralisation of land management authority, deregulation of urban land policies and regulations, curtailing of public land development agencies, improving efficiency of land market operations

and provision of financial, institutional and spatial structure for installing infrastructure networks. [from original by AD]

Drescher, Axel W. **(2001) Technical tools for urban land use planning. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology land use planning
planning; Geographic Information Systems

In spite of ongoing research on urban agriculture, in most of the world's cities, little is known about the actual extent of urban agriculture in inner city areas. Also, little is known about the spatial distribution of urban agriculture in the cities. Many questions arise: Where do urban agricultural activities concentrate and why, who is involved, what kinds of crops are grown and by which groups of city dwellers, what is the contribution of the product to nutrition and food security, which kinds of soils are occupied, how is water availability and quality, what is the distance to markets?

An important and so far in many countries unsolved problem are appropriate methodologies to integrate agricultural activities in cities into urban planning processes.

Driss, Ben Ali, Di Giulio, Antonio, Lasram, Mustapha & Lavernge, Marc **(1996). Urbanisation et agriculture en Méditerranée: Conflits et Complémentarités. Editions L`Hamattan, Paris (Histoire et perspectives Méditerranéennes.**

land use planning rural-urban linkages food security and nutrition
land use; policy; urbanisation; planning; Mediterranean ; environment rural-urban linkages environment

This publication is a collection of articles on urbanization and agriculture in the Mediterranean. Most of the articles are in French, some in English. Maps, pictures, and tables enrich the book a lot. In the first part the book deals with problems of urban planning mainly from experience of Magreb countries. The multifunctional character of urban agriculture is pointed out by one article. This paper propose a systematic mode of representing agriculture through a set of indicators, meant as a tool for choosing appropriate planning strategies. In the second part the book deals with specific problems caused by the conflict between urbanization and agriculture, like e.g. water problems and other environmental problems. In the last part the book mainly deals with rural urban linkages [AD].

Dubbeling, Marielle., Loor Bravo, J., Llerena Cepeda, M. **(2001) The El Panecillo Pilot Project in Quito. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning
Ecuador; planning

The Municipality of Quito is challenged by demands to eradicate urban poverty, to improve the urban environment and to promote a participatory style of governance. Urban agriculture is a potential source of food, income and employment, and is part of a multifunctional use of land, and therefore has an important and strategic role to play in this development. By way of a participatory city consultation on urban agriculture, the municipality embarked upon a process of institutionalising urban agriculture. This consultation was followed by the formulation of an action plan, later implemented into a specific action programme which presently forms a pilot project. It is envisaged that this will be implemented throughout the entire Metropolitan District of Quito.

Duran L.S., Batac, J.H.., Drechsel, P.. **(2001) Planning in a Changing Environment: the Case of Marilao in the Philippines. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning waste recycling community development
planning; Philippines; waste; compost

Marilao is a municipality with approximately 15,000 households located on the fringe of Manila in the Philippines. A few years ago, Marilao's authorities faced a typical periurban dilemma. With only 2,625 hectares of land area, just five kilometres from Metro Manila, Marilao's mayor could not find affordable land for a new waste disposal site. There were more than 850 business firms and housing projects that competed for the use of municipal land. Not only the problem of where to bring the waste was a problem, also what to do with recycled waste and changes in policy and urban management needed to be tackled. This paper describes the process set in motion by the Marilao authorities.

Fazal, Shahab **(2000). Urban expansion and loss of agricultural land: a GIS-based study of Saharanpur, India. In: Environment and Urbanization Vol. 12 No. 2 London and Buenos Aires p. 133-150**
land use planning
remote sensing; Geographic Information Systems; land use; urbanisation; India

This paper uses GIS data (aerial photos and satellite images) combined with field checks and surveys, to measure the loss of agricultural land to urban expansion in a middle-sized Indian city between 1988 and 1998. It identifies how such techniques allow a detailed mapping of land use changes. It includes details of the loss of productive agricultural land, the nature of the land use change, and also descries which non-agricultural uses were the most consumptive. It concludes with a discussion of the long-term implications for India and other industrializing countries. (JS from authors)

Fernandes, Edésio; Varley, Ann **(eds) (1998). Illegal cities: law and urban change in developing countries. 256 p. ISBN 1_85469_550_7 (pbk). GBP 14.95. Institute of Commonwealth Studies, University of London, UK**
Supplier: Plymbridge Distributors, Estover, Plymouth PL6 7PZ, UK
land use planning
land use rights; land tenure; urban housing

Provides an important overview of the role legislation and legal institutions play in the way open spaces are occupied in cities. Much of the content is about how urban poor gain access to urban land and housing in the margin of the law. Issues addressed are of a wide range: How is illegality perceived? How are property rights and public control of land use defined? How do informal settlements occur and how are they regularised? How does customary law operate? How secure are land tenure rights in reality? Such questions have often met with uncritical treatment in traditional legal studies. Therefore, this is an important book that brings law and urban change to the attention of a wider audience. After an introductory part setting the framework for urban legal research and the research record thus far, the remainder of the book is devoted to twelve case studies from major cities in Asia, Africa and Latin America. (WB)

Fisher, A **et al (1998). Local Food Policy. Community Food Security Coalition**
community development land use planning food security and nutrition R&D methodology
policy; NGOs; community associations; United States

This manual includes: (i) Tips for Organizing Coalitions and Food Policy Councils, (ii) Inventory of Food-related Policies in Local Government, (iii) Action Ideas for Changing Local Policy, (iv) Tips for Operating Food Policy Councils and (v) Case studies of nine Food Policy Councils and Similar Organizations. It provides useful information for assessing how city and county policies affect food production and distribution, and how they can be changed to promote community food security. It is a valuable resource for activists, academics, policy makers and others working on food and agriculture at the community level. 75 pages, (JS adapted from author)

Fisker, A.M. **(2000) The cutting edge between Agenda 21, food, and design in the new millennium. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000.. (on cd-rom).**
land use planning food security and nutrition
food; Germany; design

Agenda 21 sets out priorities and strategies to stop and reverse environmental degradation and to stimulate sustainable development. The realisation of sustainable development requires new ways of thinking, but it often leaves the question of how the individual moves from the Agenda towards concrete action. The links between the single citizen/consumer, food/meal and the design of the physical room is the

central topic subject of this project, described here.

Fleury, André; Gonthier, Michel; Hamel, Jean-Maurice **(1998). Actes de la rencontre franco-québécoise: points de vue sur l'agriculture périurbaine contemporaine. Quebec: n.p., 1998. 36 p.**
land use planning city ecology
France; Quebec; periurban agriculture; farmland preservation; regional planning; landscape

This is a conference report on a meeting in October 1998 between planners, professors and students from France and the Quebec region of Canada, part of an ongoing cooperation between French and Quebecois universities on this topic. Participating students from one country all undertook internships in the other country and report on them here. It focuses on issues that regard the periurban areas surrounding cities, and how these parts of metropolitan areas can be planned for. It includes issues of land management, agrotourism, and multifunctional agriculture. (JN)

Foeken, Dick; Mwangi, Alice Mboganie **(1998). Does access to land have a positive impact on the food situation of the urban poor? A case study in Nairobi. In: East African Social Science Research Review vol. 14 no. 1 (1998) p. 1-15. 15 p.**
land use planning food security and nutrition rural-urban linkages
Kenya; urban poor; food security; land rights; access to land

Examines the vital issue of whether and how access to farm land influences the household's food and income situation. There is a general introduction into coping strategies of the urban poor as well as an interesting review of existing access rights to urban land in Nairobi. Interestingly, for this aspect hardly receives any attention at all, the authors also investigate the phenomenon of urban households realising part of their livelihood from rural sources, through access to rural land, in particular. Previous surveys had revealed that this was the case for Kenyan middle income groups, in particular. The land is not necessarily farmed by the urban dweller himself / herself: often, it is a member of the family. The authors conclude that having access to a rural plot seems to have a positive effect on income and that, in addition, they seemed to be better off than those with access to an urban plot. Mechanisms involved are not entirely clear, however. A paper with a refreshing view. (WB)

Foeken, Dick; Mwangi, Alice Mboganie **(1998). Farming in the city of Nairobi. ASC Working Paper no. 30/1998. 49 p. African Studies Centre, PO Box 9555, 2500 RB Leiden, The Netherlands**
city ecology land use planning
food security; nutrition; food policy; land use systems; health; economic impact; land tenure; urban policies; reuse of waste; poverty; Kenya; land use policies; agricultural production; land use policies; urban livestock; wastewater reuse

Urban farming can be seen everywhere in Nairobi, especially in informal densely populated residential areas, which do not exist on official maps. Three types of urban farming are distinguished: farming in backyards, farming in open spaces and farming in former rural areas surrounded by city expansion. The second type of farming is usually practised by the urban poor and there is ample open space in the city boundaries. A description is provided on the scale of urban farming, the urban farmers and the farming practises. Next the importance of urban farming and the constraints urban farmers face are presented. Lastly the prospects of urban farming are discussed, which include environmental and policy aspects and development efforts. To further develop urban farming the first step to be taken by the Nairobi authorities is to admit that the slum dwellers are a fact of life in the city, that policies directed at improving the living situation of the poor are needed and that urban agriculture should be part of such policies.

Gertel, Jörg; Samir, Said **(2000). Cairo: urban agriculture and visions for a 'modern' city. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 209-234. DSE, GTZ, CTA, SIDA**

city ecology urban livestock land use planning

urban livestock; food security; food policy; asset strategy; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; Egypt

Forms of urban agriculture in Cairo are related to its extremely high population pressure and the government policy, especially with regards to food subsidies. Green open space is scarce. Small-scale animal husbandry, such as chicken raising, is interesting as it provides for expensive proteins and can be practised in confined areas. In certain cases organic waste is used as cheap fodder to feed the animals. Most people engaging in urban agriculture are poor and production is mainly for subsistence purposes. A second element is that animals are important assets. The image of food produced in Cairo is not very positive and there are indications of health risks associated with urban farming. Scientist and authorities consider urban agriculture an oxymoron as they associate urban with modern and agriculture with rural and backward. It is believed that urban farming tarnishes the image of Cairo with negative implications for the modernisation of Cairo. Nevertheless to a section of the urban poor small-scale animal husbandry is of critical importance and is an important strategy to cope with food security in Cairo. (NB

Girardet, Herbert **(1999). Growing food in cities: assessing the potential of a long-standing tradition. In: Gate: Technology and Development no. 2 (April-June 1999) p. 4-9**

city ecology land use planning

economic aspects; natural resource management; recycling

Looks at some of the origins of urban agriculture and examines its present potential with examples from past and present. Urban agriculture has a long history as an important source of food for the masses. The article asserts the importance of creating a circular urban metabolism. (NB)

Greenhow, Timothy **(1994). Urban agriculture: can planners make a difference. Cities Feeding People Series Report no. 12. 19 p. International Development Research Center, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
land use planning
Lesotho; Botswana; Sweden; urban planning; planners' perspective

Examines the way city planners look at urban agriculture in 3 countries: Lesotho, Botswana and Sweden. The basic question is to what extent planning plays a role in influencing the spread of agriculture in urban areas. Gaborone, the author concludes, has neither the subsistence need nor the planning attitude conducive to widespread urban agriculture. In Maseru, inhabitants farm out of necessity and suitable preconditions exist favouring urban agriculture. In Stockholm, policy environment is such that urban agriculture is seen as a valuable component in a new approach to planning with the environment and the sustainable city in mind. The paper ends with a number of recommendations to urban planners. (WB)

Groening, Gert **(1996). Politics of community gardening in Germany. In: Urban Agriculture Notes on: http://www.cityfarmer.org/german99.html#german, 16 p. Supplier: City Farmer, Canada's Office of Urban Agriculture**
community development horticulture land use planning
community gardens; Germany; municipal policies

Gives quantitative data about community gardening in Germany and highlights difficulties in obtaining urban land for small gardens in Berlin, Germany. The paper examines implications of zoning law in Germany. There is an interesting historic overview of community or allotment gardens and their contribution to community development. (WB)

Groppo, Paolo **(ed.) (1995). Land reform: land settlement and cooperatives. FAO, Rome, 129 p.**
land use planning
land use; land tenure; cooperatives; sustainable development

This report presents the views of a few specialists carrying out a comparative analysis of different theories regarding the access to land in Africa. it concludes with an elaboration of a preliminary set of proposals to be submitted to different governments. (JS)

Groppo, Paolo **(ed.) (1997). (Special issue on urban and periurban agriculture) Land reform: land settlement and cooperatives = Réforme agraire: colonisation et coopératives agricoles = Reforma agraria: colonización y cooperativas vol. 1997 no. 2. 125 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy; Land Tenure Center of**

Wisconsin University, USA
land use planning services
land use; land tenure; horticulture

Contains articles describing cases on land use and land tenure issues. A number of contributions deal with food supply and distribution systems. This (double) issue of Land Reform reflects the intention of FAO's Land Tenure Service to constitute an interdisciplinary support and study group to mitigate effects of rural exodus at the same time through urbanisation of the countryside. (WB)

Gutman, Pablo; Gutman, Gabriela; Dascal, Guillermo**. (1987). El campo en la ciudad: la producción agricola en el Gran Buenos Aires. Informes de Investigación del CEUR, no. 6. Buenos Aires: Centro de Estudios Urbanos y Regionales, 1987. 155 p.**
economic impact land use planning
Argentina; periurban agriculture; land use; history; horticulture; vineyards

This is the report that presents the results of one of the pioneering studies in urban agriculture, conducted within the UN University's Food-Energy Nexus program. It describes the range of agricultural activities that can be found in Greater Buenos Aires. Prepared by prominent urban researchers, it emphasizes changes in land uses. One chapter is devoted to a historical overview of the city's urban expansion and its impact on agriculture. After a chapter describes the state of horticulture in the metropolitan area, one chapter presents a case study of a periurban sector known for its vineyards. The report contains many data tables and maps. (JN)

Harahi, Gamez Rodriguez **(1999). Agriculture in the Metropolitan Park of Havana, Cuba. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 84-89. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
city ecology land use planning
integrated urban development; ecology; deforestation; waste management; Havana; social impacts

This paper outlines the fundamental mission, objectives, goals, and strategic planning of the Metropolitan Park of Havana (PMH, an urban, social, and ecological project being developed around the final 7 km of the Almendares River, the most important river of the Cuban capital. The PMH is committed to integrating development, environmental recovery, education, and participation. The PMH will retain a dense urban network of industries, military entities, and population centres that today occupy the territory. As an ecological park, the PMH will provide a solution to the problems of deforestation in the zone, the uncontrolled social and industrial waste, and the general lack of care for the region that threatens the area's flora and

fauna and the River itself. As a social project, the PMH will provide a space for a population of nearly 9 000 inhabitants, who will be an integral part of the development planning of the park. (NB) (Abstract adapted from original)

Hassell, M. von **(2000) The Impact of Community Gardening Initiatives in New York City on Children In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning community development food security and nutrition
United States, children; anthropology; housing; poverty

This paper describes research of the author on the Lower East Side of Manhattan since 1989. Her current work on community gardens has developed out of research about a community-based initiative to renovate abandoned buildings. Community gardens on the Lower East Side emerged in conjunction with these housing initiatives from the early 1970s on. They must be understood in the context of fluctuations in the urban economy and attendant shifts in labor markets, housing availability, and market-driven struggles over space. There are approximately 950 community gardens in New York City, predominantly on city-owned land in neighbourhoods marked by poverty and deteriorated housing conditions. Many are contested and targeted by the current city administration as sites for development. In this paper the role of and impact on children in community gardens and community-based initiatives on behalf of these gardens in New York City are analysed. The focus was on food production, art, and education projects involving children in community gardens on the Lower East Side of Manhattan and on children's participation in marches and other events on behalf of the gardens.

Hietkamp, Fern **(1995). Opportunities and constraints for urban agriculture in Bandung, Indonesia. AURN working paper no. 7. 36 p. Asian Urban Research Network (AURN), Centre for Human Settlements, School of Community and Regional Planning, The University of British Colombia, Vancouver, Canada**

land use planning city ecology economic impact
Bandung; Indonesia; urban planning; land resources; resource management

Focuses on the competition for space between urban agriculture and other activities in Bandung, Indonesia. When the author states that with the current rate of development, much of the land now used for food production within the urban area will disappear in the next 15-20 years, we must realise that this statement was made before the economic crisis hit Indonesia. The author's suggestion that city administrators should include urban farming more systematically in urban planning remains as valid as before, however. (WB)

Hobbs, K. **(2000) The role of community gardening and community development. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000.**

(on cd-rom).
land use planning community development food security and nutrition
United States, children; anthropology; housing; poverty

The White House Task Force on Liveable Communities coordinates federal agencies with missions and resources that affect the liveability of American communities. The Task Force focuses on policies that promote sustainable growth, preserve open space, reduce congestion, improve schools, and make neighbourhoods safe. In pursuing these policies, the Task Force promotes coordinated Federal financial assistance, technical expertise, and information to assist collaborative efforts by communities at the state, local, and regional levels.

Hoffmann, H. and Mathey, K. **(eds.) (2000) Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000.**
land use planning food security and nutrition
United States; economic impact

All information of the International Symposium on Urban Agriculture and Horticulture on CD-Rom. The CD contains all the abstracts, posters and papers; programme of the event including the excursion and public relations network information.

Home, R. **(2001), Negotiating Security of Tenure for Peri-Urban Settlement: Traveller-Gypsies and the Planning System in The United Kingdom. School of Surveying, University of East London. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**
land use planning rural-urban linkages
periurban area; informal sector; housing; tenure rights; security; land use planning; United Kingdom, Europe (Western)

Occupiers of informal unauthorised housing in peri-urban areas seek to improve their tenure security and living conditions through conflict and negotiation with the agencies of the state. Traveller-gypsies in the United Kingdom, while numerically few, have often occupied such marginal locations, and engaged with the land use planning system in protracted attempts to regularise and upgrade their owner-occupied self-help sites. This article summarises the contested identity and marginalization of this group, and the often inconsistent policy and approaches of central and local government towards it. The issues are explored through five case studies of the planning history of gypsy families and their sites in rural areas of the UK.

Howe, J. and White, I. **(2001) Planning for Urban Agriculture in the UK. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning R&D methodology
United Kingdom; planning; Botswana; zoning; awareness

This paper presents the findings from a UK Government Economic and Social

Research Council (ESRC) funded survey examining the role played by planning in regulating urban agriculture on allotments, community gardens and city farms in metropolitan areas of the UK. Planners' attitudes to, and knowledge of, urban food production are explored; the geography of, and the agencies involved in, urban food production is detailed and an examination of the regulation of urban food production is undertaken. The survey reveals that despite many initiatives awareness of urban food production is relatively low amongst metropolitan planning authorities. Whilst there is an increasing interest in food growing within UK society, the role of planning in this land use issue is relatively small. Indeed, urban agriculture sits uncomfortably within the UK planning framework. Despite encouraging signs of an increasing engagement with urban agriculture, planning's apparent low level of involvement remains perplexing given the significance of food to the metropolitan system.

Hsin, Robert **(1996) Guidelines and Principles for Sustainable Community Design. A study of sustainable design and planning strategies in North America from an urban design perspective. Faculty of the School of Architecture at Florida Agricultural and Mechanical University. Thesis.**
http://sustainable.state.fl.us/fdi/edesign/news/9607/thesis/thesis.htm
land use planning
sustainable design; site planning; environment

The study is an attempt to understand the broad scope of sustainable design. The vehicle used is a research and distillation of existing sustainable design theories, strategies, principles, and guidelines, with a focus on an urban planning scale. This thesis is a compilation of the most prevalent sustainable design themes which run through all the various existing information on this topic. From these common themes, a series of sustainable design guidelines and principles, covering the complete design spectrum of this topic is proposed.

Existing knowledge on this topic is generally limited to the separate professions, without much inter-coordination. A complete holistic perspective of sustainable design is a topic that has not been explored greatly. Thus the reason for this study. A holistic perspective on this topic results in a much clearer understanding of the concept of sustainability, as well as a better grasp of how to steer the design industry towards more sustainable practices.

It is important to note here, that this study is focused on sustainable design as applicable to the west, primarily, the United States. Hence, much of the gathered literature and information comes from a western perspective. This study is not representative of the global field of sustainability, other cultures have different perspectives and approaches to sustainable design [from original abstract AD].

Ignacio, NG **(1994). Resettle and survive. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 18. International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands

land use planning horticulture
home gardening; Philippines; small-scale agriculture; urban communities; urban development; urban environment; urban population; vegetables

Urban populations in developing countries are growing fast. It's expected that by 2025, urban centres in the developing world will be home to some four billion people, a figure equal to the world's total population in 1975 (World Resources 1994). Rapid population growth and urbanisation are straining resources. Shelter, sewerage, clean water and even the most basic of amenities, food, are at a premium and malnutrition is endemic. (ILEIA)

Institut d'Aménagement et d'Urbanisme de la Région d'Ile-de France (IAURIF) **(1995). Plan vert régional d'Ile-de-France. Paris, France: IAURIF. 262 p.**
land use planning
France; Paris; master plan; green spaces

This "Green Plan" for the Ile-de-France region (which surrounds and contains Paris) is a synthetic document of the various studies, laws and other instruments developed til the mid-1990s to guide and regulate the management of all open spaces (including agricultural ones) in the region. It organizes these through a four-part spatial framework: the green structure inside the agglomeration, the green belt, the rural crown, and the valleys and green links. For each of these parts, the report contains: an assessment of the current conditions and potentials; a historical overview of evolutions and actions already taken or attempted; an outline of the objectives and the overall conceivable project; and a sketching of the usable means for action to bring about this project. (JN)

Ishida, Yorifusa **(1996). Contemporary urban fringe issues and a framework and measures for the planning of urban fringe areas in Japan. Paper from the International Workshop of the Association of Rural Planning Land Use Systems in Urban Fringe Areas in Asia: Kogakuin University, Tokyo 18 p. Contains a list of relevant Japanese land use planning acts 1951 to 1992**
land use planning
Japan; periurban agriculture

This paper includes a good description of the national urban *agricultural district* zoning in force for fifty years in Japan and additional legislation by municipalities. (JS)

Jacobi, Petra **et al (2000). Urban agriculture – justification and planning guidelines. GTZ, Eschborn, Germany, 51 p.**
R&D methodology land use planning
planning; Africa; policy; poverty; emergency relief; Agenda 21

This is a seminal paper. It presents an excellent theoretical "urban agriculture flow-chart" (research-policy-action, combined with a good deal of relevant hard data and

observation. Urban agriculture is presented as a development intervention that promotes inter alia: (I) sustainable development, (ii) poverty alleviation, (iii) food security, (iv) environment and resource management, (v) community solidarity, (vi) heath, and (vii) micro-enterprise. (JS)

Jacobi, Petra. and Kiango, Suzan. **(2001) Ways to monitor & evaluate Urban and Periurban Agriculture – Experiences from Dar Es Salaam, Tanzania. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology land use planning horticulture

Tanzania; monitoring and evaluation; participatory monitoring; indicators

In Tanzania urban and peri- urban agriculture is a well-known activity and it has reached the level of official acceptance. Systematic monitoring and evaluation as well as channelling generated information and feedback from the field to the relevant levels has supported this acceptance. In the discussion about participatory M&E against conventional M&E it appears that the former should replace the latter. It is argued in this paper that there should be a balance to be struck between “conventional” and “participatory” monitoring. There should be both “hard data” and a system that allows primary stakeholders to monitor and evaluate their activities using different methods and own indicators. Truly appropriate monitoring and evaluation should enhance internal learning and provide evidence to support qualitative statements about the impact of an action.

Jarlöv, L. **(2001) Urban Agriculture in South Africa. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning

South Africa; poverty; Paradigms; planning

The paper elaborates on experiences from a short-term assignment in Kimberley and Port Elizabeth in 1998, within a Swedish project, financed by Sida, and two months of volunteer work in Port Elizabeth 1999 trying to constitute a net-work for urban agriculture. The paper discusses the gap between the real problems of hunger and malnutrition among the poor in the cities and the conventional planning view upon the urban fabric as a place where people mainly get their food from buying by means of salaries and wages.

Jarlöv, L **(2001) Why We Need New Urban Planning Concepts, insights from South Africa. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning

South Africa; planning

This article is a synthesis of insights from a short period of participation in a comprehensive urban planning project in Kimberley and Port Elizabeth (South Africa) in 1998 and 1999. All statistics used in this article originate from the First Comprehensive Urban Plan (draft), City of Port Elizabeth (May 1999). It has been observed that the phenomenon of urban agriculture in these two cities challenges the western concepts of urban planning and reinforces the need for new models appropriate to non-industrialised cities of Africa and other developing countries. The western model assumes labour employment for the majority, travel to work and the separation of work, employment, recreation and so on. However, drawing in particular from Port Elizabeth, the South African experience is that a majority of urban inhabitants is unemployed, and the informal sector economy dominates. This means that work, recreation and housing all occur in one place. Urban agriculture is one activity in the informal sector.

Kitilla M. and Mlambo, A. **(2001) Integration of Agriculture in City Development in Dar Es Salaam. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning

Tanzania; environmental management; zoning; Geographic Information Systems

In the present form, agricultural activities in the city of Dar Es Salaam often conflict with planning of urban land-uses. In some cases, agricultural activities are conducted in fragile environments or hazardous areas of the city, resulting in land degradation and water pollution. In other cases the activities are carried out in areas affected by industrial pollution. The keeping of livestock in the city's residential areas may also be hazardous to the health and safety of city residents. The initiative by the Dar Es Salaam City Council to adopt the Environmental Planning and Management approach in the city planning in 1992, was timely and most welcome. Achievements accrued from the new approach have provided significant change to the common practices. Ongoing efforts will synchronise with other two visions deployed by the government, that is, the Development Vision 2025 for Tanzania and the 2025 vision on Food, agriculture and the Environment.

Kolstrup, Hendrik **(1985). Urban agriculture: food production and land-use planning in Maputo: a project proposal. Masters Thesis, School of Architecture, Aarhus, Denmark; 213 p.**

Contains excerpt from Mozambique urban planning law.

land use planning

Mozambique; land use; land tenure; planning; community gardens; small-scale agriculture; green belts; nutrition; agricultural cooperatives; training; agricultural extension

This thesis is formulated as a project proposal. In its presentation it provides a very good picture of urban agriculture in Maputo in the post-independence decade. The documentation is appropriate to serve as an input to project design, policy, extension

services and marketing. The work was carried out with the cooperation of the National Planning Institute of Maputo. It is worthwhile to mention that the *Zonas Verdes* program in Maputo is an exemplary civic urban agriculture program. (JS)

Kundu, N., P. Konar and A. Basu **(2001), Peri-Urban Agriculture and Environmental Management: Kolkata Experience. Institute of Wetland Management and Ecological Design Kolkata, Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**

land use planning

India; periurban area; urban farming systems; urban agriculture; social development, Asia (South-Central)

Traditionally, 'urban' and 'rural' areas have been considered as two opposite aspects of social development. In consequences, urban planning has been an exclusivist land-use planning oriented towards 'urban' development. Contemporary thinking regards the two sectors as complementary to each other. Under the new paradigm of social development, areas in and around urban centers devoted to agriculture, forestry are considered as integral components of a balanced urban life.

In this context, the present paper will focus on the dynamics of urban agriculture and farming in periurban Kolkata. The Calcutta Metropolitan Area (CMA) has two kinds of 'rural' areas - one adjacent to the core city, another in the fringe of the urban waste management. In the rural periphery, agriculture continues as a fairly permanent system of production. Originally, Kolkata's Basic Development Plan (BDP), 1966 just tolerated farming as a transitional system. Today the view is deferent and supportive of restoration of agriculture and pisciculture as a fairly permanent system of metro-development. The paper intends to analyse the present scenario of 'urban agriculture' in Kolkata's urban space.

Laquinta, D. and Drescher, Axel W.. **(2001) Defining Periurban. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**

rural-urban linkages land use planning

periurban; natural resources

This paper uses definitions and concepts of the periurban area, and explores the implications for planning and management of natural resources in the rural-urban interface. In exploring this, the authors attempt to define the *social footprint*, with the aim to foster effective interdisciplinary discussion.

Levenston, Michael **(1999). Chickens in the soup. Urban Agriculture Notes. In: http://www.cityfarmer.org/chicken84.html. 3 p. City Farmer, Canada's Office of Urban Agriculture**

Supplier: City Farmer, Canada's Office of Urban Agriculture

food security and nutrition land use planning

livestock; chickens; urban policies; North America

This article from the very first issue of the City farmer Newspaper describes the battle of urban farmers, especially chicken raisers, with city by-laws in North America. Interesting from a historical point of view. (NB)

Loraine, Isabelle **(1992). Des zones d'activités agricoles péri-urbaines en Ile-de France. Paris, France: Institut d'Aménagement et d'Urbanisme de la Région d'Ile-de-France (IAURIF). 95 p.**
land use planning
France; Paris; periurban agriculture; policy; agricultural preservation

The key part of this report is a classification of the main types of actions undertaken recently to help maintain agricultural spaces in France's capital region. These actions are grouped into: "agricultural subdivisions," "planned reparcelled areas" and special planning for some major agricultural spaces. This analysis is then complemented by the development of general principles for agricultural preservation, the identification of key actors, and the proposition of means for action. (JN)

Madaleno, Isabel Maria. **(2001) Urban Agriculture Supportive Policies: two distant cities. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning community development food security and nutrition
Portugal; Brazil

Agriculture is an old urban function. Doomed and cursed as it was after the first Industrial Revolution, it never ceased to exist in developing countries and is now once again welcome in most developed countries as well. Poor Brazilian communities see urban agriculture as an alternative survival strategy, because it produces food and improves household's nutrition, but also generates income and jobs, while additionally providing self-respect and hope for a better future. In Portugal, city gardening is small-scale, aimed at giving opportunities for child and adult education, providing ways to produce and consume healthy food, and to enhance contact with land and living things.

Martin, A. and Oudwater, N. **(2000) Urban Agriculture and the livelihoods of the poor in Southern Africa. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning food security and nutrition
South Africa; poverty; livelihoods

The paper focuses on three dimensions of the social, institutional and planning context of urban agriculture. Firstly an analysis of the contribution of urban agriculture to the livelihoods of different social groups; secondly, factors affecting the outcomes of urban agriculture projects, and thirdly, the linkages between households, communities and the planning authorities. The policy implications of

these are discussed. The paper is based on research carried out in informal settlements in South Africa (Cape Town and Pretoria) and Zimbabwe (three sites in Harare, one periurban setting with strong market linkage to the central food market, a resettlement area and a high density township). Appropriate policy responses to support urban agriculture as part of sustainable urban livelihoods are needed. In Southern Africa there is increasing awareness and interest among policy makers concerning the potential of urban agriculture, but present policies provide limited support.

Maxwell, Daniel G.; Zziwa, Samuel **(1992). Urban farming in Africa: the case of Kampala, Uganda. Nairobi, Kenya: African Centre for Technology Studies.**
community development land use planning
Uganda; land tenure; social groups; land use; constraints

This report provides the culmination of Maxwell's research on Kampala in the late 1980s and early 1990s. It paints a general picture of urban agricultural practices in the city, and focuses on the social organization and the access to land by urban farmers. (JN)

Maxwell, Daniel G. **(1996). Highest and best use? Access to urban land for semi-subsistence food production. In: Land Use Policy vol.13 (1996) no. 3 p. 181-195**
land use planning food security and nutrition
Africa; access to land; land tenure; semi-subsistence farming

Pressures on urban policy-makers in Africa to formalise land tenure and land delivery systems are increasing. Parallel, there is an increased demand for informal access to land in urban areas. From analysing what brings the highest and best use, the land access and land tenure issues in Kampala, Uganda are discussed. Semi-subsistence agriculture is an important component of the urban system, yet it is a technically illegal form of land use. From the situation analysis, possible policy responses to competing demands over urban resources are presented. (NB - abstract adapted from original)

May, Julian; Rogerson, Christian M **(1995). Poverty and sustainable cities in South Africa: the role of urban cultivation. In: Habitat International vol. 19 (1995) no.2 p. 165-181. Data Research Africa, Durban; University of the Witwatersrand, Johannesburg, South Africa**
R&D methodology land use planning economic impact
household survey; farming systems; access to land; land rights

Urban agriculture is increasingly seen as a major means of supplementing incomes in the cities of South Africa. In light of that nation's transition to a non-racial democracy, the particular task of the paper is to review the potential and policy implications of urban agriculture in the context of national initiatives for post-apartheid reconstruction. To reach these objectives, findings of household surveys

are presented on the nature, methods and problems of production of groups of urban and periurban farmers. Income surveys supplemented by participatory techniques are used to gather further information on the problems faced. These major problems include gaining access to land with secure title for cultivation, finance, machinery, transport, crop security and the need for support services. The policy implications which emerge are then discussed. (Original abstract)

Mbiba, Beacon M. **(2001) The Marginalisation of Urban Agriculture in Lusaka's Contemporary Planning and Urban Land Dynamics. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning economic impact
planning; Zambia; poverty; land tenure

In 1987, Sanyal suggested that Lusaka, Zambia, was the capital city of urban agriculture (UA) in Africa. This was at the peak of Zambia's economic crisis when residents took up UA as a form of employment and to improve their nutritional status. Travelling in the region today, one will easily agree that Harare, Zimbabwe, has taken over as the capital of urban agriculture and that the activity may not be as widespread in Lusaka as observed by Sanyal. There is no longer abundant maize growing and in addition, there is little integration into planning. In fact, urban and periurban agriculture has been marginalised out of planning; it is not considered a priority by the city authorities and is being gradually squeezed out by residents seeking lodgings to rent, as well as developers. Under these circumstances, a recurring question is 'what factors determine the integration (or otherwise) of urban agriculture into city planning'?

Mbiba, Beacon M **(2001) Communal Land Rights in Zimbabwe as State Sanction and Social Control: A Narrative. Rural and Urban Planning, University of Zimbabwe, In: Africa, vol. 71, no. 3, pp. 426-448**
land use planning
communal land; land rights; Zimbabwe, Africa (Eastern)

This article takes a historical approach to argue that communal lands in Zimbabwe are a contruct inherited from colonial days (prior to 1980) which governments in post-colonial Zimbabwe have found convenient to maintain rather than dismantle. The construct is not only a convenient framework for the delivery of collective consumption goods but in turn it enables the government to subtly use communal lands as a framework for social control, especially in terms of urban management. The continued existence of communal land areas and land rights also sustains processes of social control at the household level. However, there are issues that will not receive attention in land debates as long as the larger problem of redistribution of large-scale commercial farms remains resolved.

Mbiba, Beacon M. and Veenhuizen, R. van **(2001) The Integration of Urban and Periurban Agriculture into Planning. c**
land use planning
policy; methods

In this editorial to the issue of the Urban Agriculture Magazine on Urban Planning, the authors give an overview of the discussion on how to improve the integration of urban agriculture in urban planning. It is argued that one has to specify the type of agriculture, producers, etc and institutions involved for clarification. An issue under discussion is whether we should search for new policies and new institutions, or whether integration and implementation

McAuslan, Faracque, C **(1991). Reforming urban land policies and institutions in developing countries 116 p.**

land use planning

land tenure; land use; policy; legislation

This paper defines and assesses the various institutional and mechanical elements that constitute an urban land management system. History has handed us a complex set of generally overly rigid land use regulatory processes. Here a framework is set to make them more efficient. (JS)

MDP **(2001) The Political Economy of Urban Agriculture, report of a preparatory workshop, Harare, February 2001.**

land use planning economic impact

Africa (Southern); Africa (Eastern); political economy; land use; planning; Uganda; Kenya; Zimbabwe

This report contains one general paper by B. Mbiba (The Political Economy of Urban Agriculture in Eastern and Southern Africa; Overview, Settings and Research Agenda) and five case studies commissioned by the Municipal Development Programme, for a preparatory workshop in Harare, February 2001. The aim of the workshop was to discuss new insights and jointly work on a research proposal on the subject. The five country case studies are on Uganda, Kenya, Tanzania, Zambia and Zimbabwe.

Ministry of Foreign Affairs **(1994). Stedelijke armoedebestrijding. Sector- en themabeleidsdocumenten van Ontwikkelingssamenwerking no. 5. 163 p. ISBN 90-5328-063-4. Ministry of Foreign Affairs, Directorate General International Co-operation (DGIS), PO Box 20061, 2500 EB The Hague, The Netherlands**

economic impact land use planning

poverty alleviation; urban poor; government policies; development co-operation

This publication elaborates on the general policies of the Netherlands department for development co-operation on urban poverty alleviation. The policy starts with a description of the processes of urbanisation and impoverishment in the urban environment. From there, the themes employment and income, habitat (housing, land, water, sanitation, waste, energy, transport and gender), basic social services, institutional development, policies of international donors and the thematic programme of the Dutch government are discussed. (NB)

Ministry of Planning **(1991). Investigation into the potential role of urban agriculture: towards the preparation of policy guidelines. Pretoria: Ministry of Planning, South Africa. 69 p.**

land use planning economic impact

South Africa; policy; labour; smallholder farming; land use

This reports investigates the potential role urban farming can play in South African cities. It emphasizes the use of land by small holders, the labor issues they face, and the policies that can be put in place to foster their activities. (JN)

Moldakov, O. **(2001) The Problem of UPA Planning. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning rural-urban linkages

Russia; policy; NGO's

In Russia, agricultural activities of the urban inhabitants are taking place at significant distances from their urban homes. The term "urban agriculture" refers more to agricultural activities of city dwellers than to agricultural activities within the city boundaries only. The agricultural sites, usually with a house, are called dachas and are located between 6 and 60 km from the city. This article call for the necessary inputs by ngo's and farmer rganisations to improve technical know-how and improved use of the facilitating infrastructure to urban agriculture in St. Petersburg.

Morello, J **et al (2000). Urbanization and the consumption of fertile land and other ecological changes: the case of Buenos Aires: In: Environment and Urbanization Vol. 12, No. 2 p. 199-132. IIED London & Buenos Aires, Argentina**

land use planning

land use; periurban agriculture; urbanisation

This paper describes the conflict between agriculture and urban spread in the Pampa Ondulada, the eco-region of metropolitan Buenos Aires, which is one of the richest and most productive agricultural areas. It describes and analyses the ecological changes brought about by urban sprawl into rural agricultural areas between 1869 and 1991and the form that this has taken. It also includes an analysis of the soil types where the city has spread. The paper ends with a discussion of the lack of control over continued urban expansion including that proliferation of ‘gated’ or closed settlements now favored by the upper-income groups, and the speculative parceling of land in advance of urban build out. Thousands of hectares have been taken out of production and turned into wastelands awaiting development. This issue should be addressed by regional planning and legislation. (JS adapted from the authors)

Morrée, Dicky (de) **(1999). New functions, new partnerships: searching for common ground in land use negotiations: a vision from NGOs on the multifunctional character of land and agriculture. 49 p. Bureau Beleidsvorming Ontwikkelingssamenwerking, Plein 9, 2511 CR The Hague, The Netherlands**

land use planning

sustainable development; land use; multifunctional land use; natural resources; natural resource management; stakeholders' involvement

Paper presented at the FAO Conference on the Multifunctional Character of Land and Agriculture, held at Maastricht, Netherlands, September 12-17, 1999. This paper was written to represent views of a working group of Dutch NGOs. Views were developed around three central concepts: (1) the multifunctionality of land and water use; (2) the sustainability of land and water use; (3) stakeholders' platforms for natural resource use negotiation. A summary is given of the recommendations to the Conference. (WB)

Mosha, A.C. and Cavric, B.I. **(2000) The Practice of Urban Agriculture in Gaborone City. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning food security and nutrition

Botswana; strategies; policy

The aim of this paper is to presents on the development and spatial extent of urban agricultural practice in the city of Gaborone, one of the fastest growing urbanities in Africa. From this case study, lessons can be drawn for future urban agriculture practices in semi-arid climatic conditions in Africa and abroad. The main interest in the study was to see to what extent, the people in the city of Gaborone carried out urban agriculture activity. The results from the study show that, urban agriculture in Gaborone is dominantly spontaneous and creative response and to some extent is found to be one of the survival strategies of the urban poor. As this case study has just scratched the surface of this very important urban subject in Botswana capital, there are many more questions, which need further researching into before the city can capture the full potential of this activity.

Mougeot, Luc JA **(2000). Urban agriculture: definition, presence, potentials and risks. In: Growing cities, growing food: urban agriculture on the policy agenda, p.1-42. DSE, GTZ, CTA, SIDA**

R&D methodology land use planning

food security; access to land; gender issues; land use systems; urban planning; public health; rural-urban linkages; sanitation

The article provides building blocks for defining urban agriculture in an internally coherent and externally functional way based on an extensive overview of developments and literature on urban agriculture. The more important policy challenges for urban agriculture on food security, land access, gender implications, land use dynamics and urban planning, public health and sanitation, environmental

impacts and interaction with rural agriculture are discussed. One of the major issues is that urban agriculture is mainly analysed from an agricultural perspective than an urban planners' perspective, while the latter is even more fundamental for integrating urban agriculture in the urban system. (NB)

Mougeot, L.J.A., **(2002), Urban Agriculture Main Concepts. IDRC, Cities Feeding People Progamme, Ottawa, Canada. In: Special Edition Urban Agriculture Magazine: World Food Summit, Five Years Later, RUAF,pp. 6-7, 2002**
land use planning food security and nutrition
urban agriculture; concepts of urban agriculture

Key features of current definitions of "urban agriculture" generally have downplayed a critical trait that makes urban agriculture, urban. Urban agriculture (UA) is different from and complementary to, rural agriculture in local food systems.: UA is integrated into the urban economic and ecological system. Unless this dimension is enhanced and made operational, the concept will remain of little use to the scientific, technological and policy fronts.

Mwalukasa, Michael **(2000). Institutional aspects of urban agriculture in the city of Dar es Salaam. In: Growing cities, growing food: urban agriculture on the policy agenda. - p. 147-159. DSE, GTZ, CTA, SIDA**
land use planning R&D methodology
institutional planning; urban policy development; urban management; stakeholder approaches; urban planning

The paper analyses the mechanisms for institutionalising strategies for urban agriculture in the context of an East African city. The experiences described focus on stakeholder involvement and collectively seeking solutions to priority issues of common concern. Short coming of traditional urban planning are discussed and new initiatives under the sustainable cities programme in Tanzania (SCP-TZ) are presented. (NB)

Nasr, Joe. and Smit, Jac. **(2000) Urban Agriculture and Urban Patterns: Implications for Sustainability. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom)**
land use planning city ecology
urban patterns; architecture; history

Urban agriculture has emerged as an activity over the course of the past decade, gaining recognition as a contribution to the sustainability of urban settlements on multiple grounds: health improvement, community-building, environmental enhancement, etc. The presence of this activity is now becoming visible in widely different settings: from devastated inner cities to the periurban fringe, from frigid Russian cities to towns that ring the Equator, from community gardens in the richest countries to cultivation on landfills of the poorest countries. This paper seek sto tackle the question: what are the impacts of the variety in such settings on the existence and type of urban agriculture? In other words, how do different urban

patterns influence how and where urban residents farm? Different ways of classifying urban form are assessed for their consequences on potential and actual urban agricultural practices, and a typology of urban patterns is developed and cross-linked to types of urban agriculture.

National Institute of Urban Affairs **(2000) The role of urban and periurban agriculture in metropolitan city management in the developing countries: a case study of Delhi**
Research Study Series No. 74. Rs. 250; US$20. New Delhi: NIUA www.niua.org/publicationlist/index.html#UUP. Rupees 250; US$ 20.00
city ecology land use planning
environment; management; Delhi; policy; India; pollution; land use policies

This study developed from earlier collaboration under the British DFID project on policy implications of air pollution on urban and periurban areas in developing countries. Its main concern is the contribution of urban agriculture to the national capital area of Delhi in India. After a general discussion of urban agriculture, there is a review of the policy orientation and planning provisions of the Government of India that impinge on urban agricultural practices. The case study of Delhi is described as a 'cursory review.' It gives a considerable amount of information about Delhi from official sources, and the characteristics of the periurban area or rural-urban fringe. The study tries to understand the concept and characteristics of urban agriculture, it reviews the policies that might influence such developments, studies the importance given to urban agriculture in both city development and urban environmental management and estimates its potential role in sustainable urban development. Among the conclusions: urban agriculture is important but there is no clear responsibility for these varied activities in the capital area, and planning does not yet address the issue from the standpoint of the urban poor. (Abstract by Christine Furedy)

Nettleton, J. **(2000) Regional Economic and Farmer's Market Development in the New York Region. . In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom)**
horticulture land use planning city ecology
markets; community building; organic agriculture; poverty

Consumer demand for fresh produce in New York City continues to grow, mirroring the national trend: demand for organic produce has increased over 20% in each of the last 6 years. With 42 farmers' markets in New York City (up from 35 in 1997) offering locally grown fresh fruits and vegetables and demand for new markets, further market expansion is largely constrained by a lack of participating farmers. Initiated by Cornell Cooperative Extension in NYC in 1994, New Farmers/New Markets Program: 1) develops new farmers' markets in poor urban districts; 2) increases farmer participation in the market system; 3) designs workforce preparation and educational skills training for youth and adults in groups that

produce for market. In 2000, new immigrants with prior agricultural experience are being trained to work in existing markets and seek land to produce for the niche ethnic markets in their own neighbourhoods.

Nunan, Fiona. Bird, K., Bishop, J. with Edmundson, A. and Nidagundi, S.R. **(2000) Valuing Periurban Natural Resources: A guide for Natural Resource Managers. School of Public Policy, University of Birmingham.**

rural-urban linkages R&D Methodology land use planning

urbanisation; wastewater; waste recycling; concepts; policy; decision support; India; Ghana; natural resources; cost benefits

This booklet describes a decision framework to facilitate natural resource decision-making and management, particularly in areas where there are competing demands from urban development and "rural" uses of resources. It has been written for Southern Countries and is aimed principally at a range of public sector decision-makers. In part 1 the decision framework is described while part 2 gives experiences with applications in two cities; Hubli-Dharwad in India and Kumasi in Ghana.

Nsiah-Gyabaah, K. and M. Adam **(2001), Farming Systems and Farming Inputs in and around Kumasi. Sunyani Polytechnic, Ghana / Natural Resources Institute (NRI), Chatham Maritime, Kent, UK, In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 96-111, 2001.**

land use planning waste recycling

Ghana; farming systems; urban agriculture; livestock; nutrient balance, Africa (Western)

This chapter examines the farming systems in and around Kumasi and the impact of urbanisation and rapid population growth on natural resources and the environment. The use of inputs in the farming systems is described and it is shown that large quantities of potentially useful organic fertilizer material are wasted. Some general recommendations for future activities to improve the situation are put forward.

Nuwagaba, A. and G. Atukunda **(2001), Political Economy of Urban and Peri-Urban Agriculture in Eastern and Southern Africa: The Case of Uganda. Department of Social Work and Social Administration Makerere University / Makerere University of Social Research. Paper presented for the Workshop on "The Politicval Economy of Urban Agriculture in Eastern and Southern Africa, 28th February-2nd March 2001, Harare, Zimbabwe**

land use planning

urban planning; Uganda; urban areas; periurban area; historic overview, Africa (Eastern)

The important thread that runs through this paper focuses on the role of urban agriculture in urban and periurban areas in Uganda. It commences with a historical perspective of urban farming, the changing character of urban farming and the micro and macro-economic rationality of farming activities to the over all wider urban economy. The paper proceeds with the nature of the urban land markets both formal

and informal that are available for urban farming activities. The patterns of land access for farming and the urban regulations that provide for urban farming are discussed. Further, the paper deals with the contradictions in African city formation, the role of urban planning and the growth of farming activities within the context of urban planning and urban standards of a proverbial modern city. Lastly, the identification of the research gaps and proposition of major research issues for urgent investigation are mentioned.

Odame Larbi, W. **(2001), Changing Livelihoods in Peri-Urban Accra: Breakdown of Customary Lland Ownership? Lands Commission, Accra-Ghana. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001**

land use planning rural-urban linkages

land ownership; land tenure; Ghana; security; land pressure; periurban area; land use planning, Africa (Eastern)

Pristine customary land ownership and tenurial arrangements provide security of tenure for all members of the particular land-owning community. These guarantee sustainable livelihood forms and stable micro-economies. They also provide social safety nets that guarantee access to land, reduce impact of poverty and provide social equity in the distribution of benefits from commercial land transactions. Pressures for change at the peri-urban areas in recent times have however, undermined the principles underlying established customary land ownership conventions, and has led to serious adverse socio-economic conditions. The paper examines these issues at the peri-urban interface of Accra where pressures for change are necessitated by different demand parameters and have different consequences for the environment and livelihood opportunities.

The paper contends that unless there is specific intervention and a re-organisation of land ownership and tenurial arrangements at the peri-urban areas, deprivation, landlessness, loss of livelihoods and poverty will continue to rise with their attendant social vices. The paper argues that such intervention should include development of capacity within public and private sector land management institutions, a more proactive approach to land use planning and development, development of transparent procedures for customary land management, use of civil society for massive public education on land development and environmental issues, and proper accountability and application of revenue from land transactions.

Oni, S. I. **(2001) Urban agricultural Enterprises in West Africa: Case of Metropolitan Lagos, Nigeria. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning food security and nutrition

Nigeria; poverty

This paper discusses the historical antecedent of urban agricultural enterprises in West African countries and particularly shows how urban agriculture is practiced as a means of addressing the consequences of unguided urbanisation such as acute unemployment of low/medium class level, food shortages, poor nutrition and urban poverty. It examines the socio-economic characteristics, factor costs, returns and profitability levels of the enterprise. The research findings show that while commercial vegetable entrepreneurs in metropolitan Lagos are dominated mainly by poorly educated migrant farmers, higher proportion of commercial floriculturists are well-educated, and are engaged in this enterprise on part-time basis. It is also revealed that the revenue derived from a unit of floriculture is higher than from commercial vegetables, while seedlings raised for fruits earn highest. The author advocates for urban agricultural networking involving information, exchange on expertise and projects, and exchange.

Österberg, Tommy **(1998). Cadastral Systems in Developing Countries - Legal Options. International Federation of Surveyors. Working Group 7, Cadastral Systems in developing countries. http://www.sli.unimelb.edu.au/fig7/Brighton98/Comm7Papers/TS26-Osterberg.html**
land use planning
definitions; land legislation; cadastral systems; land allocation

This report reflects and summarises the activities, discussions and conclusions from the activities of Working Group 7.2 of Commission 7 of FIG on Cadastral Systems in Developing Countries during the period 1994-1998. The working group has organised seminars and symposiums and carried out an inventory of ongoing cadastral projects. The conclusions are presented together with ideas on future activities related to the cadastral systems in developing countries.[from original abstract by AD]

Ouma, S. **(2000) Urban agriculture in Nakuru. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**
land use planning
Kenya; Nakuru; surveys

This is a general survey in the whole town and the results can be used as inference for many towns (of the same status) in Eastern and Southern Africa.

Payne, G **(1997). Urban land tenure and property rights in developing countries: a review. 73 p. ISBN 1_85339_400_9. GBP 12.95 (pbk) Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK**
land use planning

communal land; land ownership; land tenure; land use; property rights

An annotated and very thorough literature review on a very important aspect of urban agriculture. Indeed, urban land tenure and property rights play an even more vital role than in rural areas. Often, there are frictions between different systems, particularly in urban areas where land is scarce and expensive. Access to credit very much depends on the definition of property rights. Changes in ownership may have very drastic effects on prices of land and, therefore, continued use of it by the urban poor. Although the scope of the book is on cities, much of what is presented also holds for rural areas in principle, though. Urban areas present the particularity of a clash between old and new laws, in a more acerbated way than in rural areas, as in cities the old laws clearly are no longer sufficient. Clarity of tenure status is all-important: the challenge for the poor city dweller is how to obtain more tenure security, in order to be able to do for more investments, without producing a disproportionate increase in land prices, which would be catastrophic for them. In this publication, the main tenure types are catalogued and explained: customary tenure, private tenure, public ownership, religious concepts, indigenous vs. imported concepts. The author concludes that careful analysis of the existing systems should be carried out before embarking on major reforms. This is all the more so as tenure measures as a policy tools are rather inflexible in comparison with fiscal and money policies. Interestingly, full tenure turns out to be not essential to increasing levels of tenure security. In Botswana and Indonesia, the establishment of a statutory system (i.e. by the state) was firmly grounded on traditional principles. The text has many boxes with case descriptions, thus rendering this difficult and specialised subject reasonable accessible. At the end, we find an elaborate, annotated bibliography and a very welcome glossary of terms. There is also a typology of the main categories of land tenure. All in all, a publication produced with great care and thoroughness. (WB)

Perez Vazquez, A., Anderson, S. and Rogers, A. **(2001) Urban agriculture in England, Perspectives and Potential. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**

land use planning community development

United Kingdom; leisure; PRA

Urban agriculture is one of the most important activities in many countries around the world. Its importance is because of the many benefits that holders obtain for it and the multiple opportunities that it brings to minority population. The most important sort of urban agriculture in England is the allotment. Allotments are small pieces of land in cities, which English people use to grow their own food in a peaceful surrounding. Allotments have been very important during Britain's history. It was vital for producing food during the I and II World War and also in modern times the allotment is viewed as an option for many people to avoid GMO food and chemical food. The aims of this field research was to determine and analyse the main characteristics of allotment agriculture in the Southeast of England (London, Ashford and Wye) through Participatory Rural Appraisal (PRA) tools, such as

mapping, time lines, seasonal calender, ranking and force field analysis. Interviews were carried out with a selection of allotment holders about a variety of subjects using semi-structured interviews. The results suggest that the main purposes for having allotment are because of fresh and safety food, as a hobby, exercise and to get relaxation.

Petts, J.. **(2000) Creating edible buildings –growing food on and around buildings. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning city ecology

United Kingdom; architecture; footprint

The world cannot accommodate an increasingly urbanised society, which continuously draws resources from evermore distant parts and uses the biosphere, oceans, land and atmosphere as a waste sink. We must therefore seek more sustainable ways in which to live and develop solutions to the current economic and ecological crisis. The background to the programme ‘edible buildings’ is that many parts of the world growing food on and around buildings is an economic necessity. Some city farmers attach long, narrow planters or boxes to their walls and grow cucumber and melon up the walls, supported with sticks or twine. Herbs are grown on rooftops in Santiago, silkworms on balconies in Old Delhi, pigeons in downtown Cairo, rabbits in Mexico City shanties and vegetables in Haiti. In London, at least half of its 2.8 million households have gardens –comprising nearly 20% of the total area of Greater London. 1950s research indicates that 14% of the garden area in London was allocated to fruit and vegetable production but it is likely that the current percentage is lower than this.

Pothukuchi, Kameshwari; Kaufman, Jerome L **(1999). Placing the food system on the urban agenda: the role of municipal institutions in food systems planning. In: Agriculture and Human Values No. 16 (1999) p. 213-224.**

land use planning food security and nutrition

food system; food policy; urban planning

This article is a perceptive look at the relationship of city planning and the urban food system in America at the turn of the century. The urban food system is less visible than such other urban systems. The reasons for its low visibility include the historic process by which issues and policies came to be defined as urban; the spread of processing, refrigeration and transportation technology; together with cheap, abundant energy; that rendered invisible the loss of farmland around older cities; as well as the continuing institutional separation or urban and rural policy. Despite its low visibility, the urban food system contributes significantly to community health and welfare; to metropolitan economies; connects to other urban systems such as housing, transportation, land use, and economic development and impacts on the urban environment. Existing and potential city institutions that could offer a more comprehensive management of the urban food system are examined. These include

the city department of food, the policy council, and the city-planning department. (adapted from original by JS)

Pothukuchi, Kameshwari; Kaufman, Jerome L **(2000). The food system: a stranger to the planning field. In: APA journal vol. 66 (Spring 2000) no 2. 12 p.**
land use planning food security and nutrition
planning; food systems

The article argues that a conceptual gap exists in the planning field. The gap the food system, an area which planners continually impact both directly and indirectly, but which is rarely being considered in the palnning process. The article helps to fill the gap by exploring why the food system has a low priority among planners, identifying specific ways the food system affects the economy, environment and health of communities and lastly by suggesting ways to strengthen community and regional food systems and food system planning. (NB)

Pretty, Jules; Altieri Miguel **(1999). Best practices in land resources management to achieve sustainable food cycles. CGIAR CSD 8 Dialogue Paper No. 3.**
land use planning rural-urban linkages food security and nutrition
sustainable agriculture; environment; policy

This paper, prepared for the UN Commission on Sustainable Development, presents an approach to accelerating the trend to sustainable agriculture. It notes that although there has been increasing informal activity in the field only three countries have given explicit national support (Austria, Cuba and Switzerland). Sustainable agriculture is presented a multi-functional within urban and rural landscapes and economies (food and other goods, clean water, carbon sequestering, flood protection, environment for living, biodiversity). Four options for change are presented to the CSD: (i) better use of renewable resources, (ii) intensification of production, (iii) diversification of the agroecosystem, (iv) better use of non-renewable inputs. Institutions are urged to concentrate on process over product and to aim for win, win, win outcomes. (JS)

Quon, Soonya **(1999). Planning for urban agriculture: a review of tools and strategies for urban planners. Cities feeding people series report no. 28 Supplier: International Development Research Centre (IDRC), PO Box 8500, Ottawa ON, Canada K1G 3H9**
R&D methodology land use planning
urban planning; land use planning; social participation; policy development

On basis of published and "grey" literature and a survey of 26 urban planning professionals from 18 cities around the world key planning-related constraints facing urban farmers were identified as well as possible responses to these constraints. Land use issues are of particular concern to urban farmers. These issues are compounded by the urban planning policy context through, amongst others, a lack of

formal recognition. Important recommendations cited in literature and from planners are changes to land use planning policy level, participation in new multi-disciplinary institutions responsible for all facets of urban agriculture in a community and establishing records of urban agriculture. It was found that urban planners have greater opportunities to permit rather than to support urban agriculture given their position as regards to decision making at the various levels. Planners could use their influence for change, forge alliances and facilitate opportunities for urban farmers. (NB)

Remenyi, J. **(2000) The contribution that urban agriculture makes to the livelihoods of poor people. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin July 2000. (on cd-rom).**

land use planning food security and nutrition

Bangladesh; livelihoods; poverty; micro-finance; participatory techniques

This paper looks into the contribution that urban agriculture makes to the livelihoods of poor people, especially recent in-migrants from rural areas. The research is based on slum dwellers in Dhaka Bangladesh. The paper reports on work in progress, including the use of participatory techniques for assessing the contribution that urban agriculture makes to employment, income generation and cash flow into poor households in the slum areas of Dhaka. The results are relevant for how poverty programs are designed, and for how urban planning needs to coordinate with micro-finance providers to ensure that the potential contribution of urban planning to poverty reduction is realised.

Richard, Matthew J **(1991). Opportunity and conflict in the periurban area of Gaborone, Botswana. 19 p. Department of Anthropology, State University of New York, Binghampton, USA**

land use planning city ecology

Gaborone; Botswana; land use rights; land tenure; resource use

Examines potential conflicts in access to and use of scarce land resources by the various stakeholders in the periurban area of Gaborone, Botswana, one of the fastest growing urban centres in the world. Most of the conflicts have to do with the transition from communal land to freehold land tenure. This leads to fundamental changes in land use. The role of Land Boards and traditional authorities in manipulating and interpreting local land rights is unclear. (WB)

Sandewall, M., B. Ohlsson and S. Sawathvong **(2001), Assessment of Historical Land-use Changes for Purposes of Strategic Planning - A Case Study in Laos. In: Ambio, vol. 30, no. 1, pp. 55-61, February 2001. Royal Swedish Academy of Sciences.**

land use planning

sustainability; forests; Laos; water management, Asia (South-Eastern)

How can governments in developing countries act together with local people to promote sustainable forest land use? Based upon an initial review of man's use of natural resources in Southeast Asia over 100 years, an interdisciplinary approach to strategic planning based on interaction among stakeholders is outlined. A case study in a water catchment area, dominated by shifting cultivation, is used to test and illustrate the approach, which includes interviews with local people about historical events and socioeconomic and environmental conditions. The study also includes field point sampling, remote sensing, official records and a simulation tool (the Area Production Model), for verification, calibration and supplementation of the information provided by villagers. By presenting the consolidated data to the villagers and giving them opportunities to consider their landuse and explain discrepancies, and comment on the conclusions, a dialogue on land-use strategies was initiated.

Sawio, Camillus J **(1994). Urban agriculture and the sustainable Dar es Salaam Project**
Cities Feeding People Series report no. 10. 19 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
city ecology land use planning
Tanzania; urban planning; environmental aspects; land use planning; development projects

Outlines the scope of urban agriculture and then draws a picture of the situation in Dar es Salaam and a number of other cities in Tanzania, with regard to urban agriculture. The core of this publication is about the Sustainable Dar es Salaam project (SDP) established under the auspices of the Global Sustainable Cities Programme of the United Nations Centre for Human Settlements (UNCHS). Priorities set for this project had to do with management of open spaces, recreational areas, hazard lands, greenbelts and urban agriculture potential, all approached in an integrated manner. The paper presents an (impressive) constitutional framework for this project. A table is provided on the surfaces occupied by the various open spaces in Dar, from which the rise of urban agriculture plots becomes apparent. The increase in surface under residential area, however, is even more impressive. Tanzanian authorities adopt, generally speaking, a fairly positive attitude towards urban farmers (with the possible exception of animal husbandry), as opposed to what has been reported from numerous other countries. (WB)

Saasa, Mubumwanu N **(1982). Uses of vacant land in the Kaunda Square - Munali area of Lusaka. In: In the shadow of Lusaka (source unknown) p. 30-36**
land use planning
Zambia; land use; vacant lands; surveys; home gardening

Describes the characteristics of vacant plots in the eastern part of Lusaka and provides socio-economic features of the people cultivating them. (WB)

Smit, Jac **(1996). Urban agriculture, progress and prospect: 1975-2005. Cities Feeding People Series no. 18. 30 p. International Development Research**

Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9; The Urban Agriculture Network (TUAN), Washington, DC, USA
land use planning
research planning; historic overview; food policy; food security; networking

The past 25 years were important not only for the global expansion of urban agriculture, but also for achieving academic, professional and political support. By the end of the 1970s, due to the failure of many of the household and community garden projects initiated in that decade, urban agriculture was considered inappropriate on the long run. With the advent of the 1980s came a different picture of urban food production, triggered by the Food Energy Nexus programme of the United Nations University. This was followed by several other global initiatives, including studies on urban waste, the 'Street Food' project supported by the USAID and different city studies. This positive development continued and increased during the 90s, resulting not only in increased awareness about urban agriculture, but also in more publications, degrees and workshops on the subject. Government policies changed during this period, and it became obvious that governmental support is necessary for successful development of urban agriculture. Future trends are indicated in which the author predicts an acceleration of public-private partnerships, and in general, the participation of a wide variety of stakeholders. Also, organisations will regroup on regional levels and will link up with bilateral and global development organisations. Urban agriculture is a complex activity that thrives when diverse partnerships are functioning. A key publication. (WB)

Smit, Jac; Nasr, Joe **(1999). Urban agriculture for sustainable cities: using wastes and idle land and water bodies as resources. Originally published in: Environment and Urbanization 4, No. 2 (1992): 141-151. Reprinted in The Earthscan Reader in Sustainable Cities / David Satterthwaite (ed.) p. 221-233. London: Earthscan, 1999.**
waste recycling land use planning
resources; waste management; wastewater; solid wastes; land use; vacant lands

This paper describes how cities can be transformed from being only consumers of food and other agricultural products into important resource-conserving, health-improving, sustainable generators of these products. In particular, agriculture in towns, cities and metropolitan areas can convert urban wastes into resources, put vacant and under-utilized areas into productive use, and conserve natural resources outside cities while improving the environment for urban living. Agriculture within urban and periurban areas defined as a common and beneficial land use. This paper also gives examples of urban agriculture programs that help alleviate poverty while creating these benefits. (JS)

Sommers, Paul; Smit, Jac **(1994). Promoting urban agriculture: a strategy framework for planners in North America, Europe and Asia. Cities Feeding People Series no. 9. 12 p**
Supplier: International Development Research Centre (IDRC), PO Box 8500,

Ottawa ON, Canada K1G 3H9
land use planning
policy planning; urban planning; development strategies

Paints a picture of the significance of urban agriculture in a variety of settings and presents a planning framework for expanding urban agriculture activities or for establishing an urban agriculture programme. (WB)

Spiaggi, E.P. **(2000) Urban Agriculture and Local Sustainable Development in Rosario Argentina. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning city ecology waste recycling
Argentina; Rosario; vermiculture; education

Experiences are given of an project, in a poor neighbourhood (Empalme Graneros) of Rosario city, Argentina on urban agriculture, in operation since 1996. 40 families are participating of the project. In 1998 support came from de Organisation of American States (OAS), and the project collaborated with institutions from Chile Centro de Educación y Tecnología (CET), and Canada Environmental Policy Institute (EPI). One of the aims was to compare the state of UA in those countries.

Spies L **(1988). Municipal policy review: urban agriculture (South Africa). Pretoria: Technikon Pretoria.**
land use planning
South Africa; urban policy; open spaces; urban greening

In February 1994, the South African Department of Environmental Affairs and the Faculty of Environmental Science, Technikon Pretoria, hosted a national conference on the productive utilization of urban open space. In 1996, the International Development Research Centre (IDRC) decided to follow up on the conference with a review of the national and municipal policy environment for urban agriculture in the changing country. The review took the form of an international conference followed by a workshop and was jointly hosted by the Department of Environmental Affairs and Tourism (DEAT) and Technikon Pretoria, at Technikon Pretoria on 3-5 March 1998. The aim of the first conference was to simulate awareness and understanding of the value of urban agriculture and to consider the contribution it can make to community development. The aim of the second was to share information on urban agriculture, to identify policy guidelines, and to identify relevant actors and key areas where action is needed at the institutional, environmental, socioeconomic and practical levels. This paper discusses the impact of the two conferences — both direct and indirect — on institutional capacity building, institutional partnerships, scientific advances, results utilization and stakeholder involvement. It also sets down the delegates' recommendations, lists and briefly comments on the relevant national policy statements, and proposes a model for future policy development. The model indicates the responsibilities of various actors (levels of government, communities,

consultants, nongovernmental organizations, etc.) in urban agriculture-related policymaking, planning and implementation. (HC, IDRC)

Technikon Pretoria **(1998). Productive open space management with shared focus on the potential of urban agriculture (urban food production) policy and Agenda 21: proceedings of international conference 3-5 March 1998. Technikon, Pretoria, South Africa**
land use planning
open space management; Southern Africa

Contains a collection of papers highlighting various aspects of open space management in cities, notably for urban agriculture, horticulture and urban forestry. Most papers describe cities in southern Africa (South Africa, Zimbabwe, Tanzania). Apart from papers by international and national speakers, there are also abstracts from the poster displayed. (WB)

Trans Rural Initiatives **(1996). Agriculture et forêt périurbaines sortent de l'ombre. Special issue, supplement to No. 75 (1996). 24 p.**
city ecology urban forestry land use planning
France; periurban agriculture; policy

This supplement to a French periodical contains several syntheses of actions on the preservation of urban (particularly periurban) agriculture in France. These range from agricultural policies of small towns such as Aubagne to the key principles of Paris' "Green Plan". (JN)

Treanor, Paul **(1998). An Urban Ethic of Europe. In: Web Architecture Magazine Vol. 3. http://web.arch-mag.com/3/coll/coll2t.html**
land use planning
city ethic; Europe; political economy

There is an urban ethic in Europe, a set of moral principles which are applied to cities: they explain why some cities exist and others do not. Prominent are: de-urbanisation as the chosen urban trend of modernity; cities as part of national culture in a Europe monopolised by nations; and the liberal idea of an open, interaction-maximising city. In effect, three prohibitions on the existence of classes of possible cities. The urban policy of a state "Europa" should reverse these prohibitions [from original abstract AD].

Tricaud, Pierre-Marie; Blancher, Philippe **(1993). Espaces naturels dans une métropole indienne: Ahmedabad. 2 Volumes. Ministère des Affaires Étrangères, Direction du Développement et de la Coopération Scientifique, Technique et Éducative, Paris, France; 13+30 p.**
city ecology land use planning

urban greening; forestry; food security; home gardening; community gardens; livestock; India; policy; geography

This is one of a series of studies of the un-built urban metropolitan space in Africa, the Middle East, North America and Europe. It places the Ahmedabad metropolis in history (to 1411), in India and in the urban world. It details specific communities, farming areas, and methods of production. Its policy analysis and view of potentials is particularly useful. (JS)

Tricaud, Pierre-Marie **(1999). Urban open space planning: lessons from seven North American cities and the Paris Region. Institute for Policy Studies, the Johns Hopkins University Baltimore, USA. 69 p.**

land use planning

urban planning; policy; United States; France

This report reviews the challenge of finding a balance between urban development and open space preservation, considering both periurban and intra-urban spaces. Open space as defined includes urban agriculture. (JS)

Weise K., Boyd, I. **(2001) Madhyapur Thimi Municipality, Nepal Urban Agriculture Support Programme Integration of urban agriculture in planning. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning rural-urban linkages

zoning; Nepal

This article deals with land and other aspects of integration of urban agriculture into the land-use planning of Madhyapur Thimi municipality located in the centre of Kathmandu Valley in Nepal. Traditionally, municipalities in the country are defined on the basis of (the accumulation of) non-farm activities with agriculture considered a rural activity. This is one constraint confronted by efforts to promote urban agriculture. How this problem was overcome together with issues of land development strategy is narrated in the article.

Wekerle, G.R. **(2001) Multicultural Gardens: Changing the Landscape of the City. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**

land use planning community development horticulture

Canada; leisure; PRA; multi-cultural society; immigration

Toronto is one of the world's most multicultural cities, yet, until recent years, the landscape of the city reflected primarily an Anglo-American tradition in landscape design and private gardens. This has changed. The landscapes of private gardens and public spaces, including parks, have begun to reflect the diversity of ethnocultural communities that inhabit and use these spaces. Horticulture forms the

basis for communication across cultures; in some instances,it generates conflicts over public plantings and the appropriate use of public space. Immigrants to Toronto bring with them rural traditions formed in far flung parts of the world. Gardeners from Southern Europe, Latin America, the Caribbean, and South Asia bring to the city their agricultural experiences and make new demands on the city to meet their needs for earth to grow foods and plants from their homelands. Drawing from intensive interviews with immigrant gardeners, the paper reports on key themes emerging from the research: the importance of urban agriculture in maintaining cultures and traditional knowledge; the use of urban gardens to transmit culture to the next generation; how horticulture forms the basis for communication across cultures; and the emergence of an underground economy, divorced from the market economy, of seeds and plants to meet the needs of immigrant gardens.

Wekerle, G.R.. **(2001) Planning for Urban Agriculture in Suburban Development. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**
land use planning
Canada; immigrants

An examination of suburban development plans and official plan documents revealed that planning for urban agriculture in suburban development planning is non-existent in North American cities. While proponents of urban agriculture seek land for food production on remnants and left-over spaces in the core, built up areas of cities, they ignore the potential to include spaces for urban food production in the settlements of the future, from the outset. The potential inclusion of agriculture in sub-urban planning is illustrated for Toronto, Canada

Who owns this lot? **(1998). In: Idbamerica (September-October 1998) p. 13**
land use planning
South America; land tenure; access to land; digitisation; Geographic Information Systems

With the aid of the Interamerican Development Bank, South American countries are providing both rural and urban dwellers with cadastral certificates land titles. This remapping of city areas is done using a GIS software database linked to digitised versions of aerial maps. (WB)

World Wildlife Fund for Nature **- India (1991). The wetlands of Calcutta: sustainable development or real estate takeover? WWFN, India, 24 pages + annexes, maps, tables. bibliography**
land use planning
wastewater; waste management; environment; land use; periurban agriculture; India

This report presents a good exposition of the issue of urban expansion unto agricultural and natural resource lands. The eastern wetlands of Calcutta are a

world-leading example of intensive production of vegetable and fish based on municipal solid waste and wastewater. The SSFR-I presents the story beginning in 1777 and looks sharply to the future. (JS)

You, Nicolas **(1981). Alternative strategies in urban development: some Chinese experiments in a quest for agrapolitan space. In: Third World Planning Review vol. 3 no. 1 (Feb 1981) p. 77-93**

land use planning community development rural-urban linkages

China; community initiatives; land use planning; rural-urban linkages

Gives a detailed account of land use planning in China since the era of the Han Dynasty up to our days. Rural-urban linkages have always been strong in China, urban dwellers maintaining close links with their ancestral home village. Since the 1950s, the relationship between city and countryside has known different levels of appreciation, but bringing the two closer together was always an overriding aim: 'urbanise the countryside, and ruralise the city'. This article provides interesting background reading and is very revealing about policy considerations of Chinese officials. (WB)

Yoveva, Antoaneta; Gocheva, Boriana; Voykova, Galya; Borissov, Boris; Spassov, Al **(2000). Sofia: urban agriculture in an economy in transition. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 501-518. DSE, GTZ, CTA, SIDA**

economic impact land use planning

crisis response; food security; food processing; food policy; land use systems; health; ecology; economic impact; reuse of waste; poverty; land tenure

Historically urban agriculture and processing of produce is common in Sofia in various forms. With the transition to a market oriented system it function and importance changed. There are private farms and household agriculture in different forms in Sofia. Urban agriculture provided mitigated the impacts of the collapse of the economy. People could reduce their food bill and generate some additional income. Production is for self-supply and the market. At the same time it is attractive to change the land allocation from agriculture to residential area to maximise short term profits. Environmental pollution poses serious problems to agriculture as industries during the socialist era could contaminate the area unchecked. Under pressure because of budget cuts are the remaining government institutions, which could facilitate urban agriculture, could exercise the necessary control on product quality and uphold regulations. Unclear land tenure situation is a serious constraint. Environmental awareness and proximity of markets and knowledge infrastructure present good opportunities to enhance urban farming. (NB)

Yoveva, Antoaneta. and Mishev, P. **(2001) Urban Agriculture and Urban Planning in Bulgaria. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning
Bulgaria; zoning; Geographic Information Systems

In CEE countries and in Bulgaria the agricultural production in urban and periurban areas has been important for food supply as well as family income as a response to the decline in the economy and the introduction of open market principles. Urban agriculture in this regard has functioned as a social safety net for the poorer sections of society. Under the SWAPUA project the characteristics of various types of farming that can be found in and around cities in CEE/NIS countries have been identified, with emphasis to soil and water management issues. The project results are policy recommendations based on the exploratory surveys implemented by SWAPUA as well as the participatory planning processes with a variety of local stakeholders that have been initiated by the project partners. In this paper the case study of one of the Bulgarian cities, Trojan, is presented and the specific rules for urban development related to UA.

Yueng, Yue-man **(1988). Agricultural land use in Asian cities. In: Land Use Policy (January 1988) p. 79-82**
land use planning
China; Hong Kong; India; Singapore; land use; home gardening; urban livestock

Highlights the contribution of urban agriculture to feeding the populations of the south-east Asian megacities. In many cases (China, including Hong Kong, and Singapore) impressive progress has been achieved but other countries in the region still lag behind. The author argues that, apart from practical aspects, such as the availability of land and water, there are still important psychological barriers with regard to farming in the city which should be overcome. (WB)

Zeeuw, Henk de; Waters-Bayer, Ann; Dubbeling, Marielle **(1998). Integrating agriculture into urban planning and action: some options for cities. ETC International, PO Box 64, 3830 AB Leusden, The Netherlands**
land use planning
urban planning; food security; urban environment; economic impact; nutrition; health; institutional aspects; urban policies; wastewater reuse

From the notion that agricultural use of urban areas is an integral part of the urban productive system the paper analyses the growing importance of urban agriculture. The potential impacts of urban agriculture on food security, health, nutrition, the environment and community development are revisited. Next the constraints for the development of urban agriculture are outlined ranging form prohibitive policies to limited access to resources and lack of organisation among farmers. Based on the a-fore going, policy options are presented aiming to improve and promote urban agriculture as a viable activity. The options call for integrating urban agriculture in existing urban policies on food-security, health, waste management etc. The article concludes with approaches to come to action emphasising the need for integrated approaches and including an example form the Netherlands. (NB)

Zeeuw, Henk de; Guendel, Sabine; Waibel, Hermann **(2000). The integration of agriculture in urban policies. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 161-180. DSE, GTZ, CTA, SIDA**
land use planning
urban planning; urban policy development; food security; ecology; health policy; land use policies; income generation

The article summarises the discussions and conclusions of the working groups and plenary sessions of the International Workshop on urban agriculture “Growing Cities, growing Food: Urban Agriculture on the policy agenda”. A range of policy options (including examples) are described under the following themes: Food security and subsistence production, city ecology, income and employment generation and to community development. Lastly a strategy for creating an enabling environment for the development of urban agriculture is presented. (NB)

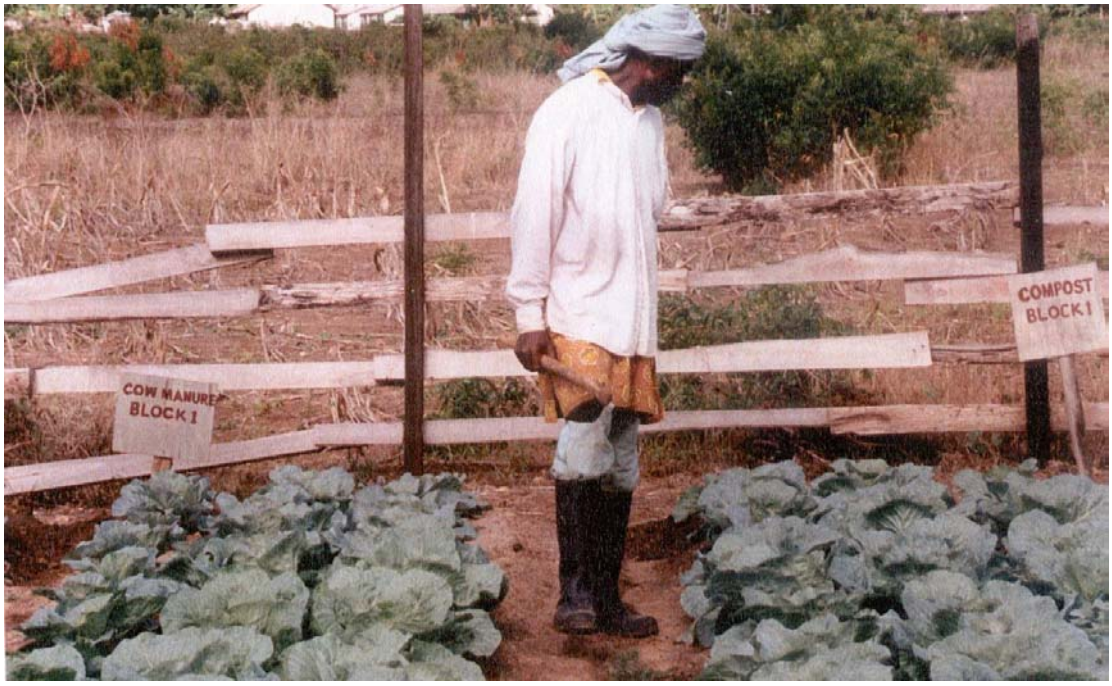
Zurayk, R., Talhouk, S., Chatila, J. and Abdul-Samad, L. **(2000) Environmental costs of periurban agriculture in coastal Lebanon. . In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).**
land use planning horticulture
Lebanon; environment; cost-benefit; commercial

The notion of urban agriculture carries an intrinsic "small scale" connotation. On Lebanon's heavily urbanised coastal zone, intensive agriculture occupies large areas, and competes for space with human

settlements and natural ecosystems. Urban farming is favoured by a mild climate, the availability of water and a closeness to markets. In this paper, we describe the main periurban agricultural systems, which include open field vegetables, protected cultures and banana orchards. The environmental significance of the high input production, such as heavy fertiliser and pesticide application is also addressed. Special reference

is made to the implications of the competition between agriculture and natural space on plant biodiversity. Data on plant biodiversity in periurban agriculture and natural space is presented, along with GIS analysis of the dynamics of land use in selected locations on the Lebanese coast.

3.4 Research and Development Methodology in Urban Agriculture



Compost versus cow manure, any difference?

(Picture: Dagmar Kunze)

A Methodological Review of Research into Urban Agriculture

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1. Introduction

If Urban Agriculture (UA) can be considered one of the most important elements in cities for achieving sustainability (Smit et al., 1996), does research have a contribution to make? This document discusses this question and reviews some methods that have been used to study urban agriculture. The methodological aspects of urban agriculture research are considered from actor-oriented and action-research perspectives.

Recent studies on urban agriculture have measured many different variables in diverse contexts most commonly to understand the impact of the urban agriculture activities and its potential for improving life in cities.

This paper seeks to:

- discuss the implications for research of the main characteristics of urban agriculture,
- describe the disciplines, research approaches and methods used for understanding urban agriculture,
- explain the contribution of the different methodologies to urban agriculture research,
- and, to discuss the contributions new methodologies could make.

2. Definitions

To be clear (and not pedantic) in our discussions we offer the following definitions that provide a certain structure to the analytical framework:

- We will use the phrase *a methodology* to mean a system of methods and principles used in a particular discipline or set of disciplines. *Methodology* itself is the philosophical study of method.
- *Methods* can be defined as the techniques of a particular field or subject.
- A *tool* is any object, skill etc. used for a particular task.

2.1 Integrationist methods and systems approaches

Multi- or interdisciplinary research provides a range of perspectives and perceptions through which data and information can be analysed and interpreted. Those involved should keep an open mind about researchable questions and where the solutions may lie.

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Systems methodologies can meet the need for exploring between different perspectives - farmer and researcher, biologist and social scientist- to achieve collaboration rather than conflict. A range of techniques can be used to facilitate this based on the principle that communities or organisations facing problematic situations only cohere if they are competent at dealing with differences that emerge within the group.

2.2 Qualitative and quantitative analysis

Qualitative information refers to the descriptive type of data collected and is concerned with the quality of an observation or idea. Such data may involve an assembly of insights rather than numbers. This is a challenge to the conventional scientific view that everything can be measured and is therefore *quantitative.*

Different methods have been used to collect qualitative and quantitative information on urban agriculture. In addition, different disciplinary foci have been used to study urban agricultural dynamics such as urban development and land use; strategies of urban farmers involved in production; natural resource management; production systems; commodity and food systems. Many of the approaches aim to involve different actors by consultation through questionnaires, survey, interviews or participatory methods.

3. The methodological implications of urban agriculture characteristics

3.1 Change and turnover

Urban agriculture can be characterised as being prone to change. Indeed, due to the often transitory nature of urban agriculture it is often considered to be a new phenomenon. The space and resources available to urban agriculture practitioners vary both quantitatively and qualitatively over short periods of time. Land-use options in the urban context are various and subject to a plethora of driving forces. This dynamic causes heightened degrees of complexity in the relationship of urban agriculture and its environment.

In addition, the people involved in urban agriculture often have competing demands on their time. The urban setting can present people with different opportunities for employment and income generation (formal and informal) and this results in urban agriculture being one of a repertoire of livelihood activities. This is brought into sharp focus when urban agriculture practitioners are from the more marginalised sectors of the urban population, which is often the case in developing countries.

Before research can make a contribution to urban agriculture it is faced then with the requirement of understanding a system that is prone to change (pressure exerted by exogenous forces), and where a complex set of relations exist with other forms of land-use and activities in the same context. Research then needs to take a dialectical approach to any situation analysis and impact assessment whereby the current mode of urban agriculture is understood as a response to exogenous and endogenous factors.

3.2 Knowledge and innovation

The development of urban agriculture has been largely practitioner-led. Research is trying to catch up with this process and identify the contributions that can be made. Research has the

chance to learn from the successes and failures in addressing other forms of agriculture, and to identify and address the researchable questions of urban agriculture in a proactive way.

The contribution of indigenous technical knowledge (ITK) and traditional knowledge on agriculture from rural settings has yet to be evaluated. However, given the different context (urban rather than rural), the different resource base and the different functions urban agriculture fulfils, it is safe to say that the process of adaptation and development of knowledge and technology for urban agriculture will generate the need for innovation. Researchers who wish to engage with the development of urban agriculture will need to take a constructivist approach to innovation facilitation whereby researchers recognise that they are just one of a set of actors involved in the process.

4. Classification of methods

4.1 Social research methods

Social research methods such as survey, questionnaire, case study and interviews have been widely used to assess the impact and contribution of urban agriculture on food security and nutrition, and in terms of management decision-making. Methods have been adapted or appropriated from Farming Systems Research (FSR) in order to make typologies of production systems, target group identification, system characterisation and problem diagnosis as elements towards the implementation of effective solutions to the problems identified. Information collection and data gathering is by questionnaires, surveying and participatory methods.

4.2 Ecological research methods

Ecological methods have been used in urban agriculture to evaluate and determine the significance of biodiversity, particularly agrobiodiversity and its contribution to food production. In addition, ecological methods have been used to study positive and negative impacts of the urban agricultural activities on the environment and to determine undesirable side-effects such as urban sanitation (Siegmund-Schultzea, et al., 1998), contamination and various types of damage, and to quantify the effects. A few studies have attempted to identify the beneficial aspects of growing food in urban areas, providing habitats for wildlife and many other environmental benefits. However, studies to determine the significance of encouraging biodiversity in these open spaces as a way to preserve natural or native resources have not been carried out.

Environmental methods used in urban agriculture have focused on ways of dealing with wastewater and organic wastes. In addition, they have been used to assess urban agriculture sustainability, including a diverse set of indicators (Jansen et al., 1996; Barret and Browne, 1991; Lynch, 1995; Rees and Wackernagel, 1996).

4.3 Economic research methods

For some urban farmers, particularly where the food produced is commercialised, financial costs and profit maximisation are very relevant. For others who use urban agriculture as a form of subsistence, other economic issues are important. For this reason selecting the appropriate techniques according to the socio-economic context is a priority. Other less tangible economic benefits that should be valued include the reduction of risk, less dependence on external inputs and demand for credit. A quantitative technique often used is cost-benefit analysis (CBA). Private or financial CBA uses market prices to value inputs and

outputs. However, CBA only offers partial results from a comparison of a limited number of urban agriculture practitioners. In addition, the production function approach measures different input quantities, and the amount of physical or monetary output (Ruben and Heerink, 1998). The production function approach is data intensive.

Economic methods have been used to determine the economic importance of urban food production. For example, Jansen et al., used this methodology to estimate the profitability and sustainability of periurban vegetable production in Vietnam. They found that vegetables provide about $1000 total revenues or $650 added value/year/farm. Little attention has so far been paid to livestock rearing in this context and its role in providing income for urban families and in their social integration.

Only recently have the non-material benefits and externalities derived from urban agriculture such as leisure, relaxation, exercise and others, been evaluated using ecological economic methods.

4.4 Biophysical research methods

Different biophysical methods have been used to study issues related to urban agriculture. Entomological methods have been used in order to identify the main crop pests that are present in allotments in Leeds, UK (Atkinson et al., 1979), and soil analyses have been used to determine soil nutrients and physical characteristics.

In order to determine soil quality, the fauna present in soil has been used as a reliable bioindicator of soil quality in addition with other chemical and physical analysis. The use of animals, plants and microorganisms as bioindicators of environmental impact is a well-established concept. However, this method has not been used in urban agriculture to determine the importance of soil organisms related to management practices.

5. Social research methods

The introduction of social methods to study and analyse urban agriculture has made a great contribution. Perhaps social methods are the most used. Using social research methods models have been developed to explain how social groups are related to urban agriculture activities. The basic topics studied have been gender, poverty, household welfare and social class.

5.1 Participatory methods (practitioners, gender, evaluation, diagnosis)

Participatory research methods emerged in the late 1970s, partly from the Farming Systems Research movement in developing countries, as a response to the disillusionment with conventional agricultural development efforts and in order to find ways to interact more effectively with local rural people (Chambers, 1992).

Participatory methods have the rigour derived from the social sciences, especially those based on qualitative and inductive techniques. They are constantly evolving, being fine-tuned and adapted to new situations. Participatory methodologies for appraising local living conditions and natural resources are increasingly widespread, but approaches that involve local people in evaluating urban agriculture projects or monitoring local urban agriculture conditions are less well developed and documented.

Participatory approaches are used in urban agriculture studies that recognise the central role of people in urban localities in the development of agricultural pursuits. In order to analyse allotment management and use in terms of gender and ethnical identity methods of Rapid Rural Appraisal have been used such as semi-structured interviews, seasonal calendars, mapping, time lines, SWOT and force field analysis (Perez-Vazquez and Anderson, 2000).

5.2 Survey and interview methods

Through s*urveys* data is gathered from people in the field and filtered through the perceptions of the research team. Sampling of a range of experiences and people takes place, but not necessarily in a statistical or representative sense. The term 'purposeful' is often used to show that data is sought in a deliberate way to provide rich detail and insight.

In order to assess diverse positive and negative effects of urban agriculture survey studies have been carried out in different cities associated with food production. Table 1 shows different studies where survey methods have been used to address different issues related to the importance and significance of urban agriculture.

Table 1: Examples of studies carried out in urban agriculture using interviews and questionnaire surveys

Study purpose	**Reference**
To determine urban gardens used at different housing densities in the suburban areas of London	Mackintosh and Wibberley, 1952
To acquire information about two types of urban cultivation (plot gardens and front yard) in Lusaka, Zambia	Sanyal, 1985
To examine the situation of urban agriculture in South Africa	May & Rogerson, 1995
To provide donors, researchers and development practitioners with an overview on research and development projects	Gura 1995
To identify the influence of policy changes on the income and cropping system of periurban agriculture	Jansen et al., 1996
To evaluate environmental degradation caused by keeping livestock	Molongo, 1997
To evaluate the household food production in Harare, Zimbabwe	Smith & Tevera, 1997
To examine the urban popular gardens in Havana as food security	Chaplowe, 1998
To test the positive impact of urban agriculture on household food security and nutritional status	Maxwell et al., 1998
To investigate damaging effects for the environment of keeping dairy cattle in the city (Dar es Salaam)	Mlozi, 1997
Analyse the characteristics of urban agriculture in Kenya set within a wider conceptual and socio-economic context	Memon and Lee-Smith, 1993
To collect data on the socio-economic situation, goals and problems of sheep keepers (72) and non-keepers of small ruminants (64) in two locations, a central and a peripheral	Siegmund-Schultzea, 1998

quarter of Bobo Dioulasso	
To determine the contribution of urban gardens to the nutritional intake and the effect of the gardens on the community	Moskow, 1999
To describe commercial vegetables produced in Lagos & Port Harcourt, Nigeria and to determine profitability of farm resources in urban agriculture	Ezedinma & Chukuezi, 1999

Survey questionnaires were used by Lado (1990) to determine urban agriculture spatial distribution and general characteristics in terms of agricultural practices, crops cultivated, consumption patterns and crop produce disposal. Using surveys in six towns in Kenya, Memon and Lee-Smith (1993) found that urban agriculture productivity was higher in the capital city (9 tons/ha) compared to the norm for all towns (3.2 tons/ha), which was higher than the rural agriculture productivity. Interviews were carried out by Prudencio (1994) to determine the general characteristics of urban agriculture in different Latin American countries. Muller (1998) studied the importance of urban agriculture in assessing food security through using interviews in Burkina Faso. She found that high socio-economic status of the gardeners is associated with producing a wider range of vegetables and fruits, most of which are not indigenous but European. Gockowski (1998) carried out a random survey of 208 households in 16 villages lying between 12 and 90 kilometres from Yaounde to investigate the urban agriculture processes and derive implications for research and development. Interviews have been also used to determine the impact of urban agriculture on household income and local economy (Nugent, 2000). It was found that the decision to farm and the level of effort spent on urban agriculture do not have a clear-cut relationship with income, wages, prices or employment opportunities. Questionnaire surveys, combined with multivariate analysis, were carried out by Bellows (2000) to establish the complexities inherent in why urban farmers cultivate land in environmentally challenged regions.

Table 2 shows the different social methods that have been used to address different situations related to urban agriculture. It can be seen that questionnaire surveys and interviews are the most used methods and that participatory techniques have been used less.

Table 2: Methods used to gather information from urban agriculture.

Reference	**Questionnaire survey**	**Interview**	**Case study**	**Semi-structured interviews**	**Participatory techniques**
Chaplowe, 1998	**X**	**X**			
Molongo, 1997	**X**	**X**			
May & Rogerson, 1995	**X**				**X**
Floquet, 1999	**X**	**X**			**X**
Maxwell et al., 1998 Maxwell 1995	**X** **X**		 **X**		
Jansen et al., 1996	**X**				
Smit & Tevera, 1997	**X**				
Lourence-Lindell, 1995	**X**	**X**			
Obosu-Mensah, 1999		**X**		**X**	

Ezedina & Chukuezi, 1999	**X**				
Moskow, 1999		**X**			
Mlozi (1997)		**X**			
Lynch (1994)	**X**	**X**			
Lado, 1990	**X**				
Memon and Lee-Smith (1993)	**X**				
Prudencio, 1994	**X**				
Muller, 1998		**X**			
Gockowski, 1998	**X**				
Siegmund-Schultzea et al., 1998	**X**				
Gertel and Samir, 2000	**X**	**X**			
Nugent, 2000	**X**		**X**		

5.3 Case studies

The aim of the case study is in-depth descriptive analysis and/or investigation of a situation (Yin, 1994). The focus of a case study is on the detailed structures, patterns or interrelationships observed within each individual case included in the study, though the cases themselves may be selected to cover a range of different types of study unit.

Nugent (2000) analysed urban agriculture case studies carried out in different countries and found that they are extremely variable in their sampling methods, scope and presentation of data. Case studies in urban agriculture have revealed trends in the relationship between urban agriculture and nutrition (Maxwell et al*.,* 1998) and its impacts in terms of policy implications and urban planning. A case study was also conducted in Gambia (Schroeder, 1993) to identify questions on the growing practice of planning voluntary environmental programmes using unpaid female labour in gardens and orchards. Maxwell (1995) carried out a series of case studies and surveys to understand the forces behind urban farming and its impact at the household level, intra-household dynamics and gender relations in Kampala. A case study to determine the level of awareness of local authorities in England and Wales of the value of urban food production was a part of the broader Local Agenda 21 project carried out using questionnaire surveys (Martin and Marsden, 1999).

5.4 Gender analysis

Gender analysis is another methodology that has been adapted recently to study urban agriculture. The purpose of this methodology is to provide a qualitative and quantitative tool that allows an overview of gender issues related to urban agriculture (Hovorka, 1998). Gender analysis attempts to understand and document gender dynamics within urban agriculture systems and is designed to raise issues and promote active learning and thinking on the relevance and importance of gender analysis in urban agriculture research.

5.5 Historical analysis

Historical analysis and documentary investigation are other methods that have been also used to evaluate the evolution of urban agriculture. These methods are useful for synthesising information from different sources so as to understand the historical development of urban agriculture and to explain the present forms of urban agriculture. A historical study was carried out by Bell (2000) in order to analyse the Velledupar land use, landscape change and management and as a tool for planning and understanding land use changes.

6. Ecological research methods

6.1 Biodiversity, richness, and complexity

Industrial or conventional agriculture is based mainly on the intensive use of inputs and has reduced crop diversity (Altieri, 1995). Biodiversity in terms of agroecosystems includes not only a wide variety of domesticated species, but also wild plants and the many ways in which farmers can exploit biological diversity to produce and manage crops, land, water, insects, and biota (Giampietro et al*.,* 1997). The concept also includes habitats and species within farming systems that benefit agriculture and enhance ecosystem functions.

There are two major types of biodiversity of interest to ecologists, ecology diversity and species diversity. Species diversity consists of the two related components: species richness and relative abundance / dominance / equitability. Ecological methods (descriptive and analytical) to define some environmental impacts can be used. The agrobiodiversity (crops and weeds) can be estimated using the Simpson Index and Shannon-Wiener Index. The Simpson Index gives more weight to common species than the Shannon-Wiener Index. However in practice, for example considering the effect of agriculture practices such as grazing, fertiliser, etc., species richness is a useful a measure as any of the two other indices (Moore and Chapman, 1976).

The ecological footprint methodology has also been used to understand how surrounding rural and natural areas are being affected by cities (Rees and Wackernagel, 1996)

6.2 Energy analysis

Energy, a vital resource in every human transformation activity, is used in agricultural production for machinery, transport, irrigation, harvesting, weeding, fertilisers, pesticides and other activities and management tools. Fossil fuel input is indispensable to most forms of urban and rural agriculture. The energy crisis, referring to fossil fuel, will have a significant impact upon food production in all parts of the world (Pimentel et al., 1973).

In order to produce food, natural ecosystems have been transformed in agroecosystems. Crops convert solar energy into particular forms of biomass such as food, fibre, fuel or other human commodities. At present, conventional agriculture is more dependent upon external inputs than it was in the past (Pimentel et al., 1993). However, urban agriculture is an enterprise that uses varying quantities and quality of inputs. Energy is considered an indicator of the intensification of production process and also a sustainability indicator. Various methods (input-output analysis, process analysis and statistical analysis) have been developed to measure energy efficiency in agriculture. Historically, energy utilisation efficiency has been estimated using Energy Ratio (ER) and Energy Productivity (EP). The label “Energy Analysis” was recommended by the first workshop on energy analysis sponsored by the International Federation of Institute for Advanced Study. In fact energy

analysis gives important information in relation to the possibilities for saving energy and this technical determination can be overlaid with economic analysis to establish the choices that should be made in the future.

Since the late 1960s there have been a large number of studies that analyse and compare the use and efficiency of energy in agriculture, particularly after the oil crisis (Pimentel et al., 1973). Both energy and economic analysis provide useful information to explore the flows of energy and materials inside of the urban agriculture and also between urban agriculture and the region interactions.

An energy and mass flow analysis has been carried out to analyse the urban agro-ecosystem, the “marais” of Paris, France. The marais system appears to be one of the most productive ever documented urban agricultural production systems and was based on the addition of vast quantities of stable manure into a highly fertile soil, and inter- and successional cropping (Stanhill, 1977). The method used to evaluate this system was input-output, through accounting for all inputs used for producing output and the energy contained in both (inputs and outputs).

7. Environmental research methods

7.1 Pollution and soil contamination

Local food production in big cities is always exposed to a high level of contamination, and leafy vegetables are particularly susceptible. The sustainability of urban agriculture will depend on social acceptance in terms of food safety, which is of major concern to many metropolis populations. However, food safety depends on a healthy environment in terms of soil, air and water, which means freedom from poisons such as chemicals or contamination by heavy metals. It is widely acknowledged that heavy metals such as lead, zinc, mercury and others can cause direct health impacts. In UK many allotment gardens in the metropolis are constantly exposed to car emissions and/or industrial contamination. Added to which many allotment gardeners still use some agro-chemicals. Heavy metal chemical analysis is being used to determine level of food and soil contamination. Chemical analysis methods to detect heavy metals have been used to determine soil and vegetable contamination. Perez-Vazquez and Anderson (2000) measured and compared concentration levels of heavy metal contents in soil and vegetables, at urban and rural sites. Methods using different chemical extractors (Aqua regia and EDTA) produced different results, in terms of concentrations of particular metals. It was found on average, that urban sites had higher concentrations of lead, zinc and copper. An investigation conducted by Van Lune (1987) in 57 allotments in the Netherlands used chemical analysis to determine some heavy-metal concentrations (of cadmium and lead) in the soil and crops (lettuce, carrots, kale). It was found that the median concentrations in the soil were higher than those in normal Dutch soil used for arable farming.

7.3 Urban planning

In relation to urban planning, participatory methods including different activities (consultation, formulation of integrated strategy, follow-up and consolidation) have been used (Mwalukasa, 2000). Through this bottom-up and stakeholder driven process critical issues are identified and prioritised to prepare strategies and action plans working together with stakeholders and local authorities. Compatibility matrices have been used to assess various degrees of compatibility between different categories through and actor-oriented approach for urban planning (Bucio, 2000).

8. Economic research methods

8.1 Conventional methods of economic valuation

Cleveland et al., (1985) studied two gardens in Tucson, USA, to determine the economic performance (net returns) that could be expected from gardening. Data (inputs and outputs) collected for a period of 2.5 years and monitoring and analysis of prices in urban markets and supermarkets economic performance was made using cost benefit analysis (CBA). Nugent (2000) estimated the money saved by growing own food through using market surveys and CBA. This framework has been also used to determine both positive and negative effects of the urban agriculture activities and quantify those impacts.

Technical criticism of CBA may be summarised under five major aspects: quantification, discount rates, risk and uncertainty, intangibles and externalities and equity. CBA has been criticised by those who dispute the assumptions of welfare techniques. In spite of these criticisms, CBA remains a viable method although it does not resolve trade-offs between equity and efficiency and between quantifiable and intangible outcomes.

Some other methods, such as output values and surveys, have been used to determine the household income and the local economy related to urban agriculture by calculating the value of the output produced by this sub-sector (Nugent, 2000). It has been found that because much of the output from urban agriculture is not sold in markets, prices cannot be easily determined. In relation to this, the author stresses the need for developing a standard research methodology for assessing the economic impact of urban agriculture globally. Nugent mentioned that *accounting matrixes* could be also used to examine the input-output relationship to urban agriculture. This analysis should include informal sector and non-market activities, along with gender disaggregation.

In addition, non-parametric software programmes are starting to be used (e.g. Nudist, Nvivo and others) in urban agriculture studies that allow for and provide confidence intervals for several analyses to determine indicators that are most and least important in urban agriculture.

8.2 Methods of economic valuation (valuing goods and externalities)

In the economic literature there are several techniques that have been used to value nonmarket benefits. However, a choice of valuation methods should be based on the aims and object of the valuation study. Usually three sets of techniques are used for valuing or estimating the values of services not explicitly priced by markets. Those are: a) the hedonic technique, which measures the value of resource services that are obtained through the purchase some market good; b) the travel cost technique estimates values using the travel costs that individuals incur to access a resource service; and c) contingent valuation method (CVM) that elicits values directly from the individuals who are potentially affected by a change in management policy.

As has been stressed before, methods that rely heavily on the valuation or quantification of all the externalities have not been used in urban agriculture. The use of these techniques implies first the identification of the potential and latent sources of externalities and then estimation of their “value”.

Contingency valuation method was used to estimate the “whole” value of benefits and services derived from allotments, through assessing an individual’s willingness to pay (WTP) or intention to accept (WTA) to keep allotments (plot or site), comparing plot holders with non-plot holders (Perez-Vazquez et al., 2000). It was found that the estimated value (WTP and WTA) for allotments differed between plot holders and non-holders, higher values being obtained from plot holders.

However, the use of conventional economic methods and those developed to assess the economic value of externalities have not yet been adequately adapted for analysing urban agriculture.

9. Biophysical research methods

9.1 Modelling methods and mathematical models

Some simulation models have been developed to aid the analyses of urban agriculture. Perhaps the weakness of the approach is that modelling always involves a considerable abstraction from and simplification of reality and is very dependent on the underlying assumptions. In sustainability studies of agroecosystems there is a need for better techniques to integrate socio-economic and biophysical aspects and at the same time to integrate qualitative and quantitative approaches. System dynamic models are suitable for such interdisciplinary qualitative/quantitative approach and analysis.

Cluster analysis has been used to reveal socio-economic differences in terms of urban agriculture (Siegmund-Schultzea, 1998) and *principal component analysis* has also been used for identifying periurban vegetable producers as a tool for research and technology development (Kieft, 1994).

9.2 Geographic Information systems (GIS)

GIS is seen as an essential instrument in the effective use of geographic information, whether for planning, decision making or forecasting. GIS is a powerful method that has been used to perform studies on land use and it has also been widely used in the management of information for planning and decision making purposes. However, the possible application of GIS in urban agriculture has been very little explored.

This method permits the stratification of very large regions into target areas prioritised for future research. It gives some insight into the nature of problems expected in these areas, predictions largely corroborated by limited ground truthing, interviews and existing literature. It is still not possible, nor logical, to rely solely on secondary agricultural or agroecological data for this type of analysis. The organisation of data and interpretation of results from GIS analyses are much strengthened by fieldwork.

10. The need for new methods for assessing urban agriculture

A closer examination of the literature on urban agriculture research reveals that most studies have used methods such as interviews and questionnaire surveys to describe and analyse urban agriculture as it presents itself today. These studies are associated with ideas of home-consumption in cities and the household economy. Studies are essentially related to empirical investigations of the incidence and importance of urban agriculture for urban food production

with emphasis on the descriptive verification of their significance. The methodologies used in urban agriculture may be grouped in three broad categories:

- those where the research is based on questionnaires;
- those using participatory methods and case studies;
- those using some combination of economic and ecological methods.

Methods are required for a better diagnosis and design of urban agricultural activities in order to identify their importance and contribution and the roles of the different stakeholders. These methods should enable the use of different approaches (qualitative and quantitative) to assess biological, social and economic aspects to provide better knowledge of the urban environment and the available resources and constraints.

If research is to make a valid contribution to the development of urban agriculture and to sustaining urban centres, effort is required for the establishment of effective knowledge networks whereby researchers can engage with urban agriculture and answer the researchable questions identified.

Tacoli (1998) has pointed out the need to investigate rural-urban linkages through flow analysis and impact of flow analysis to: identify actors involved, evaluate income derived, evaluate income distribution, access benefits in terms of resource access and control.

New paradigms for pro-poor research & action have been developed over the last few years based on the need to understand livelihoods as a result of the access to and use of assets by households within the context of formal and informal institutions. The Sustainable Livelihoods Approach (http://www.livelihoods.org) developed by DFID UK presents a checklist for research and action on poverty and frameworks such as this need to be incorporated into urban agriculture research protocols.

Agbayani, A.L. P., Holmer, Robert J., Potutan, Gerald E., Schnitzler, Wilfried H. **(2001) Quality and quantity requirements for vegetables by private households, vendors and institutional users in a Philippine urban setting. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden, The Netherlands.**

R&D Methodology horticulture

Philippines; market survey

Two studies were conducted to characterize the demands of private households, vendors and institutional users for fresh vegetables in Cagayan de Oro City, Philippines. Specifically, these surveys aimed to provide baseline data for decision-makers and farmer practitioners to further improve the market transparency for vegetables and, thus, contribute to better producer and consumer linkages. The first survey was conducted in February 1998 within different urban and periurban districts of Cagayan de Oro. The second survey using administered questionnaires was conducted in June 1999. A sample group of one hundred respondents was chosen randomly after clustering the various groups of institutional users of fresh

vegetables. The generated data of both surveys were subjected to descriptive statistical analysis.

Agyemang, K; Smith, JW **(1999). Counting the costs and benefits of implementing multi-country collaborative research projects: the case of the periurban Inland Valley Dairy Project in West Africa. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.). International Livestock Research Institute (ILRI), Ibadan, Nigeria**

economic impact R&D methodology

multi-disciplinary projects; agricultural research

Costs mainly associated with consultations, communication problems and bureaucracy are far less than the benefits including capacity building, institutional linkages information sharing and methodology development. (NB)

Allison, M **(et al.) (1998). A review of the urban waste in periurban interface production systems. 2 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**

waste recycling wastewater reuse rural-urban linkages R&D methodology

urban wastes; organic wastes

Provides a dense overview of uses of urban waste and wastewater and examines factors affecting the use of wastes in agriculture. Attention is drawn to the fact that there are important gaps in our knowledge about the quantitative need for organic wastes in urban and periurban agricultural systems and about the potential to satisfy these needs. (WB)

Anderson, S. and Vazquez, A.P. **(2001). The contribution of research to Urban Agriculture: a methodological review. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology

methodologies; methods

Developments in urban agriculture (UA) have been practitioner-led. Researchers are trying to catch up and identify what contributions they can make. In this article the authors review some methods that have been used in the study of UA from actor-oriented and action-research perspectives. Different disciplinary foci have been used to study urban agricultural dynamics such as urban development and land use;

strategies of urban farmers involved in production; natural resource management; production systems; commodity and food systems. Many of the approaches aim to involve different actors by consultation through questionnaires, survey, interviews or participatory methods. Social, economic and ecological methodologies and methods are discussed, while the need for new methods is discussed.

Ansaldo, R. W. **(2001) Identification and Improvement of Market Linkages between Producers and Institutional Users: A Case Study on Potato Contract Growing in the Philippines. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology

livelihoods; Philippines

Livelihood Enhancement for Agricultural Development, Inc. (LEAD) was established in the last quarter of 1996 between the Ateneo de Manila University, Xavier University and the author. Its main objective was to provide business intermediation services between large business entities requiring agriculture-based raw materials and farmer cooperatives needing markets for their produce. Based in Cagayan de Oro City and working closely with the Xavier University College of Agriculture Complex, LEAD networked with the University's circle of coop federations and members including the Philippine Federation of Credit Coops (PFCCO), Maramag Community Credit Coop (MACCCO) and Northern Bukidnon Free Farmers Coop, Inc. (NORBUFFCI). In this way, LEAD sought to identify cooperatives with the proven history, leadership and business experience needed to make the undertaking successful. The methodology is described in this paper.

Aragrande, M. and O. Argenti **(2001), Studying Food Supply and Distribution Systems to Cities in Developing Countries and Countries in Transition: Methodological and Operational Guide. Food into Cities Collection, no. 3. Food and Agricultural Organisation of the United Nations (FAO).**

R&D methodology food security and nutrition

food supply; food distribution; developing countries; methodologies

Escalating urban poverty levels in many developing countries and countries in transition have exacerbated the alarming status of food availability and accessibility. Poor urban consumers often reside in the most remote, deprived areas which tend to be neglected by local authorities. Their food security requires specific attention. The challenge is to improve food supply and distribution systems efficiency and dynamism. This should be achieved through effective, concerted and sustainable interventions.

This guide is aimed at administrators, technicians and researchers concerned with the urban food security. It proposes an interdisciplinary approach to the analysis of complex food supply and distribution systems for the identification of their present and expected constraints to select sustainable solutions. It reviews the preparation of a case study and ends with a framework for formulating urban food supply and distribution policies, strategies and programmes.

This guide discusses some methodological approaches to be followed in the case study, contains general terms of reference to be adapted to local conditions and helps identify the necessary human, logistic and financial resources as well as prepare an activity programme.

Atukunda G **(1998). An analysis of the impact of IDRC funded research projects on urban agriculture in Uganda. Workshop on Cities Feeding People: lessons learned from projects in African cities. IDRC. Nairobi. 21-25 June 1998**
R&D methodology economic impact
impact analysis; research; Uganda; workshops

This paper reports on the results and impact of an International Development Research Centre (IDRC)-supported study of urban agriculture in Kampala Uganda (88-0325) and fieldwork for a PhD thesis by David Maxwell, one of the original researchers. The study and fieldwork found that over one-third of the respondents practiced urban agriculture, mainly for subsistence, and that urban agriculture made a significant contribution to child nutrition status, especially in low and very-low income groups. Access to land and security of tenure were the major problem facing urban farmers. The research results were disseminated at a workshop held in Kampala in June 1990 attended by 50 participants, including government officials, academics, and representatives of nongovernmental organizations (NGOs); to the residents of the areas in which the survey was carried out; and at a 1-day seminar on Farming in the City, attended by about 100 researchers, policymakers, Kampala City Council authorities, NGOs and international organizations.

The impact of the project on human resource development, institutional capacity strengthening, partnerships with other institutions, gender sensitive analysis, scientific and methodological advances, and research utilization by non-researchers is discussed. It was noted that the studies were relevant and timely in that they were carried out just before the new structure plan for the city was drawn up, and that the seminars were instrumental in changing the attitudes of a number of city council officials toward urban agriculture. Urban agriculture was officially recognized as an informal activity and land use in the Kampala Structure Plan of 1994. (HC, IDRC)

Baker, J; Pedersen, PO **(1992). The rural-urban interface in Africa: expansion and adaptation; seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies)**
rural-urban linkages R&D methodology
Africa; Botswana; Zimbabwe; Ghana; urban poor; survival strategies; urban development

In September 1990, a conference entitled “Small towns and rural development in Africa under conditions of stress — adaptive strategies and survival mechanisms” was organized jointly by the Scandinavian Institute of African Studies and the Centre for Development Research, Copenhagen. This book is based on the papers that were presented at the conference. Chapters two and three outline the conceptual and theoretical contexts of the role of small towns in development. The next four chapters examine linkages between small towns and both rural areas and larger

towns in Sudan, Somalia, Zimbabwe and Ethiopia, respectively. The following three chapters examine the role of entrepreneurship in small town development in Botwsana, Zimbabwe and Ghana, respectively. The section entitled “Living conditions and labour markets” examines urban textile workers as farmers in the 1980s in Nigeria, the relationship between rural and urban life in Mtwara, Tanzania, and survival strategies of migrants to Makambako, Tanzania. The last, plus the four chapters in the final section, deal with urban agriculture and have been abstracted individually. (HC, IDRC)

Bakker, Nico; Dubbeling, Marielle; Guendel, Sabine; Sabel-Koschella, Ulrich; Zeeuw, Henk de (eds) **(2000). Growing cities, growing food: urban agriculture on the policy agenda. 542 p. ISBN 3-934068-25-1. DSE, GTZ, CTA, SIDA**

food security and nutrition R&D methodology

food security; economic aspects; ecology; waste recycling; community aspects; hydroponics; urban livestock; urban farming systems; policy environment; urban planning

This reader contributes to the debate over the value of urban agriculture for sustainable urban development in a thematic way. Definitions and presence of urban agriculture are explored. From there, potential contributions of urban agriculture on food security, household economics and city ecology are examined. Policy and institutional options and implications are discussed. The second part of the reader contains case studies from selected cities in Asia, Africa, Latin America and Europe which pursue a system-oriented approach to understanding urban agriculture and its ecological, economic and food security impacts in different political, economic, demographic and ecological conditions. The authors range from urban planners, researchers, project co-ordinators and NGO staff both from developing and northern countries. (NB)

Bastianelli, D. **(2001) Methods to Promote Healthier Animal Production: Examples in Periurban Poultry Production Around Dakar. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology urban livestock

Senegal; poultry; contamination; diseases

Animal diseases in periurban intensive poultry production are associated economical hazard for the producers. There is also health hazard for the consumer, with evidences of foodborne diseases du to poultry meat in Dakar. Most contamination and diseases originate in the inappropriate practices and buildings, as well as in the lack of regulations and controls. The objectives of the actions led by ISRA and CIRAD in Dakar are i- to develop a avian pathology laboratory to support the production sector, ii- to animate a network on epidemiological information (RESESAV) and iii- to study the contamination of poultry products through the production chain in order to identify critical points.

The involvement of veterinarians and field technicians in this effort is considerable. It

is the basis for al the actions of the network : they sensitize the farmers to the importance of prevention, they use the laboratory to help for diagnosis and provide a feedback on disease nature and severity which allow a general epidemiological survey and they facilitate access to the field for the experiments.

The development of tools and actions for the control of diseases in poultry production appears to be a “virtuous cycle” because the presence of a reliable laboratory encourages veterinarians to provide sound diagnosis and the farmers to adopt a more rational management of health in their flock, which in turn stimulates the activity of the laboratory.

Batac, J.H.,. **(2001) Performance Measurement within the Municipal Solid Waste/Urban Agriculture Continuum: A Practical Local Governance Methodology. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology waste recycling

Philippines; compost; monitoring; municipal government

The model of the municipality of Marilao has been presented in three conferences of the League of Municipalities of the Philippines (LMP) involving 1,500 member municipalities. As a result of the presentation, the mayors were able to identify and agree on the indicators for good governance, the replication process in their municipalities, the role of the LMP in the replication, and the policy issues and constraints. Based on the experiences of Marilao on waste management, treatment and reuse for urban agriculture, and assessment procedure is proposed. This assessment covers the existing capacity or strengths, the gaps or weaknesses, issues, challenges and opportunities in the realisation of managing solid waste and the eventual program of urban agriculture by the municipal or city organization. The assessment will involve both formal and informal sector stakeholders. Such an assessment can evolve the existing dynamics of physical resources, cultural or attitudinal mind sets and actions, and, power sharing and motivations among institutions and their actors. These dynamics are necessary in the identification of strategic thinking of positive goals directed at the improvement of service resulting to a favourable impact on the quality of life in an urban setting.

Botelho, Zita **(1999). Youth, urban governance, and sustainable food systems: the cases of Hamilton and Victoria, Canada. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 208-215. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

community development food security and nutrition R&D methodology

youth; food systems; Canada; ecology

This paper examines the challenges that youth groups encounter in their attempts to participate in urban decision making related to developing sustainable food systems. The background for this discussion includes an examination of several important concepts. The first is urban governance, which often frustrates marginalized political actors, thus the relationship between youth and social movements is significant to this discussion. Two relevant problems with urban institutions are that they generally do not promote ecological sustainability and that they do not support youth involvement in decision-making. The barriers faced by youth groups promoting sustainable food practices in the urban environment are discussed, using two case studies. Interviews were conducted with members of the Ontario-based Hamilton Organic Mentorship Experience project to identify the barriers they encountered in trying to participate in urban governance. The second case study is of a group called LifeCycles, located in Victoria, British Columbia. Finally, different roles and strategies for youth to influence urban decisions are suggested. (Abstract adapted)

Buceo, A **(2001) The Political Ecology of Urban Agriculture in Mexico City: An actor-oriented Approach to Explore the Links with Urban Planning. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology land use planning

Mexico; actor oriented approach; urban planning

In Mexico, lifestyle and culture rooted in prehispanic traditions have survived through activities such as agriculture. The new urban environment has transformed the spatial and political conditions upon which such agriculture takes place. In this paper a framework is presented to point out the relevance of a political ecology of urban agriculture, in other words to highlight the importance of an actor oriented approach in understanding the link between urban planning and urban agriculture. Secondly this approach is used to refer to Mexico City's farmer's interplay in the context of a local and global politicised environment.

Campilan, D., Drechsel, P.., and Jöcker, D. **(2001) Monitoring and Evaluation and its adaptation to urban and periurban agriculture. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology

monitoring & evaluation; participatory monitoring; indicators

Monitoring and Evaluation is crucial in assessing outcomes of urban agriculture related projects or policy interventions, as well as changes in urban agriculture itself. The challenge is how conventional M&E methods and indicators, generally used for

rural agriculture, can be adapted to the specific context and dynamics of urban agriculture. This paper gives an overview of existing literature the contributions to the workshop. Summaries are given in 11 annexes and 10 tables in the workshop paper. While there is already a well-established general literature on M&E in agricultural research and development, most of the reported experiences are based on the rural setting. In view of the contrasting characteristics often mentioned between rural and periurban agriculture, a distinct form of M&E in the UPA context is expected. The following questions are touched upon: how far have UPA projects taken up the challenge of adapting M&E for urban and periurban context? And does M&E require different framework / approach, methods and tools, and/or indicators when applied to UPA?

Cardinale E., Porphyre, V., Bastianelli, D. . **(2001) Methods to promote healthier animal production: examples in periurbanpoultry production around Dakar. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology urban livestock
epidemiology; poultry; networks; veterinarian; diseases; urban agriculture; methods

Animal diseases in periurban intensive poultry production mean economic problem for the producers. There is also health risk involved for the consumer. For instance the evidences of foodborne diseases in poultry meat in Dakar. Most contamination and diseases are due to inappropriate practices and buildings, and indirectly to a lack of regulations and controls.

Actions led by ISRA and CIRAD in Dakar are aimed at developing an avian pathology laboratory to support the production sector and at developing; research into the contamination of poultry products through the production chain; and facilitating a network on epidemiological information (RESESAV). The involvement of veterinarians and field technicians in this effort is considerable. The development of tools and actions for the control of diseases in poultry production appears to be a “virtuous cycle” because the presence of a reliable laboratory encourages veterinarians to provide sound diagnosis and the farmers to adopt a more rational management of health in their flock, which in turn stimulates the activity of the laboratory.

Cornish, G.A. **(2001) Assessing water quality and health implications in informal periurban irrigation. Case studies from Nairobi and Kumasi. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology wastewater reuse
monitoring; Kenya; Ghana; irrigation

This paper draws lessons from work carried out in Nairobi, Kenya and Kumasi, Ghana, where research was conducted into the nature, extent and importance of informal, irrigated agriculture in the urban and periurban zones of those cities. The research was funded by the Infrastructure and Urban Development Department of

DFID. Fieldwork in Nairobi was carried out in collaboration with a number of independent consultants while in Kumasi the project collaborated with staff from the Institute of Land Management and Development at the Kwame Nkrumah University of Science and Technology. The focus of this paper and the lessons drawn concern only that part of the research addressing water quality and its potential impact on producer and consumer health. The interest of this workshop is in the validity of the methods used to obtain information but the findings of the studies, and their conclusions, are used to illustrate the points made.

Cruz, M.C. **(2001) Participative Planning in the Development of Urban Agriculture in the city of Havana, Cuba. Appropriate Methodologies for Development of a Facilitating Framework for Planning and Policy in Urban Agriculture. Paper for topic 2 the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology

Cuba; policy

This article describes the process of integration of urban agriculture into planning in the City of Havana. The author describes the events and crucial steps taken in the popularization of urban agriculture in the city. However, it is concluded, that the integration, that is institutional and community participation is not yet optimal.

Dasso, Jose Andres. **(2001) Methodology for Analysing Interventions in Urban Agriculture in Latin America. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology

Latin America; Peru; compost; monitoring; municipal government

The present methodological proposal for analysing Interventions in urban agriculture in Latin America was designed to serve as a tool for NGOs and other institutions involved in promoting UA to systematically analyse interventions in this field and determine the effects of these interventions on farming families. The methodology also aimed to draw lessons from previous experiences to enhance the sustainability of actions carried out in this field. The paper describes a methodological proposal.

Davidson, Joan **(1988). Building more resourceful cities: community-based initiatives in energy saving, recycling and greening. In: Cities and ecology / MAB Program. - Collected reports vol. 2 p. 172-175. Division of Ecological Sciences, UNESCO, 7 Place de Fontenoy, 75700 Paris, France**

community development R&D methodology city ecology

resource conservation; environmental management; United Kingdom

Concentrates on community involvement in urban environmental management in the UK and examines various aspects of environmental management namely energy conservation, waste recycling and greening the city. (WB)

Dávila, Julio **(2001) Guidelines for Strategic Environmental Planning and Management of the Periurban Interface. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D methodology rural-urban linkages
urban planning; environmental planning; periurban interface; guidelines

The traditional separation between urban and rural authorities makes intervention's, aimed at supporting periurban farming, difficult. The aim of this paper is to present the principles and components of a strategic environmental planning and management of the periurban interface – and, by extension, of urban and periurban agriculture as salient activities in it – in a developing country context. The work presented here is the result of a research project aiming to produce a set of guidelines to be used as the basis for action at the local and periurban levels.

Delphin Regis, Mildred **(1999). Care Haiti: urban horticulture project Port-au-Prince, Haiti. Urban Agriculture Notes http://www.cityfarmer.org/haiti.html. 5 p. Urban Horticulture CARE-HAITI, 92, Rue Gregoire P.V., BP 15546, Pétion-Ville, Haiti Supplier: City Farmer, Canada's Office of Urban Agriculture**
horticulture R&D methodology
Haiti; home gardening; development projects

Offers a description of the recent initiatives in urban farming of CARE in Haiti. In two pilot sites activities started with the set up of demonstration gardens to generate interest and awareness. Based on this a number of groups have been formed for urban farming. The project aims to document technical approaches to urban agriculture, to document the food and income generation potential and to develop an effective extension and learning approach. (NB)

Dennery, Pascale **(1994). Inside urban agriculture: an exploration of farmer decision-making in Nairobi: a research proposal for a masters thesis. 18 p.**
R&D methodology food security and nutrition gender
Kenya; decision-making process; gender issues; family relationships; extended families

Provides the outline of a study undertaken to obtain insight in factors affecting farmers' decision-making processes: notably gender differences and resource allocation among different member of the household. Social relations, both inside and outside the family, are examined as to their influence on farmers' decisions. (WB)

Dennery, Pascale **(1995). Cities Feeding People project fact sheets. Cities Feeding People reports no. 15. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
R&D methodology food security and nutrition
development projects; food security; food supply; waste recycling; nutrition

A package of 26 fact sheets compiled by the Cities Feeding People Program. The fact sheets give a description of a selection out of more than 50 IDRC-funded projects in Africa, Asia, Latin America and Canada that were initiated between 1997 and 1998. All sheets systematically focus on urban food production and processing; reuse of urban waste; urban nutrition and food security; and research support activity. Project goals, findings and contact information are also provided. Exists also in French. (WB)

Jean-Marie Diop**, (2002), Main components of the Indigenous Soil and Water Conservation**
Phase II Project. ETC Ecoculture, Leusden, Netherlands. 'Appropriate Methods for Urban Agriculture'
R&D methodology
waste recycling, Netherlands, Europe (Western)

From 1997 to 2001, the second phase of the Indigenous Soil and Water Conservation (ISWC 2) programme had been operating in seven countries in both Anglophone (Ethiopia, Tanzania and Zimbabwe) and Francophone Africa (Tunisia, Burkina Faso and Cameroon). The programmes had taken an approach to agricultural research and development through building on local innovation and encouraging farmer experimentation and Participatory Technology Development. This paper describes the main components of this farmer innovation approach.

Diallo, Souleymane **(1993). Urban agriculture research in West Africa: record, capacities and opportunities. Cities Feeding People Series report no. 5. 10 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
R&D methodology
West Africa; urban poverty; urbanisation; rural exodus; unemployment; nutrition; access to water; sanitary problems; urban management

Studies in West Africa contain few definitions or concepts. The scale of activities varies and very little research has been conducted into urban livestock. Most researched are links between increasing poverty, urbanisation, rural exodus and urban agriculture, decline in local food production, changes in lifestyle and unemployment, quality of nutrition, water access and sanitary problems, competition and/or synergy with other urban management aspects, and status of areas and activities. Further research is needed on a comprehensive overview of urban agriculture, environmental impact of urban agriculture, technology used and lessons to be learnt from other regions. The paper provides an appraisal of research capacity and research opportunities. (NB)

Drechsel, P.; Quansah, Charles; Penning De Vries, F **(1999). Urban and periurban agriculture in West Africa: characteristics, challenges and need for action. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 19-40. International Board for Soil Research and management (IBSRAM)**
rural-urban linkages R&D methodology
urbanisation; ecology; nutrient cycling; waste contamination

Urbanisation poses challenges for food security, sanitation and poverty alleviation. Periurban and urban vegetable production will play a multiple role in achieving development goals. At the moment mainly high–value perishable products are produced. Nutrient recycling is pre-requisite to maintain these functions. Care must be take of waste contamination by agro-chemicals and pathogens. For future planning it is important to fully understand urban-rural linkages. (NB)

Drechsel, P.., Gyiele, L. and Asante-Mensah, S. **(2001) Assessing human capacity building and the potential of technology adoption via KASA analysis. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology
Ghana; monitoring

This article describes experiences of a joint UPA project of the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, and the International Board for Soil Research and Management (IBSRAM). In this project tools for participatory monitoring and evaluation (PME) were used to estimate the adoption potential of technologies at farmers level and the adoption potential of methodological approaches. In both cases, KASA analysis was applied to assess changes in knowledge, attitudes, skills, and aspirations of individuals or groups towards certain activities or innovations. KASA analysis is a generic PRA/PME tool, i.e. not a specific 'UPA method', and does not require any special adaptation to the urban situation, but a distinct timetable. The major advantages of the KASA analysis are: (i) addressing changes in views, opinions, behaviour, and feelings; (ii) useful for all kinds of collaborators; and (iii) useful to verify achievements in human capacity building (CB) e.g. for logical project frameworks. This paper describes KASA and some related methods, which were used in our studies in periurban Kumasi.

Drechsel, P.., Cofie, O.O.., Vázquez, R. and Danso, G.P.. **(2001) Technology development for municipal organic waste recycling for urban and periurban agriculture - A holistic approach.. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology waste recycling rural-urban linkages
poultry; Ghana; nutrient recycling; sanitation; FAO; IBSRAM; West Africa

One of the challenges of rapid urbanisation is how to make sufficient food available on a sustainable basis for the increasing urban population. The increase in urban food demand is giving way to intensive food production systems in and around cities often specialised on perishable crops or poultry, and also to export-oriented agriculture using the advantage of urban infrastructure. These types of agriculture require large amount of inputs, including plant nutrients. Once the food is consumed or processed in the city, related market and household refuse as well as human excreta contribute to urban pollution due to the common lack of adequate sanitation services or end in landfills. In both cases large amounts of nutrients are simply 'wasted'. This situation calls for an analysis of options for municipal organic waste recycling for the benefit of agricultural and environmental sustainability in the rural-urban continuum. An international workshop on (peri)-urban agriculture and nutrient recycling was organised for Africa in 1999 by FAO and IBSRAM, where knowledge gaps in waste recycling were analysed and recommendations developed. Many scientists, farmers and decision makers emphasised the need for more information on viable and acceptable options for the recycling of municipal and agro-industrial waste, especially for farmers in urban and periurban areas. Subsequently, the Canadian donor IDRC agreed to co-sponsor a corresponding project in three agro-ecological zones of West Africa addressing variations in organic waste generation, quality and availability. The project is an attempt to develop recycling strategies that should result in closing the rural-urban nutrient cycle as well as preserving the quality of the urban environment by reducing the (pollution effects of) waste accumulation. The analysis and its different components are described in this paper.

Drescher, Axel W. **(1997). Urban agriculture in the seasonal tropics of central southern africa: a case study of Lusaka, Zambia. On: http://www.cityfarmer.org/axelB.html#axel. University of Freiburg, Germany**

horticulture R&D methodology

Zambia; periurban agriculture; home gardening; surveys

Analyses findings of the big Household Garden Survey in and around Lusaka and in Zambian rural areas in 1992-93. Purpose was to determine the role of household gardens for urban households; the contribution of garden produce to diet and budget of the household; to draw up an inventory of the main problems encountered with the household garden; and to find out about motives of households to be involved in gardening or not. A distinction is made throughout the text between different types of agriculture in and around Lusaka: gardening for food, semi-commercial and commercial gardening, and rainy season agriculture. In the rainy season the production of staple foods predominates, whereas during the dry season people concentrate on vegetable production. Factors influencing involvement in any of these types of gardening are governed by internal or external factors, such as labour availability, access or entitlement to resources, education, occupation, and more. The impression is that gardening actually does contribute to food security and/or generation of income. (WB)

Drescher, Axel W. **(2001) Technical tools for urban land use planning. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology land use planning
planning; Geographic Information Systems

In spite of ongoing research on urban agriculture, in most of the world's cities, little is known about the actual extent of urban agriculture in inner city areas. Also, little is known about the spatial distribution of urban agriculture in the cities. Many questions arise: Where do urban agricultural activities concentrate and why, who is involved, what kinds of crops are grown and by which groups of city dwellers, what is the contribution of the product to nutrition and food security, which kinds of soils are occupied, how is water availability and quality, what is the distance to markets?

An important and so far in many countries unsolved problem are appropriate methodologies to integrate agricultural activities in cities into urban planning processes.

Dubbeling, Marielle **(1999). Urban agriculture and feeding Latin American and Caribbean cities. Urban Agriculture Notes http://www.cityfarmer.org/feedingLatAmer.html. 5 p. Urban Management Program Latin America and the Caribbean, Garcia Moreno 1201 and Mejia, Quito, Ecuador**
Supplier: City Farmer, Canada's Office of Urban Agriculture

food security and nutrition horticulture R&D methodology
food security; Latin America; best practices; poverty alleviation; waste; resource management; food security; nutrition; income generation; gender; environment

Presents the best practices and city consultation project of the Urban Management Program for Latin America and the Caribbean. The thematic orientation is on urban poverty alleviation, urban environmental management and participatory urban governance. The objective of the project is to assist a group of resource and associate cities with documenting urban agriculture experiences, producing analysis of urban agriculture activities and implement a city consultation process. (NB)

Dubbeling, Marielle. (with contributions from: Carrion, A. Cruz, M.C. Mlambo, A. and Patino, F.) **(2000) Appropriate Methodologies for Development of a Facilitating Framework for Planning and Policy in Urban Agriculture. Paper for topic 2 the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology
Latin America; Cuba; Ecuador; Tanzania; Brazil; policy

Often initiatives to develop agricultural practices and improve urban food security are often supported by civic groups only and not supported or even disjointed by municipal legislation and planning, potentially resulting in wastage of scarce resources, competition for space and conflicts. A facilitating policy and planning framework (including legislation, normative and financial aspects, and institutionalisation of processes) can catalyse promotion and support urban agricultural development in the context of sustainable development. This article gives an overview of the discussion (nicely set out in a framework) and discusses the contributions made to the workshop (notable four cases of Cuba, Ecuador, Tanzania, and Brazil).

Duc Vien, Tran **(2001) The role of aquaculture in pollution remediation in Tay Lake and Ruc bach Lake of Hanoi. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology wastewater reuse

Vietnam; aquaculture

In Ha Noi there are 18 lakes ranging from 1to 526 ha, with a total area of 615.4 ha. All of the lakes of Ha Noi are used for wastewater and storm water storage in the rainy season, and also as a source of livelihood for about 100 fishermen.In order to understand the role of aquaculture in wastewater – remediation, a study was carried out in Tay Lake from 1997-1998, to follow the application of the Department of Science, Technology and Environment of Ha Noi. This report describes the role of aquaculture in wastewater treatment and use. It gives an overview of the methods used, and gives recommendations to the authorities.

European Foundation for the Improvement of Living and Working Conditions **(1993). Innovations for the improvement of the urban environment: a European overview. 556 p. ISBN 92_826_6302_7. ECU 56.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland**
Supplier: Office for Official Publications of the European Communities, 1993

R&D methodology city ecology

development projects; case studies; sustainable development; networking

Provides an overview of some 90 urban innovative projects aiming at increased sustainability. The report examines cases from the 12 member states (in 1993) and in an additional band also gives cases from Austria, Sweden and Finland, countries that joined the European Union in 1995. Projects are listed per country. There is a wide range of themes, unfortunately not grouped together in a subject index. The report is concluded with a list of resource persons. (WB)

Fall, Abdou Salam **(2002) L'approche réseau dans l'agriculture urbaine: Le cas des unités de transformation et leurs liens amont/aval au Sénégal. (The Network**

Approach for Urban Agriculture: the Case of Transformation Units of Agricultural Products and their Links). Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.
R&D Methodology
Senegal; networks; dairy; cereals

In this article a social analysis is a proposed and described of network analysis. Taking the products cereals and milk as an example, the relations at different levels in Senegal are discussed.

Fall, A.S., O. Gueye and E.H.M. Ba **(2001) The Network Approach: the Production - Consumption Chain in Senegal. In: *Urban Agriculture Magazine, no 5*, Appropriate Methodologies for Urban Agriculture, p. 36, December 2001, RUAF, Leusden The Netherlands. Shortened version of Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org**
R&D development
Senegal; networking; dairy production; cereals, Africa (Western)

In this article a social analysis is a proposed and described of network analysis. Taking the products cereals and milk as an example, the relations at different levels in Senegal are discussed.

Fall, S.T. and Zeeuw, Henk de **(2001) Appropriate Methods for Technology Development. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology
methods; participative technology development

Although urban farmers are quite dynamic and innovative and have a vast scope for technical improvement, the rate of development and diffusion of technologies to these systems is still limited. This low level of technology development in urban farming systems, adaptation of agricultural production technologies to the specific conditions of the urban context, and the low level of acceptation by the urban farmers, is also due to the bias towards rural agriculture in the agricultural research and extension institutions; the lack of technologies well adapted to the urban production conditions; lack of attention for the innovations made by the urban farmers themselves and a lack of participation of the urban farmers in the identification of the priorities for technology development and in the testing and evaluation of new or adapted technologies. This poses multiple questions concerning the approach and methodologies applied in urban agricultural research and extension. This article seeks to answer these questions by exploring the

methods and procedures that may be applied with success in urban agriculture.

FAO **/ World food summit: draft Rome declaration on world food security / draft plan of action (1996). 6 p.**
food security and nutrition R&D methodology
food security; policy making; international conferences

The draft version of the Rome Declaration on World Food Security and the draft Plan of Action, the outcome of the World Food Security Conference held at Rome, November 1996. (WB)

Fisher, A **et al (1998). Local Food Policy. Community Food Security Coalition**
community development land use planning food security and nutrition R&D methodology
policy; NGOs; community associations; United States

This manual includes: (i) Tips for Organizing Coalitions and Food Policy Councils, (ii) Inventory of Food-related Policies in Local Government, (iii) Action Ideas for Changing Local Policy, (iv) Tips for Operating Food Policy Councils and (v) Case studies of nine Food Policy Councils and Similar Organizations. It provides useful information for assessing how city and county policies affect food production and distribution, and how they can be changed to promote community food security. It is a valuable resource for activists, academics, policy makers and others working on food and agriculture at the community level. 75 pages, (JS adapted from author)

Food and Agriculture Organization (FAO) **(1998). Methodological workshop for the compilation of urban food security and nutrition profiles, Maputo, Mozambique, February 10-11, 1998. Field document no. 1b. 37 p. Ministry of Planning and Finance, Department of Population and Social Development, Ministry of Health, Nutrition sector, Food and Agriculture Organization (FAO)**
food security and nutrition R&D Methodology
household food security; information systems; Mozambique; assessment; urban food; nutritional status

The proceedings include presentations and reports prepared by resource people together with a summary of the issues raised during the workshop. The workshop focused on developing methodologies for the compilation of household food security and nutrition profiles in urban areas in Mozambique to feed into the Food security and Nutrition Information Network. (NB)

Fundación Rockefeller **(1998). Experimentación campesina. RED: Gestión de Recursos Naturales no. 10 (1998). 64 p. Fundación Rockefeller, Virreyes 1105, Lomas Virreyes, CP 11000, México DF, Mexico**
R&D methodology

farmers' experimentation; natural resource management

Contains various contributions on farmers' experimentation resulting from a work group within RED. The introduction, by Bernard Triomphe, outlines the theme. (WB)

Gabel, Stephanie **(2001) Methodological reflections on using participatory and action oriented research with women farmers in Harare. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D methodology food security and nutrition gender
Zimbabwe; survival strategies; policy; gender; equity; participatory approaches

This paper presents the methods used for a case study in Harare, Zimbabwe in the role that people play in food provisioning within their household and, second, their use of urban cultivation on open spaces as both a household survival strategies and a food provisioning. Another aspect of the research was focused on policy and governance issues related to urban agriculture, taking special note of local level policies and decision making in regard to: gender sensitivity, equity and public participation. The methodology describes various participatory approaches that were used during the research.

Ganapathy, RS **(1983). Urban agriculture: food for the urban poor; a research proposal for a study in Ahmedabad. Ahmedabad: Indian Institute of Management**
R&D methodology
food security; research proposals; India

This paper outlines the background, objectives, methodology, organization and budget of a research proposal aimed at better understanding the state of urban agriculture in the Ahmedabad metropolitan area; identifying the potential of urban agriculture to meet the needs of the urban poor; integrating the various aspects of urban agriculture into a holistic and strategic framework; and developing alternative scenarios for using urban agriculture to shape the future of Ahmedabad as a resource conserving and self-reliant city. The project would involve a literature review, an analysis of secondary data, interviews with key informants and approximately five commissioned studies/papers. A list of 22 potential institutional participants in the project are appended. (HC, IDRC)

Garrett, Steven; Feenstra, Gail **(1999). Growing a community food system. Western Regional Extension WREP0135, Community Ventures Series.**
community development food security and nutrition R&D methodology
food systems; community; policy; evaluation

This short book defines what a community food system is and how to improve it. It provides guidance and example for project design, coalition building, strategic planning, community food system assessment, attracting resources/funding, building

an organization, shaping policy and carrying out an evaluation. The authors' conclude that the following are essential ingredients: (i) long-term vision, (ii) incorporating the values of a wide cross section of the community, (iii) through assessment of the existing community food system, (iv) finding supporting leaders, (v) beginning with doable small projects, (vi) evaluating and documenting progress towards goals, (vii) finding resources on time, and (viii) maintaining a viable organizational structure (JS)

Gibson, Tony**. Showing what you mean (not just talking about it). Neighbourhood Initiatives Foundation, The Poplars, Lightmoor, Telford TF4 3QN, UK**
community development R&D methodology
methodologies; community initiatives

Provides a set of community building tools coined "planning for real". The tool-kit is intended for people trying to organise their neighbourhood. The tool-kit is process oriented and distinguishes tree stages: the model, priorities and resource surveys. (NB)

Global Facility for Urban Agriculture **(1997). Urban agriculture for food security, jobs and waste recovery: roundtable of top local government officials. Second International Colloquium of Mayors on Governance for Sustainable Growth and Equity (UNDP). 10 p. Global Facility for Urban Agriculture**
food security and nutrition waste recycling R&D methodology
municipal policies; urban planning; open spaces

This roundtable took place in the framework of the Second Colloquium of Mayors on Governance for Sustainable Growth and Equity, held at UNDP, New York, July 28-30, 1997. A number of city case studies were presented by mayors outlining the status of urban agriculture in their cities. In a plenary discussion, challenges and benefits of urban agriculture were discussed. (WB)

Graham, Douglas H **(et al.) (1991). Periurban baseline research results: Maputo, Mozambique. 172 p. Ohio State University (OSU)**
R&D methodology
household survey; periurban agriculture; Mozambique

Reports on a baseline study of households in the periurban area of Maputo. The survey was designed to investigate characteristics of labour, land and financial markets, serving households in the periurban area along with a review of food security issues, migration profiles, and the characteristics of services available to those households and socio-demographic indicators of household living conditions. (WB - adapted from original summary)

Helka-Liisa, Hentilä **(et al.) (1996). Innovations for the improvement of the urban**

environment: Austria - Finland – Sweden. 340 p. ISBN 92_827_9014_2. ECU 36,50. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland
Supplier: Office for Official Publications of the European Communities
R&D methodology city ecology
development projects; case studies; sustainable development; networking

Provides an overview of some 90 urban innovative projects aiming at increased sustainability. The report examines cases from the 12 member states (in 1993) and in an additional band also gives cases from Austria, Sweden and Finland, countries that joined the European Union in 1995. Projects are listed per country. There is a wide range of themes, unfortunately not grouped together in a subject index. The report is concluded with a list of resource persons. (WB)

Hemmati, M.**, (2002), Multi-Stakeholder Processes for Governance and Sustainability: Beyond Deadlock and Conflict. United Nations Environment and Development (UNED) Forum, London. Supplier: Earthscan Publications Ltd, 120 Pentonville Road, London, N1 9JN, UK**
R&D methodology
sustainable development; decision-making process; international co-operation; participatory approaches

Governments, businesses, international organisations, local groups and numerous other publicly engaged bodies are turning to multi-stakeholder processes (MSPs) for decision-making as conventional politics is increasingly unable to integrate broad-based, consensual policies.

MSPs bring together all those whose interests are ate stake in crucial social, economic, developmental and environmental debates, and for whom finding practical solutions as well as ways in which these might be implemented is essential. This new political culture aims to move beyond deadlock or conflict towards a more equitable and effective process. This practical guide explains how MSPs can be organised and implemented in order to resolve the complex issues in and around sustainable forms of development, whilst recognising the rights of, and risks faced by, all parties. It includes detailed examples of MSPs in practice and provides functional checklists, explaining how to bypass adversarial politics and achieve positive results. This important contribution to the understanding of participatory approaches to decision-making will be invaluable to policy-makers, NGOs, business unions, local authorities and activists.

Hewitt, Nicla **(1995). European Local Agenda 21 planning guide: how to engage in long-term environmental action planning towards ICLEI Policy & Practice Series. 101 p. The International Council for Local Environmental Initiatives (ICLEI), Freiburg, Germany**
R&D methodology
policy development; Europe; environmental policy; Agenda 21; research planning

Deals with the implementation of the Local Agenda 21 process. Local Agenda 21 is the community-level version of the Agenda 21 agreement, concluded in Rio, 1992,

on bringing about sustainable development. This guide describes, in much detail, steps in how to create a systematic approach to planned action in a community, rather than implementing blueprints. (WB)

Holmer, Robert J. **(2001) Appropriate Methodologies for Microenterprise Development in Urban Agriculture. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology horticulture services
micro enterprise; informal sector

Much of the developing countries' rapidly growing population forms part of the economy that lies outside the regulatory framework of governments in what is known as the informal sector. Although the definitions vary according to the country context, it is generally agreed that the informal sector, whether rural or urban, comprises small and micro-enterprises producing and distributing basic goods and services in unregulated, but competitive markets. This paper reviews available literature and the contributions to the workshop.

Homem de Carvalho, J.L. **(2001) PROVE – Small Agricultural Production Verticalisation Program. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology community development services
Brazil; small enterprise development

The PROVE is a programme designed to promote small agricultural production, processing and trade involving many urban and periurban agricultural systems, including vegetable-gardening, fruit-growing and livestock systems. The State intervenes at the individual and/or collective level, with low-income groups as the main target audience. The PROVE started in 1995, and in the 1995-1998 period, 132 agro-industrial facilities were built in the Federal District. In following years, the Programme was implemented in different cities in the states of Minas Gerais, Mato Grosso do Sul, and Santa Catarina and in 28 cities in other states. In 2001, the Programme also was implemented in Quito, Ecuador. The different stages of the programme are described as the rungs in a ladder (11 rungs) that small farmers have a very hard time climbing. Enabling them to climb these rungs is a fundamental requirement to ensure the success of the PROVE and, consequently, to ensure their social integration with sustainable development and solidarity.

Hovorka, Alice J. **(2001) In: *Urban Agriculture Magazine*, no 5, Appropriate**

Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.

gender R&D Methodology

urban-peri urban; income generation; women's employment; intervention strategy

The incorporation of gender considerations in urban agriculture research is increasing, and indeed, there have been advances over the last decade in our understanding of both men's and women's experiences with farming in cities around the world. There is a move away from the so-called "urban farmer", an undifferentiated, masculine, normalised urban dweller who engages in agriculture. Instead, there is greater recognition that people's experiences with urban agriculture cannot be easily standardised and that gender neutrality does not necessarily capture the breadth of such experiences. Many researchers have begun to emphasize differences amongst urban farmers, thus highlighting the distinct agriculture systems that form along gender, race, ethnicity, class, age, etc. lines. Gender analysis allows us to disaggregate data on urban agriculture and to explore why certain processes and structures generate different opportunities and constraints for different people. This article gives a comprehensive overview

Howe, J. and White, I. **(2001) Planning for Urban Agriculture in the UK. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning R&D methodology

United Kingdom; planning; Botswana; zoning; awareness

This paper presents the findings from a UK Government Economic and Social Research Council (ESRC) funded survey examining the role played by planning in regulating urban agriculture on allotments, community gardens and city farms in metropolitan areas of the UK. Planners' attitudes to, and knowledge of, urban food production are explored; the geography of, and the agencies involved in, urban food production is detailed and an examination of the regulation of urban food production is undertaken. The survey reveals that despite many initiatives awareness of urban food production is relatively low amongst metropolitan planning authorities. Whilst there is an increasing interest in food growing within UK society, the role of planning in this land use issue is relatively small. Indeed, urban agriculture sits uncomfortably within the UK planning framework. Despite encouraging signs of an increasing engagement with urban agriculture, planning's apparent low level of involvement remains perplexing given the significance of food to the metropolitan system.

IDRC **(1997). Cities Feeding People program initiative: prospectus 1997-2000. Ottawa: IDRC**

R&D methodology

development programmes; impact assessment; capacity building; community development; policy development

The International Development Research Centre (IDRC)'s Cities Feeding People (CFP) program initiative supports development research aimed at removing the

constraints to and enhancing the potential of urban agriculture. The program initiative has three specific objectives: to strengthen local research capacity to generate household- and community-level information as a basis for municipal policymaking and support; to mobilize and enhance regional capacity to share experiences; and to influence governments, policymakers and international agencies to incorporate urban agriculture into their development programs. CFP supports research at the city level, working with people from research institutions, nongovernmental organizations and community-based organizations in Africa, the Middle East and Latin America. The three main areas of research are: appropriate space-intensive production systems for low-income urban farmers; safe and affordable use of organic wastes by small-scale urban farmers; and policy instruments to enhance low-income urban farming.

The CFP Prospectus covers the strategies to be adopted in pursuit these goals, the plan of action, the program of work and budget, anticipated risks, communication and dissemination, and evaluation. Appendices include the evaluation framework, team member profiles, a map of IDRC-supported urban agriculture projects (1993-1997), a list of members of the Support Group on Urban Agriculture (SGUA), a selected bibliography, a list of reports and publication from CFP projects, the CFP Report Series, and a summary of the CFP Prospectus Consultation Meeting. CFP has a budget of 1.2 million CAD for the first year, 1.2 million CAD for the second year and 2 million CAD for the third year. (HC, IDRC)

International Institute of Rural Reconstruction (IIRR) **(2001) Towards Better Enterprises: Business Development, Marketing and Microfinance Practices. IIRR, Y.C. James Yen Center, Silang, Cavite, 4118 Philippines**.

R&D development
workshops; enterprise development

IIRR coordinated the participation of 19 individuals from research and development organisations in Asia, Africa, Latin America, Europe and North America. Citigroup Foundation provided the funding for the "writeshop" on microenterprises.

International Food Policy Research Institute (IFPRI) **(1996). Uncommon opportunities for achieving sustainable food and nutrition security: an agenda for science and public policy. A 2020 Vision for Food, Agriculture, and the Environment Brief no. 37. 2 p. International Food Policy Research Institute (IFPRI), 1200 Seventeenth Street, N.W. Washington DC 20036-3006, USA**

food security and nutrition R&D methodology
food security; government policies; political aspects; sustainable development

An invitation to the World Food Summit convened by FAO in Rome in November 1996 'to harness science and technology for the transformation of agriculture into a primary instrument of a global Evergreen Revolution'. A 10-point agenda is proposed as a basic scientific and public policy framework for achieving sustainable food and nutrition security at both the national and international levels. A very condensed and important policy brief. (WB)

International Institute for Environment and Development (IIED) **(1994). Special issue on participatory tools and methods in urban areas. RRA Notes no. 21 (Nov 1994). International Institute for Environment and Development (IIED), 3 Endsleigh Street, London WC1H 0DD, UK**

R&D methodology community development

urban communities; community survey; participatory methods; urban planning

This issue of RRA Notes contains 13 articles on what might be called Participatory Urban Appraisal. Indeed, the need for the use of participatory research and development approaches in community development programmes in urban areas is high, as the editors indicate. Sections of this issue include: (1) Problem statement; (2) Description of the characteristics of urban settings and how they differ from the rural context; (3) The papers themselves, covering a wide range of issues; (4) Conclusions. A key publication. (WB)

International Potato Center **(1999). A CGIAR global strategic initiative on urban and periurban agriculture: a proposal submitted for Finance Committee. Strategic Research Funding. The International Potato Center, Lima, Peru**

R&D methodology

CGIARs; periurban agriculture; international agricultural research; research policy; networking

Marks a transition in the vision of the Consultative Group on International Agricultural Research (CGIAR) traditionally geared to rural food production. In the light of the strong case for dealing more intensively with urban and periurban agriculture (UPA), given its rapid rise to a current 800 million people worldwide who work in some form of urban agriculture, the CGIAR Systemwide Review Panel has now expressed an interest in urban agriculture. The underlying paper outlines how CGIAR centres can contribute to promote urban and periurban agriculture in order to reduce poverty and food insecurity. Spearheads are fostering links between urban consumers and producers around towns and cities, and promoting the development of 'green belts' using models developed from research on food crops, animal production, and agroforestry. There is a list of potential project partners and UPA experiences at the end of the proposal, as a token of the CGIAR's intention to closely link to existing efforts in the field of UPA. (WB)

Ishani, Z. and Lamba, Davinder. **(2001) Applications of Methods and Instruments in Urban Agriculture Research: Experiences from Kenya and Tanzania. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

gender R&D Methodology

Kenya; Tanzania; gender

The paper deals with methodology applied in two studies of urban agriculture in Kenya and Tanzania, conducted by, and in collaboration with Mazingira Institute.

The first study titled "Urban Food Production and the Cooking Fuel Situation in Urban Kenya" was published by the Institute in 1987. The second study on " Gender and Urban Agriculture and its Implication for Family Welfare and the Environment in Dar Es Salaam, Tanzania." was completed in 2000 (not published). The Kenyan study comprised six cities and towns covering the various agro-climatic zones. It analysed the patterns of food and fuel production and consumption by the urban households in Kenya by considering the socio-economic characteristics of the sample population, crop production, livestock production and fuel. In addition, it raised issues for consideration by policy makers. The Tanzanian study " Tanzania - Gender and Urban Agriculture: Cattle Raising and its Implication for Family Welfare and the Environment in Dar es Salaam, Tanzania" was at a city level. It analysed the gender roles in cattle raising in the district of Kinondoni in Dar Es Salaam.

Jacobi, P. and Kiango, Suzan. **(2001) Ways to monitor & evaluate Urban and Periurban Agriculture – Experiences from Dar Es Salaam, Tanzania. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology land use planning horticulture
Tanzania; monitoring and evaluation; participatory monitoringp; indicators

In Tanzania urban and peri- urban agriculture is a well-known activity and it has reached the level of official acceptance. Systematic monitoring and evaluation as well as channelling generated information and feedback from the field to the relevant levels has supported this acceptance. In the discussion about participatory M&E against conventional M&E it appears that the former should replace the latter. It is argued in this paper that there should be a balance to be struck between “conventional” and “participatory” monitoring. There should be both “hard data” and a system that allows primary stakeholders to monitor and evaluate their activities using different methods and own indicators. Truly appropriate monitoring and evaluation should enhance internal learning and provide evidence to support qualitative statements about the impact of an action.

Jacobi, Petra **et al (2000). Urban agriculture – justification and planning guidelines. GTZ, Eschborn, Germany, 51 p.**

R&D methodology land use planning
planning; Africa; policy; poverty; emergency relief; Agenda 21

This is a seminal paper. It presents an excellent theoretical “urban agriculture flow-chart” (research-policy-action, combined with a good deal of relevant hard data and observation. Urban agriculture is presented as a development intervention that promotes inter alia: (I) sustainable development, (ii) poverty alleviation, (iii) food security, (iv) environment and resource management, (v) community solidarity, (vi) heath, and (vii) micro-enterprise. (JS)

Jolly, Desmond **(1999). Urban agriculture as food-access policy. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 195-199. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition R&D methodology
access to food; rural-urban linkages

Hunger malnutrition, and suboptimal access to food have resulted from a number of political, economic and demographic forces. Among these are urbanization, un(der)employment, food-marketing systems and welfare politics. Urban agriculture can enhance access to food and thus enhance the welfare of low-income urban residents. However, the net outcome may be negative if urban agriculture is seen as a substitute for, rather than an addition to food and agricultural policies designed to improve rural conditions and provide affordable access to food for the all urban residents. Hence, the benefits of urban agriculture may depend integrally on an overall context of food and agricultural policies designed to meet the food needs of the entire population. (Abstract adapted from original)

Kiango, Suzan and P. Jacobi **(2001) Weaving the net... M&E tools used in support of UA in Tanzania. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings available on: www.ruaf.org. University of Hohenheim and GTZ / Ministry of Agriculture and Food Security (MAFS-GTZ)**
R&D methodology
methodologies; Tanzania, Africa (Eastern)

In Tanzania urban and peri- urban agriculture is a well-known activity and it has reached the level of official acceptance. Systematic monitoring and evaluation as well as channelling generated information and feedback from the field to the relevant levels has supported this acceptance. In the discussion about participatory M&E against conventional M&E it appears that the former should replace the latter. It is argued in this paper that there should be a balance to be struck between ""conventional"" and ""participatory"" monitoring. There should be both ""hard data"" and a system that allows primary stakeholders to monitor and evaluate their activities using different methods and own indicators. Truly appropriate monitoring and evaluation should enhance internal learning and provide evidence to support qualitative statements about the impact of an action."

Konijnendijk, Cecil C**. Causes of conflicts affecting urban forest policy-making: a theoretical approach. In: Conflict management and public participation in land management, p. 133-147. Wageningen Agricultural University, The Netherlands**
urban forestry R&D methodology
forest policy analysis; social conflicts; environmental psychology

In highly urbanised societies urban forests are essential for recreational and environmental purposes. Policy makers, planners and managers these days have to respond to higher, more varied and better expressed demand for urban forest functions while pressures increase. In order to gain insight in the resulting conflicts an analysis was made from an environmental and psychological perspective. Subsequently, a theoretical framework is presented. With this theoretical approach the frequency and intensity of social urban forest conflicts can be partly explained. Better insights are believed to assist policy-makers in future conflict prevention and resolution. (NB - abstract adapted from original)

Konijnendijk, Cecil C **(1997). Urban forests: benefits and functions: overview of contemporarary research in the Netherlands. 31 p. Subdepartment of Forestry, Wageningen Agricultural University; European Forest Institute, Torikatu 34, FIN-80100 Joensuu, Finland**

urban forestry R&D methodology

research projects; Netherlands

Gives an overview of Dutch research in the field of urban forestry policies over the period until 1997, focusing on the 1990s in particular. Addresses of research organisations and key references are included. (WB)

Lamba, Davinder **(1993). Urban agriculture research in East Africa: record, capacities and opportunities. Cities Feeding People Series report no. 2. 16 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

R&D methodology

Africa (Eastern); policy making; access to land; food production; nutrition; food security; income generation

Maps aspects which have been best researched and lists contributions to science and policy making which deserve further research. Furthermore, institutions which could be interested to carry out future research and ideas for further research are suggested. Well-known fields of research include access to land, food security and nutrition, food production, crop and livestock production and supplementing income of employees. Further areas for research include equity aspects, health risks, economic policy and legal aspects, planning, food and production systems. (NB)

Lee-Smith, Diana; Memon, Pyar Ali **(1993). Urban agriculture in Kenya. Canadian Journal of African Studies 27:1 (1993) pp. 25-42. Papers, 18 pp.**

genderfood security and nutrition R&D methodology

Africa; Kenya; urban theory; urban policies; urban development; women's role; subsistence production; urban poor; food security

This article analyzes the characteristics of urban agriculture in Kenya within a wider conceptual and socioeconomic context and is based on a survey by the Mazingira

Institute (Lee-Smith et al., 1987). This article emphasizes the significance of incorporating a food component, namely crops and livestock, into urban theory, and raises questions of policy for sustainable urban development. The authors claim that the situation in urban areas with respect to urban farming must be understood as part of a wider food crisis, exacerbated by the fact that women's work and subsistence production are largely ignored, and the situation therefore remains misunderstood. The article notes women's roles and participation in urban agriculture. Extension services need to be made more available in urban areas, and specifically, they need to be directed to poor urban women. The article concludes by stating that the fact that urban farmers are mainly, but not exclusively, women producing for their own families' consumption, is no reason to discount the conceptual significance of these activities or the value of their primary economic production. (AH)

Lewcock, Chris P **(1996). Periurban interface research: workshop proceedings. ODA London & British Council Kumasi Ghana; 80 p.**

R&D methodology rural-urban linkages

Ghana; Geographic Information Systems; waste management; horticulture; environment; post harvest operations; sustainable agriculture; wastewater; rural-urban linkages; information systems; erosion

This workshop aimed first to introduce the periurban interface research being carried out by NRI to Ghanaian leadership. And it explores several relevant aspects as listed above in the keywords. (JS)

Lindayati, Linda **(1996). Urban agriculture: a survey of academic expertise and programs in Canada. Cities Feeding People Series report no. 19. 55 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

R&D methodology

Canada; waste management; community gardens; rooftop gardening; food security; urban forestry; periurban agriculture; urban planning

In this paper, urban agriculture related scientific expertise existing in different subject areas is brought together including a list of resource persons. The areas include urban design, community gardening, organic farming, permaculture, greenhouses, rooftop gardening, waste management, urban pest management, urban food security, urban forestry and agriculture in periurban areas and international research. Urban agriculture covers a broad range of activities and dimensions and even in Canada it is not yet well recognised as a field in itself. (NB)

Madaleno, Isabel Maria and Gladys Armijo **(2001) New Methodologies and Techniques for Urban Agriculture Research in the Developing World: The Chilean Project. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology
Chile; urban agriculture; research; developing countries, America (Southern)

State of the art projections from the International Food Policy Research Institute (IFPRI), The Urban Agriculture Network (TUAN), the Research Centre on Urban Agriculture and Forestry (RUAF), the International Development Research Centre (IDRC), the Canada's Office of Urban Agriculture (City Farmer), to name just a few, show that far too many developing world urbanites will go hungry in the near future if appropriate solutions are not found in order to prioritise actions that can have impact on improving food security in urban settings. Innovative scientific and technological studies on the integration of small-scale agricultural practises into the urban and peri-urban environment, city food production diagnosis, evaluation of urban land uses, and the design of sustainable urbanization systems can only contribute to multiply local successes and educate the people.

Martin, A., Oudwater, N., Guendel, Sabine. **(2001) Methodologies for Situation Analysis in Urban Agriculture. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology
diagnosis; PRA; participation; stakeholder analysis

Situational analysis in urban and periurban agriculture is often a starting point for many programmes and projects supporting interventions to improve the contribution of urban agriculture to income, family nutrition, social and environmental benefits and well being. Yet there has been little specific consideration of appropriate methods and tools for assisting situational analysis in urban agriculture. We begin by considering some of the conceptual challenges in investigating urban agriculture and the broader analytical frameworks for understanding. The paper discusses some specific contexts of investigation in an urban (agriculture) setting and identifies and critically assesses relevant methods and tools.

Maxwell, Daniel G. **(1993?). Land access and household logic: urban Farming in Kampala. Research Paper. Kampala, Uganda: Makerere Institute of Social Research, (1993?). 35 p.**
R&D methodology gender
Uganda; land tenure; household economy

This report goes beyond Maxwell's previous work and other research on urban farming in Kampala which tended to treat households as internally homogeneous units, except for income differences. This paper thus dives into breaking down the functioning of the urban farming households to understand its logic. (JN)

May, Julian; Rogerson, Christian M **(1995). Poverty and sustainable cities in South**

Africa: the role of urban cultivation. In: Habitat International vol. 19 (1995) no.2 p. 165-181. Data Research Africa, Durban; University of the Witwatersrand, Johannesburg, South Africa

R&D methodology land use planning economic impact
household survey; farming systems; access to land; land rights

Urban agriculture is increasingly seen as a major means of supplementing incomes in the cities of South Africa. In light of that nation's transition to a non-racial democracy, the particular task of the paper is to review the potential and policy implications of urban agriculture in the context of national initiatives for post-apartheid reconstruction. To reach these objectives, findings of household surveys are presented on the nature, methods and problems of production of groups of urban and periurban farmers. Income surveys supplemented by participatory techniques are used to gather further information on the problems faced. These major problems include gaining access to land with secure title for cultivation, finance, machinery, transport, crop security and the need for support services. The policy implications which emerge are then discussed. (Original abstract)

Mbiba, Beacon M**. (2001) Participatory methodologies for policy development in urban agriculture: visualisation and the Harare experience in the early 1990s. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology
diagnosis; PRA; participation; group research; policy

This paper reflects on a combination of techniques that were deployed to implement a focus group research design whose objective was to simultaneously: (a) share preliminary survey results (b) collect information from policy makers (c) influence the thinking of policy makers and (d) develop a strategy for further research in a policy environment that was at that time hostile to urban agriculture. At the core of the techniques was use of photographs and visualisation.

Mbiba, Beacon M. **(2001) Periurban transformations and livelihoods in East and Southern Africa: the Peri-NET experience. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**

rural-urban linkages R&D Methodology
networking; research; Southern Africa; Eastern Africa

This paper describes the origins and operations of Peri-NET a research network in South-Eastern Africa on Urban and Periurban Africa.

Ministry of Planning and Finance **(1998). Consolidation of the household food security and nutrition information network for policy formulation and development planning in Mozambique. FAO Field Document no. 1. 54 p.**

Ministry of Planning and Finance, Department of Population and Social Development, Maputo, Mozambique
R&D methodology food security and nutrition
food security; nutrition; methodologies; urban policies; Mozambique; Zambia; urban planning

A workshop report documenting the process of developing and implementing a methodology for the compilation of urban food security and nutrition profiles in Mozambique. Draft methodology, presentations and issues raised during the workshop are presented. A supplementary report in English presents the workshop objectives, key issues and a presentation of the Zambian experience. (NB - abstract adapted from original)

Mlambo, A **(2001) Institutionalizing Urban Agriculture in Dar Es Salaam City through the "EPM" Process. Paper for topic 2 the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology
Tanzania; policy; environmental management

Urban Agriculture is pronounced in the city of Dar Es Salaam however, in its present form, agricultural activities in the city of Dar Es Salaam often conflict with proper planning of urban land-uses. In some cases, agricultural activities are conducted in fragile environments or hazardous areas of the city resulting in land degradation and water pollution. In other cases the activities are carried out in areas, which are affected by industrial pollution. The keeping of livestock in the city's residential areas is also hazardous to the health and safety of city residents. The initiative by the Dar Es Salaam City Council to adopt Environmental Planning and Management (EPM) approach in the city planning in 1992 was timely and most welcome. Achievements accrued from the new approach have provided significant change to the common practices, and are described in this article.

Mnidga, H; Lyimo, M **(1997). Communication manual. 87 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
horticulture R&D methodology
agricultural extension; communication; participatory learning

Ten different sessions are covered in this manual, ranging from practising basic knowledge on communication, adult learning, and working in groups to facilitation. Apart from the extensionists involved in the Urban Vegetable Promotion Project (UVPP), this course was open to other interested extensionists in the Dar es Salaam region. Sessions shared a common factor: concentrating on improving the flow of information and supporting the participatory approach for distributing technical knowledge. (WB)

Mougeot, Luc JA **(2000). Urban agriculture: definition, presence, potentials and risks. In: Growing cities, growing food: urban agriculture on the policy agenda, p.1-42. DSE, GTZ, CTA, SIDA**

R&D methodology land use planning

food security; access to land; gender issues; land use systems; urban planning; public health; rural-urban linkages; sanitation

The article provides building blocks for defining urban agriculture in an internally coherent and externally functional way based on an extensive overview of developments and literature on urban agriculture. The more important policy challenges for urban agriculture on food security, land access, gender implications, land use dynamics and urban planning, public health and sanitation, environmental impacts and interaction with rural agriculture are discussed. One of the major issues is that urban agriculture is mainly analysed from an agricultural perspective than an urban planners' perspective, while the latter is even more fundamental for integrating urban agriculture in the urban system. (NB)

Moukoko-Ndoumbé, F. **(2001) Accounting for UPA Real Economic Performance and Environmental Impact at Farm Level Methods - Analytical approach - Pilot applications. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology

monitoring; environmental impact assessment; economic accounting

The proximity of urban and periurban agriculture to central markets and consumer centres confers to this type of agriculture specific opportunities that often set it apart from rural agricultural production. Taking advantage of these opportunities, urban agriculture has significantly complemented rural agriculture, in many instances, filling critical food security and income gaps. In spite of all this, feelings are mixed as to the suitability of and long-term social sustainability of agriculture in urban periurban areas. Because conventional economic accounting continues to measure farm level agricultural performance and management efficiency essentially in terms of present productivity and profitability of man-produced, market-valued inputs, the contribution of nature and environment to the production process and the impact of agricultural production on the environment are simply ignored. The Plan of Action of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992, Agenda 21, urged that conventional accounting systems should be expanded to cover concerns related to the environment and natural resource sustainability. In response, the United Nations Statistics Division issued a Handbook on a System of Integrated Environmental and Economic Accounting (SEEA, 1993). Drawing on SEEA guidelines and other relevant works, the FAO Farm Management and Production Economics Service and the Royal Tropical Institute (KIT), the Netherlands, have developed methods/guidelines for monitoring and accounting for soil nutrient inflows, outflows and balances and integrating related physical and monetary values into conventional farm accounting, at farm level, which are

described here.

Moustier, Paule **(2001) Assessing The Socio-Economic Impact Of Urban And Periurban Agricultural Development. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology economic impact horticulture
West Africa; Central Africa; policy; vegetables

The paper provides practical indicators and field methods for assessing the impact of urban and periurban agriculture in social and economic terms (employment, income, added value, and food supply). In a context of growing advocacy for policy support in favour of urban agriculture, while public resources are shrinking, it is more and more necessary that researchers provide rigorous assessment of the contribution of urban agriculture to policy objectives. The paper is based on the author's fieldwork in West and Central Africa, mostly centred on vegetable production and marketing, as well as some literature review.

Moustier, Paule **(2001) CIRAD Experience on Urban and Peri-Urban Agriculture (UPA) in Africa. Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa, January 2001 Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement (CIRAD)**
R&B methodology
research; urban agriculture; periurban agriculture, Africa (Central), Africa (Eastern), Africa (Northern), Africa (Southern), Africa (Western)

CIRAD (Centre de cooperation internationale en recherche agronomique pour le developpement) is a French research centre specialised in applied research for tropical countries (Africa, Asia, Latin America). CIRAD activities on urban and peri-urban agriculture (UPA) are distributed among its departments dealing with fruits, vegetables and flowers (FLHOR), animal production (EMVT), annual crops (CA) and agrarian systems and resource management (TERA). To reach the objective of enhancing the environment and economic sustainability of UPA, research tools have been developed in the following areas: (I) appraisal of UPA dynamics, based on comparative farming and marketing research carried out in various countries (Congo-Brazzaville, Guinea-Bissau, Cameroon, Senegal, Madagascar); (ii) market information and coordination systems (Congo- Brazzaville); (iii) sustainable intensified vegetable production systems (Cameroon); (iv) sustainable intensified animal systems (Senegal, Cameroon, Niger); and (v) slaughter waste recycling for vegetable compost (Senegal). In South Africa, CIRAD intends to collaborate with ARC (Agricultural Research Council), in the area of decision-tools for profucers, extension workers and urban planners.l

Muster, Gisa **(1998). Environmental problems of urban agriculture: a case study of**

Dar es Salaam, Tanzania. 58 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
Supplier: Ministry of Agriculture and Co-operatives (MoA&C) and Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ).
city ecology horticulture R&D methodology
Tanzania; open space management; off-plot cultivation; vegetable production

Shows the interaction between the urban environment of Dar es Salaam and agricultural production in open spaces, examining environmental effects in particular. In addition, the role played by urban agriculture in the city's economy is examined. A methodology is presented to estimate the environmental impact of vegetable production on the city's environment. (WB)

Mwalukasa, Michael **(2000). Institutional aspects of urban agriculture in the city of Dar es Salaam. In: Growing cities, growing food: urban agriculture on the policy agenda. - p. 147-159. DSE, GTZ, CTA, SIDA**
land use planning R&D methodology
institutional planning; urban policy development; urban management; stakeholder approaches; urban planning

The paper analyses the mechanisms for institutionalising strategies for urban agriculture in the context of an East African city. The experiences described focus on stakeholder involvement and collectively seeking solutions to priority issues of common concern. Short coming of traditional urban planning are discussed and new initiatives under the sustainable cities programme in Tanzania (SCP-TZ) are presented. (NB)

Myint Thaung, Cho Cho Myint and Nyo Nyo Myaing (eds.) **(2001) Proceedings of the Second Agricultural Research Conference, 13 and 14 January 2001. Yezin Agricultural University, Yezin, Pyinmana, Myanmar**
R&D methodology
agricultural research; conferences

This second Agricultural Research Conference consists of 4 sessions:

1) Social Economics and Extension

2) Strategies for Crop Production

3) Environmental Science and Crop Improvement

4) Plant Protection

Nell, Wimpie **(2001) Agricultural Development within the holistic Integrated approach: MUCPP/CHESP as a case study in South Africa. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D methodology
South Africa; multi-disciplinary approach; political ecology

In order to develop a strong and powerful South Africa, it is very important that strong and powerful communities and regions are developed. To create a winning community, region or country, one must think and act in a fresh, new and effective manner. The absence of a total integrated system's (holistic) approach placed a question mark on the sustainability of the Green Revolution in Asia and the absence of ecologists on its programmes had a degrading effect on the natural environmental resources. This paper describes the MUCPP/CHESP case study in South Africa using agriculture development in a holistic integrated model. The role of different actors and disciplines involved is discussed.

Nitsch, Egbert; Aue, Christina; Schmitt, Brigitte **(1998). Zur staedtischen Land- und Gartenwirtschaft in einer Welt: Beitraege der gruenen Veranstaltung vomm 22 Juni 1998 in Bonn. 139 p. Arbeitskreis II (Umwelt, Raumordnung und Staedtebau, Verkehr, Landwirtschaft) der Bundestagfraktion von Buendis 90 / der Gruenen, Bundeeshaus, 53113 Bonn, Germany**

R&D methodology rural-urban linkages horticulture

Agenda 21; Germany

Contains a number of papers presented in the framework of a seminar organised by the German Green Party. In quite a number of German cities, processes are taking place that are local implementations of Agenda 21. The underlying discussion aims at giving a more practical focus to the Agenda 21 discussion. (WB)

Nugent, Rachel A **(1999). Measuring the sustainability of urban agriculture. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 95-99. ISBN 0_88936_882_1. CAD 35.00**

Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9

R&D methodology economic impact

economic impact; food systems; cost-benefit analysis

The paper defines economically relevant benefits and costs of urban agriculture to evaluate conditions needed for sustainable urban agriculture. Urban agriculture is sustainable if the benefits exceed the costs over a relevant period and the impacts are equally distributed. A cost-benefit framework is presented to measure whether the benefits of urban agriculture outweigh the costs in a particular locale. A comparison of a sustainable local food system and the traditional import-export local food system model is discussed. Sustainable urban food systems can form a closed loop if they reduce the need for cities to import resources to satisfy their production and consumption needs and reduce the amount of waste leaving the city. A theoretical model for measuring the sustainability of urban agriculture in a community is presented. (Abstract adapted from original)

Nugent, Rachel A. **(2001).Using economic analysis to measure the sustainability of urban and periurban agriculture: A comparison of cost-benefit and contingent valuation analyses. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology economic impact

diagnosis; economic method; sustainability

One of the claims made about urban and periurban agriculture is that it adds to the “sustainability” of an urban area. This has been used as a selling point for local, national and international policy-makers to support the development of it, with clear and fair policies, and to integrate it with other components of the food, planning, and agricultural systems under their jurisdictions. But whether urban and periurban agriculture really makes a city more “sustainable” is an open question and will remain so until methods are developed to measure what is meant by sustainability. This paper describes several economic methods, a combination of standard and recently-developed economic methods, and seeks answers to the following questions about the social, environmental, and economic impacts of urban agriculture: In what ways does UPA affect the community, and why? Are the positive and negative effects temporary or permanent and how might they change over time? Who are the important stakeholders affected by UPA, what conflicts arise among them, and how might they be resolved? Are the impacts of UPA better for the community than an alternative use of the resources, and how should choices be made about alternatives? How do factors from outside the community affect UPA and its role in the community?

Nunan, Fiona; Shepherd, A **(1998). Where city meets country. Is the periurban interface a concept that counts? 2 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**

rural-urban linkages R&D methodology

natural resources

Examines management of natural resources in the periurban interface. This research was done in the framework of the Periurban Interface Production Systems Research programme, one of seven portfolios which together constitute DFID's Natural Resources Systems Programme. The research emphasises a move away from a simple geographic definition of the interface to an understanding based on intensive linkages and flows of, for example, commodities, wastes and labour. (WB)

Nunan, Fiona. Bird, K., Bishop, J. with Edmundson, A. and Nidagundi, S.R. **(2000) Valuing Periurban Natural Resources: A guide for Natural Resource Managers. School of Public Policy, University of Birmingham.**

rural-urban linkages R&D Methodology land use planning

urbanisation; wastewater; waste recycling; concepts; policy; decision support; India; Ghana; natural resources; cost benefits

This booklet describes a decision framework to facilitate natural resource decision-making and management, particularly in areas where there are competing demands from urban development and "rural" uses of resources. It has been written for Southern Countries and is aimed principally at a range of public sector decision-makers. In part 1 the decision framework is described while part 2 gives experiences with applications in two cities; Hubli-Dharwad in India and Kumasi in Ghana.

Ouedraogo, C.L., V. Yameogo-Bougouma, S.R. Kondombo and A.J. Nianogo **(2001) Methodologie de la Recherche sur la Production Animale en Zone Urbaine et Peri-Urbaine (Research Methodologies on Animal Production in the Urban and Periurban Zone) Paper for the "Appropriate Methodologies for Urban Agriculture" workshop, Oct. 1-5 2001, Nairobi, Kenya. Ministere des Ressources Animales / Universite de Polytechnique de Bobo-Dioulasso / Institut de l'Environnement et de Recherches Agricoles (INERA) / Union Mondiale pour la Nature, Ouagadougou.**

R&D methodology urban livestock

research; methodologies; animal production; urban areas; periurban area

This article contains a summary description of research methods that can be used in animal production in the urban and peri-urban zone, a literature review of urban animal husbandry in Burkina Faso and some case studies from Burkina Faso. The research methods are classified in three categories according to their duration: short (bibliographic study, rapid formal or informal investigations), middle (three to eight months) or long term (two years or more). The most complete methods are those of long duration but in view of the time they take, they can only be employed in specific circumstances. Nevertheless, the methods chosen here reflect the authors' objectives and the means put at their disposal.

An examination of some of these studies reveals that an improvement of the methods is needed, since the majority have been executed without a consequent planning, or with insufficient means, which has seriously limited their outreach.

Paje, B. G. **(2001) Methodologies to Improve Entrepreneurial Skills of Urban Agriculture Entrepreneurs. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology services

Philippines; informal sector; micro entreprise

In developing countries only few job opportunities exist in the formal sector and unemployment rates remain very high, especially in the countryside, triggering the migration of people into the urban centers. However, the industrial sector absorbs new entrants only at a limited scale, forcing these segments to move into entrepreneurship due to lack of alternatives. In the Philippines, by government's definition, small industries include livelihood operations in the informal sector. While the number of entrepreneurship ventures abounds, one sees lots of these slowly dying and some going bankrupt. It is perceived that entrepreneurial activities lack the

dynamism and competitive edge of those in more developed countries. One reason that can be advanced is the lack of skills and competencies to manage business enterprises. Corollary to lack of skills is the fact that small entrepreneurs find it difficult to pay for know-how and its application in their enterprises. This paper describes the CEFE's Basic Theory, to improve entrepreneurial skills.

Pantuliano, Sara and Plastow, John **(2001) Experimenting With Pim: The Acord Sudan Urban-Rural Linkages Programme Experience Of Adapting Participatory Impact Monitoring. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology

participatory impact monitoring

This paper explores the way in which ACORD programmes in the Horn of Africa have adapted the GTZ inspired Participatory Impact Monitoring (PIM) to their working environments. It begins with an introduction to the methodology and the ways in which it was introduced to non-literate communities. Thereafter the paper explores the results and lessons learnt from a twenty-month action research in the use of PIM with the Urban-Rural Linkages Programme and three of its partner CBOs from amongst the Beja people of Eastern Sudan.

Pearce, Barry **(1995). Towards an economic evaluation of urban innovative projects: micro projects for mega change. 75 p. ISBN 92-828-1104-2. ECU 20.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland Supplier: Office for Official Publications of the European Communities, Luxembourg**

city ecology economic impact R&D methodology

sustainable cities; sustainable development; urban planning; European Union; innovations; project evaluation

Report of an overview of 110 projects on innovative urban projects in EU member states. There are interesting and relevant appendices presenting a checklist on evaluation criteria on urban sustainability and an evaluation matrix. (WB)

Pearce, Barry **(1995). Urban eco-auditing and local authorities in Europe. The sustainable city: a European tetralogy no. 1. 142 p. ISBN 92_827_4917_7. ECU 15.00. European Foundation for the Improvement of Living and Working Conditions, Loughlinstown House, Shankill, Co. Dublin, Ireland Supplier: Office for Official Publications of the European Communities, Luxemburg**

city ecology R&D methodology

environmental impact assessment; environmental auditing; case studies; Europe; sustainable urban development; Sweden; Spain; United Kingdom

Environmental auditing, or eco-auditing, examines formal and rigorous procedures for reviewing and evaluating a municipality's environmental performance. 'Municipality', in this context, refers to either the local authority organisation or to the community on behalf of which it works. Apart from checking on environmental performance it also critically examines the information used to make the assessment. Environmental auditing is either internal or external looking. In the former, it examines and evaluates the authority's current policies, plans, practices and structures, and in the latter, it reviews and describes the state of the local environment in the municipality's locality. This report looks at a number of initiatives of European local authorities with environmental auditing, following what has already been going on in the private sector. Three case studies are reviewed in particular: Sundsvall (Sweden), Igualada (Spain), and Kirklees (UK). Among tools presented here, we mention environmental balance sheets containing the accounts of stocks and flows of environmental resources. Links between urban eco-auditing and the economics of the sustainable city receive particular attention. The main issue here is the potential tension that exists between environmental protection and economic development. This report looks at attempts there have been to link or integrate environmental auditing with an economic analysis of policies, plans and projects. Specifically, the report looks at whether economic initiatives are being audited in terms of their environmental impacts and whether an economic appraisal of environmental initiatives is being included in the auditing process. The report concludes that environmental auditing requires much commitment across the municipality, in terms of human resources and finance made available. Some clues are given on how to reduce cost involved. Data collection and interpretation has revealed itself often to be difficult. There is a danger that too much emphasis is placed on procedures and structures for making decisions rather than on securing actual improvements to the environment. Environmental auditing may play an important role in strengthening self-control mechanisms for environmental protection and in creating more environmental awareness. (WB)

Perkins, Ellie **(1999). Public policy and the transition to locally based food networks. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 60-63. ISBN 0_88936_882_1. CAD 35.00**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition R&D methodology
food systems; ecology; public policy; local economy

Food networks play an important role in local economies because of their many linkages, their employment requirements, and the ties among food, culture, health, and well. This paper explains the social, economic, and ecological importance of locally based food production and distribution systems, giving examples of policies and institutions that communities and governments can use to help develop them. It provides examples of such measures in action from Toronto and other places. The paper also discusses the relationship between public policy and grass-roots community initiatives as part of the local institutional structures surrounding food.

Finally, the paper sets out several criteria for assessing the ecological implications of public-policy measures and discusses the political and cultural conditions that favour development of locally based economies and food systems. (NB - abstract adapted from original)

Peters D., Thi Tinh N., (NIAH), Than Thuy T.**(2000) Improved Feed for Pig raising in Vietnam. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock R&D methodology

Vietnam

Sweetpotato vines are an important feed stuff in sweetpotato-based pig feed systems. Two constraints to using vines as a feed source are the heavy labor requirements for preparation and difficulties with storage. Vietnamese farmers, mostly women, spend an average of one to two hours each day preparing sweetpotato vines to feed to one or two pigs. As the number of pigs increases, even more time is spent on chopping vines. Moreover, after sweetptotato roots are harvested, a large amount of vines need to be processed in order to be stored as feed for later when vines are no longer available in the field. In the Red River Delta area close to the capital city of Hanoi, farmers cultivate sweetpotato, inter-cropped with corn, exclusively for vine production as pig feed. The pigs are grown mainly for urban meat consumption in Hanoi. The article informs us about two sequential on-farm trials, which were carried out to reduce demand for women's labor and improve pig growth efficiency using fermented sweetpotato vines.

Plastow, John and Pantuliano, Sara. **(2001) Experimenting with PIM: the ACORD Sudan Urban-Rural Linkages Programme Experience of Adapting Participatory Impact Monitoring. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology rural-urban linkages

participatory monitoring; Sudan; migration; action research

This paper explores the way in which ACORD programmes in the Horn of Africa have adapted the GTZ inspired Participatory Impact Monitoring (PIM) to their working environments. It begins with an introduction to the methodology and the ways in which it was introduced to non-literate communities. Thereafter the paper explores the results and lessons learnt from a twenty-month action research in the use of PIM with the Urban-Rural Linkages Programme and three of its partner CBOs from amongst the Beja people of Eastern Sudan.

Polèse, Mario **(1994). Urban research as a tool for international development. On: http://www.unesco.org/most/wien/polese.htm. 6 p. INRS Urbanisation (Université du Quebec); Montreal Interuniversity Group Villes et Développement**

R&D methodology
urbanisation; economic development; social development; knowledge bases

Outlines the role of urbanisation in social and economic development, and proposes an agenda for urban research with emphasis on the needs of developing countries. As the author argues, choices that are to be made in the transition from a fundamentally rural to an urban society will have a crucial effect on the nature of society's social and economic development. Such choices can only be made successfully if grounded on a sound knowledge base. (WB)

Prudencio Boehrt, Julio **(1993). Urban agriculture research in Latin America: record, capacities and opportunities. Cities Feeding People Series no. 7. 24 p. International Development Research Centre, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
R&D methodology
Latin America; wastewater recycling; economic aspects; vegetable gardens; home consumption; waste management; hydroponics

The paper reviews the existing literature on urban agriculture and related topics in Latin America and presents the institutions with potential research capacity in the field of urban agriculture or related topics. Most researched and tested production systems in LA are family, school or community vegetable gardens, a second fairly well developed activity is the breeding of small livestock. Most activities are carried out by low-income families, living in suburban or marginal city areas. The activity is to support family consumption and to a significant level the overall family income. There are few experiences relating to urban agriculture. Proposed research issues are: water recycling systems, popular hydroponics, impact of urban agriculture upon the urban family. (NB)

Quansah, Charles. and Asante-Mensah, S. **(2001) Methods to Identify the Priorities for Technology Development: a Case Study in the Use of Local Knowledge. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology
Ghana; local knowledge; monitoring; participatory methods

The increasing conversion of agricultural land for housing development due to urban growth requires the development and adoption of improved land management practices to sustain the requisite food production to feed the masses. Although appropriate land management technologies are available, adoption is very low. This is due, among other factors, to a lack of participation of farmers in the technology development. This paper presents a case study in which various participatory methods are used in research priority setting, accommodating local knowledge in

appropriate technology development, monitoring and evaluation. The steps in the implementation of the methods are demonstrated and some of the results are presented to show their relevance to enhanced technology adoption and institutionalisation.

Quon, Soonya **(1999). Planning for urban agriculture: a review of tools and strategies for urban planners. Cities feeding people series report no. 28 Supplier: International Development Research Centre (IDRC), PO Box 8500, Ottawa ON, Canada K1G 3H9**

R&D methodology land use planning

urban planning; land use planning; social participation; policy development

On basis of published and "grey" literature and a survey of 26 urban planning professionals from 18 cities around the world key planning-related constraints facing urban farmers were identified as well as possible responses to these constraints. Land use issues are of particular concern to urban farmers. These issues are compounded by the urban planning policy context through, amongst others, a lack of formal recognition. Important recommendations cited in literature and from planners are changes to land use planning policy level, participation in new multi-disciplinary institutions responsible for all facets of urban agriculture in a community and establishing records of urban agriculture. It was found that urban planners have greater opportunities to permit rather than to support urban agriculture given their position as regards to decision making at the various levels. Planners could use their influence for change, forge alliances and facilitate opportunities for urban farmers. (NB)

Rabinovitch, Jonas **(1998). Final summary report international workshop on rural-urban linkages, Curitiba, Brazil, 10-13 March 1998. 5 p. MDGD/BDP United Nations Development Programme**

rural-urban linkages R&D methodology

development policies; periurban agriculture

Reports on a UNDP-sponsored workshop. Main conclusions were: (1) rural-urban linkages add a crucial spatial dimension to understanding key development issues and formulating effective policies and programmes to address them; (2) ensuring reciprocal benefits from rural-urban linkages requires a localisation of planning and management capacities to assess rural-urban linkages issues and devise appropriate initiatives; (3) the conventional view of rural as equivalent to agriculture is no longer reflective of the reality of either rural regions or the rural component of rural-urban linkages. One of the recommendations of the workshop was for UNDP to set up a clearinghouse for the development of a network of members with a common interest in rural-urban linkage issues and policies. (WB)

Rogers, Nedjo **(ed.) (1996). Urban agriculture handbook: practical actions for**

cultivating communities. Youth and Sustainable Cities Series, booklet No. 3. Victoria, B.C.: LifeCycles and The West Coast Ecological Youth Alliance.
community development R&D methodology
youth;allotment gardens; community gardens; kitchen gardens; community greening; Canada

This is in essence a manual with a lot of justification from history and cases. Its scope is limited to urban agriculture as an anti-poverty greening and education tool. (JS)

Rogerson, Christian M. **(2001) Urban Agriculture: Defining the Southern African Policy Debate. Paper prepared for the Sub-Regional Expert Consultation Meeting on Urban and Peri-Urban Horticulture, University of Stellenbosch, Cape Town, South Africa . Department of Geography & Environmental Studies, University of the Witwatersrand, Johannesburg, Southern Africa**
R&D methodology
Africa (Southern); policy; urban agriculture, South Africa

The author wants to help debates about poverty in southern Africa by discussing urban farming, the related policy implications and environment and thirdly South Africa as a case study for policy debates and socio-economic research in this field. The most important scale he argues, is that of the local level. Economic decline and especially structural adjustment programmes have forced citizens into the informal sector and as an example urban farming is now widespread in Africa, Lusaka in Zambia is even coined as " world capital of urban cultivation". He then describes the urban farmers, mostly women and usually not recent migrants. Official reaction is usually negative. Examples are given from South Africa of towns where urban agriculture is planned and allowed. Authors are cited who argue that urban farming is not that much the solution to urban poverty as others claim. (WiH)

Röling, N. and Fliert, E. van de **(2001) Introducing Integrated Pest Management in Rice in Indonesia: a Pioneering Attempt to Facilitate Large Scale Change. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology
IPM; Indonesia; farmer field schools

Integrated Pest Management (IPM) is an important component in sustainable agri-culture. The paper describes the National IPM Programme, which the Indonesian Government is implementing since May 1989. It is the first large-scale attempt to systematically introduce more sustainable agricultural practices as a national, public sector effort. As of October 1995, the Project had trained an estimated 229,000 farmers in season-long Farmer Field Schools. In doing so, the Project had learned immensely important lessons for all of us who are interested in what it takes, in practice, to foster sustainable agriculture. This chapter is an attempt to capture some of these lessons, although the authors realise full well that they can only describe some of the highlights. This article is a chapter in "Sustainable Agriculture: Participatory Learning and Action" by N. Röling and M. Wagemakers (Eds),

Wageningen Agricultural University, Department of Communication and Innovation Studies. To be published by Cambridge University Press.

Santandreu, A. **(2001) Rapid Visual Diagnosis applied in Montevideo; a rapid, low cost, participatory methodology. Paper for topic 1 the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology
Uruguay; PRA; diagnosis

The article describes a methodology, applied in Montevideo, Uruguay. The team of investigators used Rapid Visual Diagnosis (RVD), a participatory methodology of diagnosis in urban agriculture, developed by the Latin American Center of Social Ecology – CLAES (Montevideo, Uruguay). RVD allows for the incorporation of local groups and communities in a participatory process of knowledge development that takes place "from the bottom up".

Sawio, Camillus J **(1993). Feeding the urban masses: towards an understanding of the dynamics of urban agriculture and landuse change in Dar es Salaam, Tanzania. 71 p. International Development Research Center (IDRC), PO Box 62084, Nairobi, Kenya; Clark University, Worcester, MA, USA.**
food security and nutrition R&D methodology
Tanzania; food security; food supply; income generation; land use; open spaces; land tenure

This is one of the first – and most important – among the wave of doctoral and Masters thesis focussed explicitly on urban agriculture, which emerged over the past decade in universities scattered across the globe. The firs three chapters introduce the food shortage situation in Dar es Salaam, the importance of studying urban agriculture (a fairly new concept at the time), and the conceptual framework for evaluating urban agriculture's role. The fourth chapter paints a picture of the changes in agricultural land use in the Dar area since the mid-1960s. The next four chapters – the dissertation's core provide the results of a survey undertaken, focussing in turn on urban farmers, urban farms and urban farming practices. The final chapter offers a typology of impediments to urban agriculture in Dar. (JN)

Sawio, Camillus J **(1993). Urban agriculture research in East and Central Africa: record, capacities and opportunities Cities Feeding People Series report no. 1. 28 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
R&D methodology
research; Africa (Eastern); Central Africa; waste management; waste recycling; urban policies

Describes urban agriculture research, strengths and weaknesses and areas for future research in Eastern and Central Africa A list of research persons and institutions is presented which might carry future research. Lastly, two potential research projects in Eastern and Central Africa are presented. Until present, little research has been carried out to develop small scale appropriate technologies, to examine multi-food production systems, analyse legal and policy aspects, to design organic recycling systems and to find solutions to health risks related to urban agriculture. Future areas for research include intensive use of waste, the use of waste water for irrigation, crop and livestock selection methods which suit the urban environment and appropriate infrastructure for urban agriculture. (NB)

Sawio, Camillus J **(1998). Urban agriculture in Dar es Salaam. Workshop on Cities feeding people: lessons learned from projects in African cities. IDRC. Nairobi. 21-25 June 1998.**

R&D methodology economic impact

Tanzania; workshops; project implementation; monitoring & evaluation; project impact; impact assessment

This International Development Research Centre (IDRC)-supported project (93-0037) aimed to build up baseline data to feed into the Urban Environmental Planning and Management process taking place under the auspices of the Sustainable Dar es Salaam Project. The research team, which included urban planners, geographers and scientists, examined the extent of urban agriculture and its role in the urban economy, income-generation and food security; health issues; the impact of urban agriculture on the environment (including analyses of water, crops and soil for heavy metals and other contaminants); and actual and potential instruments for urban agriculture support. The result was a broad data collection, in-depth analysis and presentation of the results in readily understandable form using maps, diagrams, tables and figures.

This paper examines the impact of the project on institutional capacity strengthening, human resource development, partnerships with other institutions, gender sensitive analysis, scientific and methodological advances, and research utilization by non-researchers. It was noted that the project strengthened the University College of Lands and Architectural Sciences (UCLAS) and the University of Dar es Salaam (UDSM), both in terms of equipment and research capacity; inspired a number of students to pursue postgraduate studies in aspects of urban agriculture; and sensitized farmers, stakeholders and local governments to the importance of urban agriculture. The project generated information that was used in the Strategic Urban Development Plan for Dar es Salaam and leveraged funds for rehabilitating the Horticultural Gardens. These gardens are becoming vehicles for disseminating knowledge, seeds, and technologies for developing urban agriculture. (HC, IDRC)

Schnitzler, Wilfried H **(et al.) (1999). City harvests: the case of Cagayan de Oro City (Philippines). Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems: a**

project of the European Commission (no. IC18-CT97-0184). 44 p.
R&D methodology food security and nutrition
Philippines; interviews; surveys

Describes results of a study on agriculture activities in Cagayan de Oro; Philippines. Elements were: (1) the analysis of baseline survey data on periurban vegetable consumption, farming and marketing conducted by the Periurban Vegetable Project; (2) the exploration of existing data pertaining to urban agriculture from various sources; and (3) in-depth interviews with key informants. provides a wealth of information. Also published as a chapter in the 'reader' 'Growing Cities, Growing Food'. (WB)

Seck, Mamadou **(2001) Appropriate Methods for Technology Development in Composting and Waste Re-use in UPA , Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings available on: www.ruaf.org . Ecole Superieure Polytechnique, Dakar**
R&D methodology
methodologies; composting; waste reuse; Senegal; Africa (Western)

In the Rufisque suburb of Dakar, capital of Senegal, a group of eighteen unemployed formed an association to combat their poverty by creating work and incomes. The association approached the author and his colleagues from the University of Cheikh Anta Diop with the idea of utilising organic garbage for use in the vegetable gardens and nurseries. The idea was to compost this garbage by aerobic treatment and thus add value to this waste material. The compost is intended for a group of farmers who are asked to use following the guidelines set by the researchers. These farmers were also invited to follow a number of extension sessions and on plot demonstrations. The municipality of Rufisque provided for a one hectare area of land where the composting was to be practised.

The population of this suburb was invited to a number of meetings in which the prupose and importance of waste separation and collection was explained. The population contributes by paying a slight amount for each bucket of collected organic waste.

The association of the youths takes care of the collection, transport and composting. The composting method is taught by the author and his colleagues from the University.

There are two main aims of this research and action strategy. The first is to make compost and to improve the soil for urban agriculture. The second is to investigate the phyto-sanitary effects of using water soluble extracts from compost on a crop of tomato.

The article goes on to describe in great detail the method of composting and the results of composition of the compost and development of various strains of bacteria.

In the conclusion the use of compost is described clearly advantageous and the use of compost extract also but less pronounced. The challenge of getting waste

separated was overcome by informing the population and by the help og the youths association who gained also by the selling of compost to farmers.

The use of compost extract is hardly documented in Africa and data thus hard to compare. More study is required.

Selener, Daniel; Chenier, Jacqueline; Zelaya, Raul **(1997).. Farmer-to-farmer extension: lessons from the field. IIRR: New York. 150 p. Available in English and Spanish.**

services community development R&D methodology
training; agricultural extension; Mexico; Nicaragua; Ecuador; Latin America; case studies

This book is especially useful for people working in agriculture, health, education, and community development following participatory approaches. This book is the result of two workshops, one in Honduras and another in Ecuador, that were conducted to document and analyze the experiences of several community development projects, using the "farmer-to-farmer" extension methodology. Most of the information contained in the book is from the farming promoters' points of view, based on their practical experience working in farmer-to-farmer programs. The description and analysis presented offers a broad set of experiences. This information can be analyzed and adapted by the reader to his/her own project, according to the context, project philosophy, objectives, and available resources, among others. (JS adapted)

Shuman, Michael H **(1998). Going local: creating self-reliant communities in a global age. Free Press, New York, 306 p.**

community development R&D methodology
selfreliance; globalisation; ecology

This book details how dozens of communities are regaining control over their economies by investing in locally owned businesses and replacing imports. This is presented as a compliment to globalization. (JS)

Slater, R. **(2001) Understanding women's involvement in urban agriculture in Cape Town: A social development perspective. In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

gender R&D Methodology
South Africa

Urban agriculture research in Southern and Eastern Africa has concentrated largely on the use of questionnaires and surveys, usually with a view to understanding the economic benefits accruing to those who practice urban agriculture. For researchers, the focus has been on identifying and analysing the contribution of urban agriculture to income generation, subsistence and food security or on considering its

environmental and planning implications. In Cape Town, however, the economic benefits of urban agriculture are limited. In 1989 an investigation found that, where practised, urban agriculture contributed less than one per cent of household income. Questions remain of what are the dynamics behind urban agricultural activity in this context? Why do people living in low-income settlements in Cape Town invest time and money in agriculture in the absence of economic benefits? To try and answer this question an alternative analytical and methodological approach was developed and applied during 10 months of interviewing in three townships in Cape Town. The approach relied on an understanding of how people came to live in Cape Town and the impact of apartheid on opportunities to find work and a place to live. During 1996, 169 people were interviewed in Langa, Khayelitsha and Lower Crossroads settlements and the life histories of fourteen women were recorded. Through the use of an alternative framework, urban agriculture was found to be important in a number of ways.

Streiffeler, Friedhelm **(1991). The knowledge system and the action motives in urban agriculture in subsaharan Africa. In: Proceedings of the International Workshop Agricultural Knowledge Systems and the Role of Extension, Bad Boll, p. 256-265. Institute of Socio-Economics of Agricultural Development, Faculty of International Agricultural Development, Technical University of Berlin, Podbielskiallee 64, D-1000 Berlin 33, Germany**

services R&D methodology

Zaire; Kisangani; community initiatives; agricultural extension

Examining knowledge systems of urban agriculture is interesting as a comparison to the knowledge systems of the rural space. The author employs figures from a survey held at Kisangani, Zaire, to arrive at conclusions regarding learning processes in agricultural experimentation. He found that urban cultivators in Kisangani were hardly interested in trying new things. Neither did there seem to exist strong informal networks between these urban farmers as has been reported from other countries at a number of occasions. There is much scope for improved community development and agricultural extension among this group of people. (WB)

Stren, Richard; Yeung, Yue-man **(1993). Towards a research agenda for the 1990s. On: http://www.unesco.org/most/wien/yeung.htm. 12 p.**

R&D methodology

consultative approaches; networking

Discusses some main findings of consultative research between a large number of researchers conducted in the field of urban agriculture in cities in developing countries and lists themes for the urban research agenda for the 1990s. The broad focus of the project makes it difficult to discern concrete results. (WB)

Sumberg, James **(1996). Livestock production in periurban areas of Africa: an analysis of Dar es Salaam, Mwanza and Shinyanga, Tanzania. 79 p. Overseas**

Development Group, School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK
Urban livestock R&D methodology rural-urban linkages
animal husbandry; periurban livestock production; political aspects; food security

Describes and characterises livestock production in and around urban areas in Tanzania, focusing specifically on dairy, broiler and egg production. Contains a bibliography with nearly 450 references. The enclosed paper critically examines the large number of publications extolling virtues of urban agriculture for urban food security and poverty reduction. The authors stress the importance of rural-urban linkages in resource and output markets. At the same time, they issue a warning against attaching an exaggerated weight to the contribution of urban farming to food security of the majority of urban dwellers. Very detailed, very sound and very complete. (WB)

Swanepoel, Frans **(1996). Improved quality of life. 2 p. Foundation for Research Development (FRD), PO Box 2600, Pretoria 0001, South Africa**
R&D methodology rural-urban linkages
South Africa; development programmes

One third of South Africans have an income less than the accepted minimum subsistence level. More than 70% of these are based in rural areas. The Foundation for Research Development proposes a number of programmes to improve this situation, notably a food production and food security programme, both in rural, periurban and urban settings, and a rural and urban development programme, focusing on infrastructure and creating job opportunities. Principles and mechanisms underlying these programmes are elaborated upon. (WB)

Tadros, HR; Feteeha, M; Hibbard, A **(1987). Squatter produce market vendors in Egypt. Cairo: Social Research Centre, American University in Cairo**
services food security and nutrition R&D methodology
Egypt; street vendors; marketing; food supply; food distribution

This document presents the results of a study (83-0056) carried out with support from the International Development Research Centre (IDRC) in 18 squatter markets in different districts in Cairo. The methodology involved direct observation, surveys, and interviews with government officials and 192 vendors. Commodities available through these vendors included vegetables and fruit; meats; prepared and processed foods and beverages; nonfood products; and services. The researchers noted business hours, environmental problems, characteristics of vendors, reasons for entering the vending business, and the role of the market "Sheik" or informal leader. Data was also collected on vendors' Suppliers and customers; the effect of vending on other marketing systems; vendors' relationship to the government; and attitudes of government officials and authorities toward vendors. The findings indicated that markets were relatively stable operations, generated jobs, and were well integrated into the city's social structure. The recommendations called for

up-to-date statistics on squatter markets, better cooperation between vendors and authorities, and improvements to the market organization. (HC, IDRC)

Talukder A., Pee, S. de, Taher, A., Hall, A., Moench-Pfanner, R., Bloem, M.W. **(2001) Improving food and nutrition security through homestead gardening in rural, urban and periurban areas in Bangladesh. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**

R&D Methodology food security and nutrition gender

Bangladesh; home gardening; gender; children

Malnutrition is a serious public health problem in Bangladesh, and can have serious impacts on the population as malnutrition retards child growth, increases the risk and duration of illness, reduces work output, and slows social and mental development. Improving nutritional status, including micronutrient status, can lead to increased productivity, increased child survival and growth, and reduced maternal morbidity and mortality. Interventions for improving nutrition can address deficiencies of specific nutrients. However, when the goal is to address deficiencies of more nutrients simultaneously and to target the population throughout the lifecycle interventions such as dietary diversification are more appropriate. Homestead gardening activities are centered on women because they are usually the ones who take care of the homestead garden. These activities empower the women and can increase their income. This combination of empowerment and increased income can result in better use of household resources and improved caring practices. Therefore, homestead food production also addresses a priority area of poverty alleviation and overall development of communities. This article describes the important characteristics of HKI's Homestead Gardening Program in Bangladesh (1990-2001) as well as how it is being monitored and evaluated.

Tegegne A., Tadesse, M., Mekasha, Y. and Yami, A. **(2000) Market-oriented Urban and Periurban Dairy Production Systems in Ethiopia. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock rural-urban linkages R&D methodology

Ethiopia; farming systems; dairy; markets

The case study was designed to characterise the market-oriented urban and periurban dairy production systems in the Addis Ababa milk shed in Ethiopia. Seven sub-systems identified include traditional crop/livestock farms in rural areas, intensified dairy/crop livestock farms in rural areas, crop/livestock farms with intensive cropping in the Addis Ababa milk shed, specialized dairy farms, periurban producers in secondary towns, intra-urban dairy farms in Addis Ababa and urban dairy producers in secondary towns. It appears that cash income from sales of milk and milk products and/or young stock and breeding animals and utilisation of

available resources such as capital, land, labor, etc are the most important reasons for keeping dairy animals. However, as the level of intensification increases, factors such as management skills, labour force, feeding resources and systems, genetic improvement, control of diseases and parasites, udder health and mastitis, calf mortality, reproductive problems, waste management, quality control, processing and marketing and other socio-economic considerations are becoming important in influencing these urban and periurban dairy production systems.

The Urban Agriculture Network **(1994). Worldwide network for urban agriculture. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 19. The Urban Agriculture Network, 1711 Lamont St. NW, Washington, DC 20010, USA**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
R&D methodology
home gardening; networking; small-scale agriculture; urban environment; urban population

The Urban Agriculture Network is a focal point and resource centre for promoting urban farming in low-income countries. It brings together over 1000 NGOs, researchers, farmers, government agencies and international agencies from over 25 countries. The network promotes urban farming as a strategy to empower the poor, reduce hunger and malnutrition, promote income-generating employment and enterprise development, and make the urban environment healthier. The network promotes increased interaction and cooperation among agencies working in urban farming at local, national and international level. (ILEIA)

Tinker, Irene **(1997). Street foods: urban food and employment in developing countries. Oxford University Press, New York. 243 p.**
food security and nutrition R&D methodology gender
poverty; gender;safe food; informal sector; street food

This book presents the first empirical study of sellers of foods on urban streets. It recounts the efforts of an action-research project to improve the income of street food vendors and the safety of the food they sell in the Philippines, Thailand, Indonesia, Bangladesh, Egypt, Nigeria and Senegal. Details of the street food trade provide robust comparative data on the vendors and the informal sector. The study includes and analysis of income and gender. The Book is thorough in its analysis of what is urban and how street food functions as a system interfaced with other urban systems, in a variety of economies and cultures. Street food is found to be an essential link in the informal economic sector, nutrition and urban agriculture. (JS)

Tjallingii, Sybrand P **(1995). Ecopolis: strategies for ecologically sound urban development. Dorschkamprapport. ISBN 90_73348_34_X. Instituut voor Bos- en Natuuronderzoek**

Supplier: Backhuys Publishers, PO Box 321, 2300 AH Leiden, The Netherlands
city ecology R&D methodology
urban development; ecological development; urban planning; Netherlands

Resulting from ESUD, for Ecologically Sound Urban Development, a Dutch study project looking into the problems of the environment and urban development. Aim of the project is to form a planning strategy, to indicate steps which can be taken at the local level and to draw up priorities for research, design and policy. A number of models together shaping the Ecopolis, are described in this publication: for chains, areas and organisations. Examples cited are from The Netherlands. (WB)

Torres Lima, Pablo A **(1991). El campesinado en la estructura urbana: el caso de Milpa Alta. 131 p. ISBN 970_620_023_1. Universidad Autónoma Metropolitana, Xochimilco, Mexico**
community development rural-urban linkages R&D methodology
Mexico

Describes the case of farmers in a commmunity that has provided a megacity with food while maintaining much of its traditional, rural, social tissue. The analysis examines various facors: natural resources in the region, type of population, structure of the labour force, land use, and socio-economic relations. (WB)

Torres Lima, Pablo A **(2001) Sustainable urban agriculture development in Mexico, a methodological approach. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D methodology
Mexico; economic analysis; agroecology; indicators; policy

Mexico has embarked on a course of economic openness, and unless that whole effort is reversed, the process will require an allocation of labour away from agriculture toward the production of other goods and services or into the informal economy. However, urban agriculture is a food production alternative that directly influences household labor allocation at urban regional level. Our methodological approach is a mix of regional economic analysis with survey and life-history interviews of participants in the process towards sustainability. By assessing economic, social and agroecological indicators that enhance or decrease sustainability of urban agriculture, our methodology contributes to defining development strategies and policies that lead to sustainability in different regional and economic contexts.

Universitat Bonn and ATSAF, Universitat Hohenheim **(2001) Deutscher Tropentag 2001: One World, Research for a better quality of life. Book of abstracts and and Cd-rom with full Papers.**
R&D Methodology

agriculture

The theme of the annual Conference on International Agricultural Research for Development, "Deutscher Tropentag" was hosted by the University of Bonn and had the title One World, Research for a better quality of life. Seventeen themes were discussed in separate Symposia. No. 10 was on Urban and Periurban production systems, in which 11 papers were presented.

Urban Agriculture Support Group **(1996). Global Facility for Urban Agriculture. On: http://www.cityfarmer.org/globalfac1.html#global. 1 p. Urban Agriculture Support Group (SGUA)**

R&D methodology

international co-operation; policy development; networking

A web page containing the description of the Global Facility on Urban Agriculture (GFUA) established by the Urban Agriculture Support Group (SGUA) in 1996. The Resource centre on Urban Agriculture and Forestry (RUAF) (www.ruaf.org) is an outcome of this joint effort to promote urban agriculture worldwide. (WB)

Vazquez, A.P. and S. Anderson **(2001) A Methodological Review of Research into Urban Agriculture. Resource paper for the "Appropriate Methodologies for Urban Agriculture" workshop, Oct. 1-5 2001, Nairobi, Kenya , Wye College, University of London**

R&D methodology

urban agriculture; research; methodologies

Developments in urban agriculture (UA) have been practitioner-led. Researchers are trying to catch up and identify what contributions they can make. In this article the authors review some methods that have been used in the study of UA from actor-oriented and action-research perspectives. Different disciplinary foci have been used to study urban agricultural dynamics such as urban development and land use; strategies of urban farmers involved in production; natural resource management; production systems; commodity and food systems. Many of the approaches aim to involve different actors by consultation through questionnaires, survey, interviews or participatory methods. Social, economic and ecological methodologies and methods are discussed, while the need for new methods is discussed.

Wackernagel, Mathis; Lewan, Lillemor; Borgstroem-Hansson, Carina **(1999). Evaluating the use of natural capital with the ecological footprint: applications in Sweden and subregions. In: Ambio vol. 28 (1999) no. 7 p. 604-612 Supplier: Royal Swedish Academy of Sciences**

R&D methodology city ecology

ecological footprint; footprint calculations; Sweden; economic impact assessment

The ecological footprint assesses people's use of natural resources by comparing their resource consumption and waste production to the regenerative capacity of the earth. Previous studies based on United Nations statistics have shown that

humanity's use of natural capital exceeds the global biocapacity. They have also shown a great spread in the size of people's ecological footprints. In this study which focuses on Sweden, the method of footprint and biocapacity calculations is improved and it is demonstrated how a national footprint can be used for regions and even catchment areas. The method is compared to those used earlier and possibilities and limitations are discussed. (WB - from original abstract)

Wekwete, Kadmiel H **(1993). Urban agriculture research in East and Southern Africa I: record, capacities and opportunities. Cities Feeding People Series no. 3. 14 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

R&D methodology

urban policies; Southern Africa; rural-urban linkages; waste management

An state-of-the-art analysis is presented of urban agriculture research and potential for future research in Southern and Eastern Africa, including Zimbabwe, Kenya, Tanzania, Lesotho, Zambia, Malawi, Botswana and Swaziland. Most researchers have aimed to inform policy makers about the positive features of urban agriculture and highlighted the importance of urban agriculture as a survival strategies. Further research would be needed on rural-urban relations, reasons for policy to promote urban agriculture, and interrelations between agriculture, wastewater and disaster in cities. (NB)

Wheatley, C. **(2001) Fostering innovation in urban and periurban based clusters of small-scale agrifood enterprises. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology services

Philippines; micro-entreprise; agri-food

In the world of research and development practitioners, small enterprise development has long had an urban bias, with relatively little attention to given to agri-food based enterprises, that are seen as falling within the ambit of rural development. Meanwhile, agriculture has long suffered from the view that it is essentially rural and production-oriented, with little emphasis given to a market- or enterprise-orientation. However, the current competitive “operating environment” of small-scale agri-food based enterprises in the developing world is one in which markets and enterprise increasingly matter. In many countries, and especially in Asia, groups of similar micro and small-scale enterprises are commonly found in concentrated geographical areas, or clusters.

Working with clusters of enterprises and their associated support services, rather than on individual enterprises, can be both efficient in using scarce resources and effective in facilitating change in a wide number of enterprises, through a small intervention leveraged across the cluster.

Whyte, A; MacKenzie, F **(1999). Cities Feeding People: a review of the CFP program initiative of IDRC. Ottawa: IDRC**

R&D methodology food security and nutrition economic impact development programmes; project impact; impact assessment

The reviewers examined the implementation of the objectives set in the International Development Research Centre (IDRC)'s Cities Feeding People program initiative: prospectus 1997-2000, as evidenced in the following five projects: Urban agriculture in Dar es Salaam (93-0037); Socioeconomic and ecological impacts of urban agriculture in Harare (95-0007); Urban horticultural technologies in Port-au-Prince (96-0035); International research awards in urban agriculture (97-0026); and wastewater treatment using water lettuce in Dakar (98-0214). The reviewers agree that CFP has been effective in raising awareness of urban agriculture among international organizations, donors, and national and urban governments; knowledge creation; publication and dissemination; and training. They note that it needs to better integrate gender and social relations into is conceptual framework and to make the political economy of conflict more integral and explicit in that framework.

The reviewers also looked at the question of whether adequate recognition of urban agriculture has been achieved and whether CFP should move on to more strategic issues. They conclude that it would be premature to move on, as the battle has yet to be won on three fronts: in the cities, which may have the will but not the tools to move from attitude change to policy change; within the research community, which has difficulty attracting practitioners in urban agriculture due to its inherently multidisciplinary nature; and within the international donor community, where urban agriculture is not central to any agency's mandate and therefore vulnerable in all. (HC, IDRC)

Yeung, Yue-man **(1993). Urban agriculture research in East and Southeast Asia: record, capacities and opportunities. Cities Feeding People Series report no. 6. 15 p. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**

R&D methodology

South East Asia; poverty; waste reuse; aquaculture; vegetable supply; technology; urban policies

Many studies on Asian cities can be found, dealing with food production and distribution as well as with science an technology of food production in urban settings. Especially in China and Taiwan, studies on market potential have been conducted. There is also a considerable amount of studies to relate urban agriculture and water, waste and disaster. Furthermore, research capacities in China, South Korea, Philippines, Hong Kong, Thailand, Malaysia, Singapore and Indonesia are presented. Research opportunities exist on urban poor and food sources, waste reuse and fish farming and vegetable supply and technology. (NB)

Zeeuw, Henk de **(2001) Trying out PTD with NGOs in Peru and Bolivia. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology
PTD; Bolivia; Peru; PRA; sustainable agriculture

This paper is written as a contribution to the internal workshop on Participatory Technology Development (PTD) organised by ETC EcoCulture in July '98. The project described, originated as part of the follow up activities, undertaken by ICCO, of the study on Sustainable Agriculture that was implemented in 1994. One of the findings of that report was that although the ICCO partners in Peru and Bolivia talked a lot about participation, their actual practice at field level was not participatory at all, particularly not when it came to technology development. Against this background, ICCO supported the suggestion to develop a support programme to introduce and adapt the PTD approach among their partner organisations and other NGOs in the Andean region. This project was further seen as the Latin American part of a global programme on PTD.

3.5 Extension, Marketing and Credit Services for urban agriculture

Livestock health service checking for cisticercosis in cattle.

(Picture: Katrien van ‘t Hooft)

Adequate Services for sustainable urban agriculture

Henk de Zeeuw

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This category of the annotated bibliography includes literature on:

- Provision of extension services to urban producers, see also chapter 3.7, entirely dedicated to this theme
- Processing of urban produced food
- Marketing of urban produced food
- Credit for urban producers and agriculture-related micro enterprises

The fact that this category includes only 20 abstracts for four such important aspects of urban agriculture indicates that up to now the delivery of adequate services to (intra- and peri-) urban farmers has not received a lot of attention, or only as a minor aspect of literature focusing on other aspects of urban agriculture[7].

This is quite different from the situation of rural agriculture where publications on extension, processing, marketing and credit are abundant.

Special attention to these themes in urban agriculture is very much needed since it can not be assumed that the approaches and strategies applied in rural extension, marketing, etcetera also apply in the urban conditions.

During the RUAF-SIUPA Workshop on Appropriate Methodologies for Urban Agriculture in Nairobi, October, 2001 the participants identified a large number of differences between the conditions for agriculture in the rural and urban context that directly influence the methodologies that can be used with success (see table 1).

The available literature on urban agriculture **extension** is contradictory in its conclusions. Some sources indicate that urban farmers are highly dynamic and innovative (hydroponics, warehouses, drip irrigation, rooftop farming, reuse of organic wastes and waste water, niche products) due to its closeness to markets and urban consumers, better possibilities for contacts with exporters (flowers, herbs, mushrooms, etc.) and closeness to suppliers of inputs. Some of the urban farmers are farmers by choice who try out new products and techniques not hindered by the traditions in rural farming. Urban farmers also have the advantage that the head offices of most extension organisations and research institutes are in the cities and interaction with them is easier as soon as access has been obtained.

Others (e.g. Streiffeler, 1991 for the case of Kisangani, Zaire) come to the conclusion that urban cultivators are hardly interested in trying new things. Factors that may explain this

[7] However, we must also admit that this category has not yet received sufficient attention in our literature search and abstracting activities. We will devote much more attention to this category in the coming period.

behaviour include the poverty of a substantial number of the urban producers, insecurity of land use, lack of extension services for urban farmers and limited technology development for urban agriculture.

In my view both situations may exist side by side in the same city.

Table 1. Differences between rural and urban agriculture influencing the approaches and strategies to be used in agricultural services

	Rural	**Urban**
Farm types	Conventional; farms consisting of interdependent sub-units	Unconventional; partly mobile; partly without soil; more specialised independent units acting in cluster
Livelihood	Farming is a primary livelihood, engaged full-time	Farming often a secondary livelihood, engaged on a part-time basis
Farmer type	Usually 'born farmers' Strong traditional knowledge	In part 'beginners": urban citizens engaging in agriculture by necessity or by choice (entrepreneurs); in part recent migrants Weak traditional knowledge
Market	Distant markets; Marketing through chain Low degree of local processing	Closeness to markets; Direct marketing to customers possible; Higher degree of local processing
Land security	Relatively high	Insecure, competitive demands and land uses
Production factors	Low land price Lower costs of labour High costs of commercial inputs Variable cost of water	High land price Higher costs of labour Lower costs of commercial inputs High cost of (drinking) water Availability of low cost organic wastes and waste water
Cropping calendar	Seasonal periods	Year-round growing of crops
Products	Staple crops mainly; Cows, sheep	Perishable products especially green vegetables, dairy products, poultry and pigs, mushrooms, ornamental plants, herbs, fish
Community involvement	Easy as small with more common focus	Not possible as too diverse and large Farmers are not organised
Social context	Community Majority of families engaged in farming More homogeneous Relatively stable Few external stakeholders Farmers are more organised	Small groups with common interests Percent of community members engaged in farming is highly variable High diversity within short distance Highly dynamic with strong fluctuations Many external stakeholders with different interests and contrasting views on UA Farmers are hardly organised

Environment	Relatively stable	Fragile, polluted, competitive uses/plans
Availability of research and extension services	More likely	Less likely
Policy support	High priority on policy agenda	Mixed; policies often vague or non-existent

A major challenge for the coming years is to prepare extension services (be it governmental, municipal, university services, NGOs or private sector) better for providing relevant advice to urban farmers, since most of their knowledge is based on rural experiences and does not necessarily apply in the cities

This applies both to the methodologies applied as well as to technical knowledge diffused. Successful rural extension and training methodologies (e.g. the farmer to farmer approach, farmer field schools, participatory technology development) need to be adapted to the urban conditions. The same applies to the technologies that are promoted. The urban setting requires technologies that are ecologically friendly, use little space and highly productive, make use of urban resources such as organic wastes and waste water, can be combined with other functions (e.g. recreation, landscape management, water storage) and result in safe food.

The available literature on **marketing** focuses mainly on marketing from the rural areas to the cities and exports, with an emphasis on the formal and central city markets.

The literature dealing with marketing of products of urban farming mainly deals with marketing of vegetables grown in the periurban area of the cities (see Argenti, 2000; Moustier, 1999;). Much less information is available on marketing systems in urban livestock, aquaculture and intra-urban forms of agriculture.

Happily enough there is also growing attention being paid to informal food marketing and distribution systems (see e.g. Tadros et al. on ‘squatter markets’ in Cairo and Powell et al. on street vending of food in Kingston).

Especially in more developed countries there is a growing literature on alternative marketing systems especially related to organically grown food (see e.g. Scharf on a Food box system in Toronto) but experiences with such systems in developing countries are still rare although in high demand.

Such innovative informal urban food marketing and distribution systems need to be much more documented and studied and local initiatives in this field deserve more policy support.

The area of **micro and small enterprises** related to urban agriculture is a very interesting one that is worth much more attention.

Carvalho (2001) indicates that business opportunities in urban agriculture abound, resulting in different kind of enterprises that can be classified into three major categories (apart from the agricultural production enterprises):

- Processing enterprises (i.e. food preparation, packaging, milling, drying and others),
- Input delivery enterprises (i.e. agricultural supplies such as fertilizers, compost, soil media, seeds, pesticides, water, tools, feeds),

- Service delivery enterprises (i.e. special labour services such as milking, animal health assistance, bookkeeping, transport and others).

Such enterprises are often overlooked by informal sector programmes and more attention is needed for provision of training, management assistance, credit and marketing information to these micro- and small entrepreneurs.

The area of **financing** urban agriculture has received very little attention so far. During a recent meeting of the international Support Group on Urban Agriculture it was identified as the main topic for advocacy activities in the coming period. Little is known about the credit needs of the agricultural enterprises in the city. The conditions of existing credit schemes for the informal sector are often not the most adequate for farming enterprises. Little is known too about the financial mechanisms that can be used to fund urban agriculture intervention programmes and to stimulate (safe) urban agriculture and related micro-enterprise development.

References

Argenti O. (2000), Food for the cities : food supply and distribution policies to reduce urban food security. Food into Cities ; DT/43-OOE, FAO, 30p

Carvalho, J.L.H. (2001) PROVE, Small Agricultural Production Verticalization Program.

Programa de Gestion Urbana, Ecuador , PROVE IV, Cuaderno de trabajo 83

Moustier, Paule; Mbaye, Alain; Bon, Hubert (de); Guérin, Hubert; Pages, Jacques (eds) (1999) Agriculture périurbaine en Afrique subsaharienne : actes de l'atelier international 20-24 avril 1998, Montpellier, France. Montpellier : CIRAD ; CORAF, 278 p.

Powell, D; Wint, E; Brodber, E; Campbell, V. (1990) Street foods of Kingston. University of the West Indies, Mona, Kingston JM. 125 p.

Scharf, Kathryn (1999) A nonprofit system for fresh-produce distribution : the case of Toronto, Canada. In: For hunger-proof cities : sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds). - p. 122-127

Abaleron, C.A. **(2001) The Pros and Cons of Peri-Urban Management in a Tourist City. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 CONICET / Quality of Life Program, Fundacion Bariloche, Argentina**

rural-urban linkages

Argentina; urban management; urbanisation; periurban area, America (Southern)

The paper describes the physical expansion of San Carlos de Bariloche, an international winter resort of North Patagonia, Argentina; explains how the management of the urbanisation process works; shows which difficulties are acting in public participation related to environmental matters; and suggest new ways to better represent the views and the people of smaller geographical subdivisions such as neighbourhoods in the management of the peri-urban interface. The constrains of growing inequality and destruction of the natural resources of a tourist city, plus the structural context in which Argentina are subjected, are giving room to a descentralisation process accompanied by a political crisis that is asking for genuine ways of local decision representation, including those of the peri-urban interface.

Adam, M. **(2001) Definition and Boundaries of the Peri-urban Interface: Patterns in**

the Patchwork. In: Waste composting for urban and peri-urban agriculture: closing the rural-urban nutrient cycle in sub-Saharan Africa, by P. Drechsel and D. Kunze, pp. 193-208, 2001. Natural Resources Institute (NRI), Chatham Maritime, Kent. Uk
rural-urban linkages
Ghana; urban agriculture; socio-economic aspects; farming systems; periurban area, Africa (Western)

It is useful to have and idea about the nature, size and demarcation of the 'periurban area', not only for the modelling of nutrient flows, but also to pave the waay for adequate policy support. Three approaches to the demarcation of the periurban interface (PUI) as used by the research team for the Kumasi Natural Resources Management Research Oroject are presented in this chapter, together with some reflections on the nature of the problems faced by the inhabitants of these areas. A comparison with the findings of other research in the PUI is drawn and a definition is proposed.

Allen, A. **(2001) Environmental Planning and Management of the Peri-urban Interface. Key note paper for the Conference Rural-Urban Encounters: Managing the Environment of the Peri-urban interface, London 9-10 November 2001. Environmental Planning and Management Programme, Development Planning Unit, University College London**
rural-urban linkages
environmental planning; periurban interface

There is increasing recognition among development professionals and institutions of the fact that rural and urban features tend to increasingly coexist within cities and beyond their limits. This paper argues that environmental planning and management of the peri-urban interface cannot simply be based on extrapolation of planning approaches and tools applied in rural or urban areas, but need to be based on the specific situation.

Amend, Jörg; Magasini, I; Mutahiwa, Sergei; Swai, Ignaz (1997). Integrated pest management in urban vegetable production in Dar es Salaam. 17 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania
horticulture services
Tanzania; horticulture; home gardening; IPM

One of the objectives of urban food production is ensuring sustainable development of the cities. Proper agricultural practices are an important element for ensuring this sustainability. The underlying paper examines the application of Integrated Pest Management (IMP) methods in urban vegetable production in Dar es Salaam. Main objective of the research was to identify pest and diseases occurring in the most important crops cultivated and to develop strategies for IPM for these crops. This report contains the methodology used for the research and the results. The authors also give general recommendations for the vegetable growers in Dar es Salaam, as well as special recommendations for IPM management of the most important vegetables. (WB)

Anon. **(1994) Case Studies of Innovative Housing Finance Institutions . United Nations Centre for Human Settlements (Habitat) Nairobi: UNCHS**
Supplier: UNCHS, PO Box 30030 Nairobi, Kenya
Extension, marketing and credit services
Botswana; Kenya; Zimbabwe; financing; housing; case studies; institutional setting; innovations

This study employs three case studies to examine the main issues in housing finance for low-income groups, paying particular attention to innovations meant to broaden access to improved shelter for the poor. The case studies focus on housing-finance institutions in Botswana, Kenya and Zimbabwe. The repsective institutions were selected because they have made conscious efforts to extend shelter finance to households with limited incomes and have achieved some degree of success in this regard. Further, the study derives its importance from the general failure of many housing finance institutions, both public and private, to target low-income groups.

Atkinson, A. **(2001) The Juggernaut and Peri-Urbanisation, Workshop A. New Synergies in Development. Paper prepared for the conference 'Rural-urban encounters: Managing the Environment of the Peri-Urban Interface', Development Planning Unit, University College London, 9-10 November 2001**
rural-urban linkages
conferences; periurbanisation

This paper takes a strategic look at the problems emerging in the peri-urban interface around the cities of the South. It asserts that these are the result of the ideology of development and the ways in which this emerged and has evolved out of the 18th century European Enlightenment. The last 200 years has seen a struggle spread across the globe between two visions concerning the ultimate ends of 'development'. Neo-liberalism today represents the triumph of the pessimistic view that sees poverty and human degradation as acceptable in spite of spectacular life transformations for some. Paradoxically, in this context the development ideology is 'succeeding', where in more optimistic times it failed. The mass of southern peasants are being both pressured are lured to participate in the global commercial economy even with little of no hope of moving beyond the impoverished margins. Meanwhile the unconsidered activity of both rich and poor in spatial redistribution, including the peri-urban interface, and evolving lifestyles represent the ultimate in profligate misuse of resources presaging an environmental disaster of unimaginable proportions in the years ahead. The essay ends with a brief look at the current potential social, ideological and political forces for positive change and provides a sketch of directions that could head off the denouement and create a sustainable world where all can live well.

Azami, Shaheda **(1996). Food processing and urbanization in Bangladesh. In: Appropriate Technology vol. 23 (1996) no. 1 p. 9-11**

services food security and nutrition
Bangladesh; Dhaka; food processing; food distribution; street vendors

Deals with street vending of snacks in Dhaka. The article describes a number of cases putting in evidence the entrepreneurship of street vendors and the problems they have to cope with. In order to expand and/or improve their businesses more training in different aspects of food processing techniques and business planning would be necessary, though. (WB)

Ba Diao, M. **(2001) Urban-Rural Linkages for Animal Products Supply in Dakar. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 Senegalese Agricultural Research Institute**
rural-urban linkages
urban agriculture; food supply; urban waste management; rural-urban linkages, Senegal, Africa (Western)

In response to growing urbanisation, the promotion urban agriculture (UA) becomes more and more a priority for policy makers in developing countries because it meets the demand for food, employment and urban waste management. Around Dakar, the government promoted intensive dairy, poultry and fattening sheep productions. However, demands for the land and water by city dwellers for non-agricultural uses are increased and farmers have many problems for growing fodder through lack of resources. Consequently, a scrutiny of the efficiency and sustainability of UA relative to rural agriculture (RA) becomes rather pressing and legitimate. Recent studies on UA carried out by a multidisciplinary team showed strong linkages between RA and UA, in terms of production and flows. From rural areas to urban zones, live animals, dairy products, fodder, crops by-products and labour are provided. Conversely, services, manufactured products, industrial by-products and other inputs are available.

In order to make urban food supply quantitatively and qualitatively more stable, it is important that urban-rural linkages are fully understood; neither urban nor rural development should be treated in isolation.

Bapat M **(1992). Street food vending in Pune. Pune: Centre of Studies in Social Sciences**
services
Pune; India; street vendors; street food; surveys; food quality; food distribution; bylaws

This book presents the results of a project (87-0053) carried out with support from the International Development Research Centre (IDRC). The study included an examination of the legislation governing hawkers and vendors in the city of Pune; a reconnaissance survey of the location and number of food vendors in the city; a survey of a cross section of food vendors, covering about 10% of the total number; microbiological testing of samples of the various types of food served by vendors and in restaurants; and nutritional testing of various types of food sold. The food samples collected from street food vendors were largely unsatisfactory in terms of

their bacteriological quality, but no worse than the foods served in licensed restaurants. Meals prepared by women in their homes for sale on the street were of better quality than street foods in general. The project findings highlighted the legitimacy of street food vending, generally viewed by authorities as an obstacle to traffic, in terms of fulfilling a nutritional need and providing employment. The research resulted in a plan for regulating, supervising and facilitating street food vending in Pune that was discussed with city officials. It also resulted in an overall improvement in the hygiene and condition of street food, and increased communication between vendors and authorities. (HC, IDRC)

BC Housing Management Commission **(1999). People, plants and homes: brings gardens to life. Urban Agriculture Notes http://www.cityfarmer.org/peopleplant.html. 5 p. Community Information and Education, BC Housing Management Commission**
Supplier: City Farmer, Canada's Office of Urban Agriculture
city ecology services
inner city gardening; housing; Canada; British Columbia

Describes the British Columbia Housing's People, Plants and Homes Program, which promotes gardening in its residential complexes. (NB)

Berg, L.M. van den **(2001) Farming downstream from Hanoi. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Peri-urban interface, London 9-10 November 2001. Alterra-Wageningen URBAN, The Netherlands**
rural-urban linkages
Vietnam; irrigation; urbanisation; horticulture; aquaculture, Asia (South-Eastern)

The paper outlines the nature of the land conversion processes that take place in the southern outskirts of Hanoi, in Thanh Tri District. The responses of farmers to these challenges include turning to more intensive horticultural production and fish farming on the one hand and demanding higher compensations for lost land on the other.

Bergeron, Bernard **(1998). Agriculture péri-urbaine au Gabon. 4 p. Ministère des Affaires Etrangères, Coopération et Francophonie, Bureau Production Agricole, Industrielle et Echanges**
rural-urban linkages services
Gabon; periurban agriculture

The 'Institut Gabonais d'Appui au Développement (IGAD) is closely involved in shaping periurban agriculture around Libreville, mostly commercial. The underlying paper describes the development methodology of the IGAD. Focus is on horticulture, food processing and training. (WB)

Beverwijk, Jasmin; Baarsen, Dirk-Jan; Duuren, Bert (van) **(199?). Extension and**

experiental learning in urban agriculture. 7 p. PGO Tropische Landbouw en Rurale Ontwikkeling T050-200
services horticulture
agricultural extension; allotment gardens

The underlying report analyses experiences with allotment gardening in the Netherlands. Information is given about existing organisations in the field of extension and allotment gardening. Interestingly, there is also information about Farmer Field Schools on IPM in rice as a learning model for other situations and countries. (WB)

City Farmer, Canada's Office of Urban Agriculture **(1999). City farms in the United Kingdom. Urban Agriculture Notes http://www.cityfarmer.org/cityfengland8.html. 3 p. City Farmer, Canada's Office of Urban Agriculture**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture food security and nutrition services
city farms; United Kingdom

Brief description of some city farms organised in the Federation of City Farms in the United Kingdom. (NB)

Cohen, Monique **(1991). Use of microenterprise in the delivery of food programs to school children. World Bank Washington D.C. 39 p.**
food security and nutrition services
street food; policy; nutrition

This report finds that street foods are and essential part of urban diets and economies. They provide valuable nutrients that may not be supplied from other sources available to some urban families. Research results and a project design are presented to integrate street food into school nutrition programs in developing countries. (JS)

Cofie, O.O., Drechsel, P., Amoah, P., Danso, G.P., Gyiele, L. **(2001) Improving Rural-Urban Nutrient Flows Through Urban And Peri-Urban Agriculture University College London, UK Development Planning Unit**
rural-urban linkages wastewater reuse reuse
water, periurban agriculture, nutrient transport; Africa (Western)

Rapid urban growth in several parts of africa poses challenges to urban food security and municipal waste management. Urban centers can be considered as vast food and nutrient sinks, because unlike in rural areas, urban household waste and market refuse is not returned into food prodution but rather contributes to urban pollution and health risks. On the other hand, there is an increased nutrient need, for example, in urban and peri-urban production areas specialized on urban food supply.

Increased understanding of rural-urban nutrient flows could reveal the potential for nutrient recycling to agriculture. Concomitantly, recycling can reduce nutrient mining

as well as health and environmental problems caused by accumulated organic waste. The paper discusses strategies to study nutrient flows within the rural-urban interface based on an ongoing project conducted in three different agro-ecological zondes in Ghana. Flow data show the contribution of rural, peri-urban and urban farming to urban food security. Waste analysis suggest that the organic waste products generated and de facto available could be recommended for crop procuction. The study also reveals that there is enough waste (solid and liquid) currently dumped as refuse, which could be recycled for agricultural use. A pilot station for co-composting is currently under construction in Kumasi.

Cornell University Extension **(1999). Direct marketing today: challenges and opportunities. USDA On: http://www.ams.usda.gov/directmarketing/DirectMar2.pdf.**
horticulture services
market gardening; periurban agriculture

This manual presents every step the urban or rural farmer needs to take in order to be a direct marketer. Applicable everywhere, but especially in USA. Includes directory to resources. (JS)

Dahiya, Bharat **(2001) Hard Struggle and Soft Gains: Environment, Voluntarism and Governance in Pammal, South India. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 Cambridge University**
rural-urban linkages
periurban area; environmental management; services; India; community initiatives, Asia (South-Central)

In the developing country peri-urban context, environmental management suffers from poor provision of urban services. The urban local governments are unable to provide these services adequately owing to their poor financial situation and administrative capacities. In some areas, this has resulted in the formation of civil society organisations that provide self-help urban services. Although it has contributed to environmental management in peri-urban settlements, the civil society organisations have faced challenges from two sides: the urban residents who are reluctant to pay for the self-help services and the urban local governments that stop providing secondary-level urban services. Thus, the civil society organisations are left in conflicting situations from both sides. The approaches taken for the resolution of such conflicts by civil society organisations have been two-fold: commitment in the provision of self-help urban services in face of degrading living conditions, and building networks with those in power and having influence on the peri-urban local governments. The paper presents a case study of conflicts in environmental management and their resolution through strategic networking by a civil society organisation in Pammal, a small town in South India.

Dayaratne, Ranjith and Raja Samarawickrama **(2001) Empowering Communities in Managing Rural Urban Encounters: The Concepts and Practices of the**

Housing and Community Development Program in the Peri-Urban areas of Colombo. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001, University of Bahrain / Colombo Municipality Council
rural-urban linkages
periurban area; community development; urbanisation; Sri Lanka, Asia (South-Central)

Peri-urban areas of Colombo have been battling the trauma of their communities whose cultural identities are neither urban nor rural. Their life styles are dislodged from the traditional situations while unhealthy policies and the transition forces have posed serious issues to the development agencies and practices.

Open economic policies of Sri Lanka since 70s resulting in the promotion of the private sector have boosted the development and acquisition of land, shooting up the land values. Land-use has begun to change from agriculture to industry and residential use. The pressure of the industry commerce and investment and the attractions of the city as a cultural and educational center have brought about unprecedented changes. Recently, these have received a positive attention and practices have emerged that recognize the distinct nature of the periurban areas and more importantly their potentials as a sustainable and essential transition space between the urban and rural areas.

In this context, the Colombo Municipality Council together with other development agencies have launched a program aimed at dealing with essentially social and spatial issues of the peri-urban areas. Based upon the concepts of community empowerment and capacity building, this program has enabled the communities to deal with the traumatic impacts of the urbanization practice. This paper examines the Housing and Community Development Program (HCDP) of the Colombo Municipality Council of Sri Lanka.

Debnath, Debashis ***(2001) Mandora - Blossoming in Horizon and Beyond "It was Five Past Midnight in Bhopal" Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 Indian Institute of Forest Management**
rural-urban linkages
India; rural-urban linkages; rural-urban migration, Asia (South-Central)

Bhopal is the capital city of Madhya Pradesh, is well known as "City of Lakes" and has placed its name as worst ever-industrial disaster on the globe. There are few lakes that keep environmental balance of the city. Mandora, the studied village is situated 7-8 kilometers from the heart of the city towards periphery.

The villagers were migrated lobors from Sajapur, the adjacent district. They started their habitation on the bank of the lake Kerwa. During dam construction on that natural lake they were displaced and promised to give compensation. Instead of getting it they struggled to survive on the relocated place, which is the present habitation. Though all the households are divided into traditional social hierarchy, they maintain the cohesiveness, which resulted in selfinitiated environmental

management.

In their natural resources management it has been observed the dependency on land, forest and water bodies support them to eke out their existence. Their occupational patterns vary from agricultural labours, wage workers in the shops, unskilled labours to business men. Facing prolong crises of fuel wood, fodder, house construction materials their self-initiated process as well as their responses to the induced institution have led them to meet up the daily necessity of biomass. Their many set-up rules have also developed their awareness in the management of health and hygiene.

Drescher, Axel W. **(1997). Management strategies in African homegardens and the need for new extension approaches. In: Food Security and innovations: successes and lessons learned / F. Heidhues and A. Fadani. 11 p. Universitaet Freiburg, Hebelstrasse 27, D-79104, Freiburg, Germany**
Supplier: City Farmer, Canada's Office of Urban Agriculture
services horticulture
home gardening; food production; food security; extension services; Zambia;

Reports on gardening and cropping in Lusaka. As stated elsewhere, these activities often take place in a setting of non-co-operative authorities. This paper comments on urban farming activities and examines the relationship between land access and social status of the compounds. The author argues that, while wet-season staple food cropping is practised on a broad scale, dry-season vegetable gardening is much less widespread because many city dwellers lack access to resources necessary for this activity. Urban farming has not been addressed by extension services as these solely focused on the rural sector. Output, especially of leafy vegetables, could be increased considerably, however, were such services provided to gardeners. Information needed primarily concerns with pest management, species diversity and soil fertility. (WB)

Egusquiza, Rolando **(1987). Curso de cultivo de papa en huertos caseros. Asociación Perú Mujer & Universidad Agraria de la Molina, Lima.**
horticulture services
home gardening; gender; training; root crops; Latin America

This is a trainers' manual for women raising potatoes in neighborhoods. The initial objective was to train trainers or promoters. The stated objectives were good nutrition, micro-enterprise, good health and provision of service to low-income women. Methods of cultivation offered in the course were experimental. (JS)

Feenstra, Gail **et al (1999). Entrepreneurial community gardens: growing food, skills, jobs and communities. ANR University of California Publication No. 21587. Also on: http://danrcs.ucdavis.edu. 106 p**
community development economic impact services

community gardens; United States; entreprise development

Entrepreneurial community gardens are identified as a potential strategy for meeting multiple community needs, addressing both food security and economic development simultaneously. A survey of 27 such gardens nationwide was carried out. The following questions were posed: (i) what products and marketing strategies have worked under which conditions, (ii) how much income is being generated, (iii) how many jobs have been created, (iv) what kind of training is provided, (v) how much land and capital are required, (vi) what are the typical operating costs, (vii) to what degree can these enterprises be self-sufficient? Five cases explore all these questions and others. A set of 12 recommendations for success are posited. The appendices offer resources and addresses. (JS)

Food and Agriculture Organization (FAO) **(1999). Urban food security and food marketing: a challenge to city and local authorities. Food into Cities collection no. DT/40-99E. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition services

food security; food marketing; urban planning; distribution systems

The relation between food security and food marketing and ways to overcome inhibitions in food marketing to improve food security in the context of urban growth are analysed. Food security especially of low-income urban consumers depends on the level and stability of the cost of accessing food and the variety and quality of food available to them. Major problems in marketing and what city managers and planners can do to enhance food security are presented. Efficiency improvements of all marketing and distribution systems are most important for this. (NB)

Food and Agriculture Organization (FAO) **(2001) Proceeding of Regional Seminar "Feeding Asian Cities", Bangkok, Thailand, November 2000. On: http:/www.fao.org/waicent/faoinfo/agricult/ags/agsm/sada/asia/index.htm**

food security and nutrition horticulture services

Asia; marketing; horticulture

This seminar was organised by the Association of Food Marketing Agencies in Asia and the Pacific (AFMA), and the Regional Network of Local Authorities for the Management of Human Settlements (CITYNET), in collaboration with GTZ, International Union of Local Authorities (IULA), Ministère des Affaires étrangères (France), UNDP/UNCHS/World Bank - Urban Management Programme - Regional Office for Asia and the Pacific, World Union of Wholesale Markets (WUWM) and with the technical support of FAO.

Garnett, Tara **(2000). Urban agriculture in London: rethinking our food economy. In: Growing cities, growing food: urban agriculture on the policy agenda, p. 477-500. DSE, GTZ, CTA, SIDA**

services food security and nutrition city ecology
food policy; nutrition; community development; land use systems; health; ecology; economic impact; gender; urban policies; reuse of waste; poverty; land tenure; food systems; United Kingdom; food deserts; education

Starting with the ecological footprint of London the London foot system is analysed. Increasing alienation of Londoners from agriculture and the emergence of food deserts are raised as issues. Despite a small contribution in quantities produced a wide range of farming activities occur in London (allotment gardens, private gardens, county farms, parks etc). From this perspective the potential and actual contribution of urban agriculture towards health, the environment, household economies, education and training and community development are discussed. Factors affecting urban agriculture and the perspectives for urban agriculture are presented in which it is argued that sustainable food growing is a metaphor for social change, catalysing new ways of thinking about our society, our economic system and our environment. It is argued that there are plenty of opportunities in the multiple and flexible forms of urban agriculture. (NB)

Gonsalves, JF; Arizala **(1986). The bio-intensive approach to small-scale household food production. IIRR & UNICEF, Silang Cavite Philippines, illustrations, tables**
horticulture services
household gardening; bio-intensive horticulture; poverty; gender; ecology; nutrition; integrated pest management; waste recycling; composting

This is a packet of 20 educational one to six-page items that constitute the substance of a short course. They present the concept of biointensive horticulture practice and specific methods for specific crops. (JS)

Groppo, Paolo **(ed.) (1997). (Special issue on urban and periurban agriculture) Land reform: land settlement and cooperatives = Réforme agraire: colonisation et coopératives agricoles = Reforma agraria: colonización y cooperativas vol. 1997 no. 2. 125 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy; Land Tenure Center of Wisconsin University, USA**
land use planning services
land use; land tenure; horticulture

Contains articles describing cases on land use and land tenure issues. A number of contributions deal with food supply and distribution systems. This (double) issue of Land Reform reflects the intention of FAO's Land Tenure Service to constitute an interdisciplinary support and study group to mitigate effects of rural exodus at the same time through urbanisation of the countryside. (WB)

Guendel, Sabine Zeeuw, Henk de, and Waibel, Hermann **(2000) The integration of**

Agriculture in Urban Policies. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.
services community development
policy

The major objective of the International workshop in Havana in October 1999 Cuba was; “to move urban agriculture beyond the daily reality of urban farmers to the agenda of policy-makers”. In synthesising that conference, the authors review the variety of conditions that facilitate the growth of UA, and secondly, discuss a range of policy options to selectively support the development of sustainable urban food production systems. This article is a shortened but adapted version of article in Bakker et.al, 2000, Growing Cities Growing Food.

Haan, Hans Christiaan; Coad, Adrian; Lardinois, Inge **(1998). Municipal solid waste management, involving micro and small enterprises: guidelines for municipal managers. 154 p. ISBN 92-9049-365-8 ; USD 20. Publications Department, International Training Centre of the ILO, Viale Maestri del Lavoro 10, I-10127 Turin, Italy**
Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK
waste recycling services
waste management; solid wastes; appropriate technology; micro- and small enterprises

Solid waste management in cities in low-income countries face ever increasing problems in solid waste management services because of the uncontrolled growth of these cities. Not surprisingly, poor city areas are first and most affected. Causes are manifold: lack of funds; low workforce productivity; inadequate management, often through failing bureaucratic procedures; and inappropriate equipment given the existing infrastructure. By involving the private sector, however, a number of successes have been obtained, resulting in higher quality of services in connection with lower costs, e.g. in Guatemala City, Harare and Dakar. The focus of this publication is on micro- and small enterprises (MSEs) which have the advantage that their appropriate technologies allow them to provide low-cost services at places where larger scale operations either are too expensive or make use of inappropriate equipment. At the same time, a number of restricting conditions are given that concern the extent to which SMEs can be involved in these operations. The current trend, the authors argue, is toward a mixed system of small and larger enterprises working together with municipalities. (WB)

Hermann, Hans-Joachim **(1999). Planning for survival spaces in the city: how urban agriculture could be promoted. In: Gate: Technology and Development no. 2 (April-June 1999) p. 10-13**
economic impact services food security and nutrition
urban dwellers; rural-urban migration; urban poor; survival strategies

The majority of poor people live in urban areas. The received wisdom of

development theory that the poor migrate to the city is being challenged in this article. Urban agriculture is an important element in survival strategies. However, the isolated promotion of urban agriculture as part of a solution of the problems of the urban poor will be of little help. (NB)

Holmer, Robert J; Schnitzler, Wilfried H **(1999). Urban and periurban small and medium-sized enterprise development for sustainable vegetable production and marketing systems: Vietnam, Laos and Philippines. Urban Agriculture Notes http://www.cityfarmer.org/laos.html. 5 p. Periurban Vegetable Production Project (PUVeP), Xavier University College of Agriculture, PO Box 78900, Cagayan de Oro, Philippines**
Supplier: City Farmer, Canada's Office of Urban Agriculture
horticulture economic impact services
vegetable production; Vietnam; small- and medium-sized enterprises; Laos; Philippines

Gives a description of the Urban and Periurban Small and Medium-Sized Enterprise Development for Sustainable Vegetable Production and Marketing Systems. The project is implemented in Vietnam (Ho Chi Minh City), Laos (Vientiane) and the Philippines (Cagayan de Oro). The project aims to facilitate small and medium sized enterprises in South-East Asia with access to the market by developing socially, economically and ecologically sustainable vegetable production systems. (NB)

Holmer, Robert J. **(2001) Appropriate Methodologies for Microenterprise Development in Urban Agriculture. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December 2001, RUAF, Leusden The Netherlands.**
R&D Methodology horticulture services
micro enterprise; informal sector

Much of the developing countries' rapidly growing population forms part of the economy that lies outside the regulatory framework of governments in what is known as the informal sector. Although the definitions vary according to the country context, it is generally agreed that the informal sector, whether rural or urban, comprises small and micro-enterprises producing and distributing basic goods and services in unregulated, but competitive markets. This paper reviews available literature and the contributions to the workshop.

Homem de Carvalho, J.L. **(2001) PROVE – Small Agricultural Production Verticalisation Program. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org. A shortened version is taken up In: *Urban Agriculture Magazine*, no 5, Appropriate Methodologies for Urban Agriculture, December**

2001, RUAF, Leusden The Netherlands.
R&D Methodology community development services
Brazil; small enterprise development

The PROVE is a programme designed to promote small agricultural production, processing and trade involving many urban and periurban agricultural systems, including vegetable-gardening, fruit-growing and livestock systems. The State intervenes at the individual and/or collective level, with low-income groups as the main target audience. The PROVE started in 1995, and in the 1995-1998 period, 132 agro-industrial facilities were built in the Federal District. In following years, the Programme was implemented in different cities in the states of Minas Gerais, Mato Grosso do Sul, and Santa Catarina and in 28 cities in other states. In 2001, the Programme also was implemented in Quito, Ecuador. The different stages of the programme are described as the rungs in a ladder (11 rungs) that small farmers have a very hard time climbing. Enabling them to climb these rungs is a fundamental requirement to ensure the success of the PROVE and, consequently, to ensure their social integration with sustainable development and solidarity.

Interamerican Development Bank **(1997). Simposio 'La Ciudad Latinoamericana y del Caribe en el Nuevo Siglo', Taller G. Financiamiento municipal. Interamerican Development Bank, Washington, DC, USA**
services
financing; urban planning

Contains three case studies on strategies for municipal finance and on tax collection policies. (WB)

Jacobi, Petra **(1997). Importance of vegetable promotion in Dar es Salaam, Tanzania. 15 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
horticulture economic impact services
Tanzania; agricultural production systems; economic analysis; marketing

Urban agriculture in Dar es Salaam involves a large proportion of the city population, Therefore, the city has been of major interest for research undertaken in this area for many years. The Urban Vegetable Promotion Project, started in 1993, deals with the different production systems of vegetables in and around Dar es Salaam. Three major production systems are determined: periurban production, open space system and homegarden production. The report gives useful information about the number of people engaged in gardening, different cropping patterns and cultivars used, cultivation periods, and approximate yield. It is argued that the different production systems all occupy a specific niche with regard to vegetable production and consumption in Dar es Salaam. (WB)

Jahn, Gundula **(1996). Die Bedeutung der Dienstleistungsbereiche fuer die**

periurbane Haltung kleiner Wiederkaeuer am Beispiel Marouas, Kamerun. 75 p.
urban livestock services
Cameroon; urban livestock; ruminants; agricultural service provision

Explores the importance of provision of services like agricultural advise, veterinary support and supply of inputs on the potential for improvement for keeping small ruminants. An inventory is made of available services and this is compared to the productivity of the herds of different household categories keeping sheep. (NB)

Jaramillo Avila, C., **(2002), Trust Funds as Financing Mechanisms for Participatory Urban Agriculture. Municipal Programme on Urban Agriculture, Quito Municipality. In: The Economics of Urban Agriculture - *Urban Agriculture Magazine no. 7*, August 2002, pp.32-33,**
extension, marketing and credit services economic impact
financing; participatory methods; urban agriculture, Ecuador, America (Southern)

Among the approximately two million residents of the Metropolitan District of Quito, Ecuador, 45% live in conditions of poverty and 12% in destitution (PNUD, 2002). These conditions are linked to and aggravated by the economic crisis produced by the structural adjustment policies of the last three years.

Koc, Mustafa; Koc, Hulya **(1999). From staple store to supermarket: the case of TANSAS in Izmir, Turkey. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 115-121. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
services food security and nutrition
access to food; food distribution; consumption patterns; Izmir; Turkey

This paper examines a successful staple-store project operated by the municipal government of Izmir, Turkey. Whereas its immediate success offered relatively affordable food to urban poor and middle class consumers and helped to curb inflationary tendencies to a certain extent, the project later extended beyond its original goals and turned into one of the two biggest supermarket chains in Turkey. The paper suggests that staple stores can he effective tools for food access if they can be kept as small operations, and the paper offers some insights on the impacts of supermarketing on food access, pricing, and consumption. Yet, there are no easy solutions that improve access to food. Although TANSAS protected consumers from high inflation and speculation in the 1970s, it inadvertently played a role in introducing and spreading supermarket chains in Turkey, altering the food-consumption and food-distribution patterns irreversibly. The paper also warns of the impacts of global economic pressures and neo-liberal restructuring schemes on the future of public enterprise and public policy at the local level. (NB - abstract adapted from original)

Koc, Mustafa; MacRae, Rod; Mougeot, Luc JA; Welsh, Jennifer (eds) **(1999). For**

hunger-proof cities: sustainable urban food systems. 240 p. ISBN 0_88936_882_1. CAD 35.00. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
food security and nutrition services
food supply; nutrition policy; sustainable agriculture; urban health

Most contributions to the book were presented at the International Conference on Sustainable Urban Food Systems in May 1998. The book examines food security from an urban perspective. The concept of urban food security, local food systems and how to improve the availability and accessibility of food for city dwellers are discussed. The book explores the role urban and community agriculture play, how this can be improved and its linkages with rural populations. Furthermore ecological and health concerns and a gender perspective on urban food production are examined. The politics of food and food policy and urban agriculture as food access policy are discussed. Finally strategies toward food democracy and the emergence of innovative food systems are analysed. The discussions are based on case studies form around the world including Canada, United Kingdom, Poland, Turkey, Cuba, Zambia and Zimbabwe. The book includes contributions from farmers, professors, activists, business leaders, policymakers and community organizers. (NB)

Kogi-Makau, Wambui **(1998). Production and utilization of vegetable (sic) and fruits in two urban sites in Dar es Salaam: a case study in Mbuyuni and Manzese, Dar es Salaam, November 1995 to November 1996. 74 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
horticulture services
household survey; Tanzania; consumption patterns; home gardening; marketing

Presents the results of a household survey in two areas of Dar es Salaam. Data are given on acquisition and consumption patterns of vegetables and fruits and on production and utilisation of agricultural produce. (WB)

Leybourne, Shona L; Grant, Miriam **(1999). Bottlenecks in the Informal Food-transportation Network of Harare, Zimbabwe. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 110-114. ISBN 0_88936_882_1. CAD 35.00. Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9**
services food security and nutrition
food distribution; food security; urban policies; Zimbabwe;

In the context of the bottlenecks that pervade the internal informal food distribution flows of Harare, urban dwellers who work in the informal food-distribution network and/or live in the poorer areas of the city are facing food insecurity. Gender, class, and race are axes of perceptual difference between policy writers, policy enforcers

and the recipients of these policies, and these axes affect how individual transporters, food retailers, and consumers choose to manoeuvre in the grid of authority's domination. It is suggested that the state should recognize the contribution that the informal food distribution network is making to the food security of the city. A strategically oriented dialogue that seeks to ensure the security of these people's basic food requirements would protect the local structures that have been created by the people for the people. Such discussion might include the formalization, hence protection, of the actors within the informal food-distribution system thus cushioning a large proportion of the urban poor from immediate food insecurity. (Abstract adapted from original)

Mwangi, Alice Mboganie **(1995). The role of urban agriculture for food security in low income areas in Nairobi. Food and Nutrition Programme no. 54. 82 p. ISBN 90_5448_028_9. Ministry of Planning and National Development, Nairobi, Kenya; African Studies Centre, Leiden, The Netherlands**

food security and nutrition services

Kenya; food security; micro enterprise; nutrition; livestock; horticulture; rural-urban linkages; surveys; stakeholders; agricultural extension

Reports on findings of a survey of 1994 among 210 low-income households in Nairobi about the role of urban agriculture. One group has urban farmers organized by the UNDUGU Society and the other does not have any organisation amongst its farmers. It finds that urban farming leads to more food security and better nutritional status and access to extension services has very substantial benefits. Household income for the farmers was about 50 percent higher than average for the community. Findings reveal that the Kenyan government takes urban agriculture insufficiently into account in its planning. Policies regarding land distribution and tenure rights are not suitable for the urban farmers. The report states the need for agricultural extension among low income households, with a special emphasis on women farmers, who constitute the majority of urban farmers. The constitution of an organisation representing urban farmers' rights is vital to protect their interests. Given health hazards connected with urban food production, the government should impose more control on waste, water and other environmental issues. The report suggests that poverty alleviation hinges on sustainable economic development stemming from close collaboration between governments, NGOs, donors, research institutions, and farmers. (WB)

Niemeyer, Rolf; Sanders, Stephan **(1999). Organic matter composting in urban waste management: how urban agriculture can benefit from organic wastes. In: Gate: Technology and Development no. 2 (April-June 1999) p. 28-33**

waste recycling services

waste management; composting; organic wastes

The article looks at the potential for transforming organic wastes into a valuable product with considerable benefits for urban agriculture. The different aspects of collection, composting and marketing of organic waste in (peri-)urban centres are

discussed. (NB)

Ouedraogo, S; Zoundi, SJ **(1999). Approvisonnement de la ville de Ougadougou en poulets de chair. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 67-82. Natural Resources Management and Production System Department**

services food security and nutrition rural-urban linkages

poultry production; meat supply; economic aspects; employment

The contribution of modern producers to the urban meat supply system is low. Traditional producers are the main suppliers to the city. Most production comes form a range of 10 to 200 km from Ougadougou. (NB)

Paje, B. G. **(2001) Methodologies to Improve Entrepreneurial Skills of Urban Agriculture Entrepreneurs. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology services

Philippines; informal sector; micro-entreprise

In developing countries only few job opportunities exist in the formal sector and unemployment rates remain very high, especially in the countryside, triggering the migration of people into the urban centers. However, the industrial sector absorbs new entrants only at a limited scale, forcing these segments to move into entrepreneurship due to lack of alternatives. In the Philippines, by government’s definition, small industries include livelihood operations in the informal sector. While the number of entrepreneurship ventures abounds, one sees lots of these slowly dying and some going bankrupt. It is perceived that entrepreneurial activities lack the dynamism and competitive edge of those in more developed countries. One reason that can be advanced is the lack of skills and competencies to manage business enterprises. Corollary to lack of skills is the fact that small entrepreneurs find it difficult to pay for know-how and its application in their enterprises. This paper describes the CEFE’s Basic Theory, to improve entrepreneurial skills.

Powell, D; Wint, E; Brodber, E; Campbell, V **(1990). Street foods of Kingston. Mona: Institute of Social and Economic Research, University of the West Indies**

services food security and nutrition

Jamaica; surveys; street food; street vendors; bylaws

This book presents the results of a project (85-0309) carried out with support from the International Development Research Centre (IDRC). The study included both men and women vendors. Researchers identified and mapped the location of vendors across Kingston and St. Andrew, noting the type of food sold, predominant

clientele, and peak selling time. They interviewed 300 vendors regarding procurement and preparation of food, vending practices, access to credit, and demographic characteristics. And, they conducted field observations of, and in-depth interviews with, 30 vendors. Seven samples of foods - two from the pre-prepared traditional solids group, four from the home-made liquids group and one from the non-traditional liquids group - were examined for extraneous matter and microbial content, as well as nutritive value and cost-nutrient benefit. The total plate count of microbes was high in all but two foods: jerk chicken and “sky juice.” The high microbial count of most other products indicated poor sanitation and hygiene, e.g. improperly washed bottles for drinks. Other study findings were as follows: vending was the sole source of livelihood for most vendors; men regarded vending as a business whereas women tended to see it as temporary employment; and the best cost-nutrient benefit was found in prepared nontraditional solid foods. Three broad areas were identified in which policy interventions could facilitate the street food trade: the location of street food vendors; the access of food vendors to funding; and the training of food vendors in business management, hygiene and nutrition. (HC, IDRC)

Richter, Juergen; Basler, Alois; Franzen, Hubertus **(eds) (1996). Small-scale food processing, contributing to food security: proceedings of the international workshop held from 4 to 8 September 1995 in Bonn-Roettgen, Germany. DOK 1744 A/a. 242 p. ISBN 3_931227_01_4. Deutsche Stiftung fuer Internationale Entwicklung (DSE); Council for Tropical and Subtropical Agricultural Research**

food security and nutrition services

food processing; small scale industries; food security

Increased food production alone is not enough to bring about food security. Access and entitlement to food by food-insecure people is crucial. Food security can often only be secured by the urban poor through an increase in income and, hence, purchasing power. Small-scale, decentralised, food processing can be an important income-earner for poor people. The underlying proceedings stress the development of this sector. Gender is an important notion in this, as small-scale food processing is often the domain of women in developing countries. In many cases, access to improved technologies, extension and credit keep them from further developing their business and increase their productivity. This volume underpins a number of project activities to address these issues. (WB)

Rocha, JL; Barahona, T **(1998). Puerto Morazan: la camaronicultura: un espejismo en tiere salada? Nitlapan-UCA, CIFOR, Proterierra-Inifom; 99 pages**

services hydroponics

aquaculture; ecology; financing; cooperatives

Puerto Morazan, a town famous for its shrimp farms, was hit by Hurricane Mitch in 1998, with a devastating effect on its most important industry, shrimp production, processing and shipping. The producers are grouped into cooperatives and they have a capital demand that they can not afford, and have been forced to contract

heavy debts at high interest rates. This is at a time when the price of shrimp is falling worldwide. The future of the town, closely linked to shrimp with its (negative) ecological consequences, is in a state of uncertainty. Shrimp culture can be either an oasis or an illusion. This study may have significant awareness raising capacity for other one-product urban agriculture towns and cities. (JS adapted from authors)

Scharf, Kathryn **(1999). A nonprofit system for fresh-produce distribution: the case of Toronto, Canada. In: For hunger-proof cities: sustainable urban food systems / Mustafa Koc, Rod MacRae, Luc JA Mougeot and Jennifer Welsh (eds), p. 122-127. ISBN 0_88936_882_1. CAD 35.00.**
Supplier: International Development Research Centre (IDRC), Publications Department, PO Box 8500, Ottawa, Ontario, Canada K1G 3H9
services community development food security and nutrition
food distribution; access to food; Canada; Toronto

The Good Food Box (GFB) project of FoodShare Toronto is a nonprofit fresh-food-distribution system that operates like a large buying cooperative: 4 000 boxes of fresh fruit and vegetables are delivered through 200 volunteer-run neighbourhood drop-offs each month. The GFB is a successful continuity-based and market-driven food-distribution alternative. The similarities and divergences from traditional community-development or nonprofit-sector projects are explored, as "business principles" needed to be incorporated to ensure its success in the marketplace. Stimulating community self-organization, improving food access for low-income people, promoting healthy food choices, and avoiding the stigmatisation involved in charity-based models of food distribution are all goals of the GFB. As a free-based service, the GFB must compete effectively, meaning that it must maintain a high level of customer service, a high level of sales, a fairly low level of mandatory time investment from participants, and attractive advertising - charactristics which it are not often seen in non-profit community-development projects. (Abstract adapted from original)

Selener, Daniel; Chenier, Jacqueline; Zelaya, Raul **(1997).. Farmer-to-farmer extension: lessons from the field. IIRR: New York. 150 p. Available in English and Spanish.**
services community development R&D methodology
training; agricultural extension; Mexico; Nicaragua; Ecuador; Latin America; case studies

This book is especially useful for people working in agriculture, health, education, and community development following participatory approaches. This book is the result of two workshops, one in Honduras and another in Ecuador, that were conducted to document and analyze the experiences of several community development projects, using the "farmer-to-farmer" extension methodology. Most of the information contained in the book is from the farming promoters' points of view, based on their practical experience working in farmer-to-farmer programs. The description and analysis presented offers a broad set of experiences. This

information can be analyzed and adapted by the reader to his/her own project, according to the context, project philosophy, objectives, and available resources, among others. (JS adapted)

Seré, Carlos; Neidhardt, Rainer **(1994). Stadt-Land-Integration im Rahmen periurbaner Tierproduktion. In: Entwicklung + Ländlicher Raum vol. 28 no. 2 p. 10-14**

rural-urban linkages Urban livestock services

periurban livestock production; food processing; marketing

Addresses rural-urban linkages as a result of periurban animal husbandry. Contrarily to animal production in developed countries, animal husbandry near cities is very dependent on city waste as a source of animal feed. The nearness of the city allows for a low level of processing of the produce (packaging, quality control, transport, distribution) keeping sales prices low. This paper highlights the close links that exist between the city and its rural hinterland. A number of interesting case studies are presented from West Africa; Lahore, Pakistan; Montevideo, Uruguay; and Lima, Peru. (WB)

Skinner, G. William **(1981). Vegetable supply and marketing in Chinese cities. In: Vegetable farming systems in China: report of the visit of the vegetable farming systems delegation to China / Donald L. Pluckett, Halsey L. Beemer, Jr. (eds), p. 215-280**

horticulture services

China; vegetable production; marketing; selfsufficiency; zoning; urban planning

Describes the marketing situation in China with respect to vegetables in the early 1980s. All cities visited had in common that the larger part, well over 85%, of vegetable demand could be fulfilled through production within the city bounds. The author also reports on production ecology differences at the various locations and highlights stringent zoning aspects as an outcome of political ideology. Very detailed information, but relevant for those interested in China. (WB)

Streiffeler, Friedhelm **(1991). The knowledge system and the action motives in urban agriculture in subsaharan Africa. In: Proceedings of the International Workshop Agricultural Knowledge Systems and the Role of Extension, Bad Boll, p. 256-265. Institute of Socio-Economics of Agricultural Development, Faculty of International Agricultural Development, Technical University of Berlin, Podbielskiallee 64, D-1000 Berlin 33, Germany**

services R&D methodology

Zaire; Kisangani; community initiatives; agricultural extension

Examining knowledge systems of urban agriculture is interesting as a comparison to the knowledge systems of the rural space. The author employs figures from a survey held at Kisangani, Zaire, to arrive at conclusions regarding learning processes in

agricultural experimentation. He found that urban cultivators in Kisangani were hardly interested in trying new things. Neither did there seem to exist strong informal networks between these urban farmers as has been reported from other countries at a number of occasions. There is much scope for improved community development and agricultural extension among this group of people. (WB)

SODEM **(1990). Curso de huertos familiares. La Paz, Bolivia: SODEM. 20 p.**
horticulture food security and nutrition services
training; home gardening; Bolivia

This binder contains a collection of Spanish-language training material on home gardening. It is intended for trainers rather than gardeners themselves. (JN)

Stevenson, Christopher; Kinabo, Joyce; Nyange, David **(1994). Urban horticulture in Tanzania: a situation analysis of the production, marketing and consumption of fruits and vegetables in Dar es Salaam, Dodoma and Arusha. 94 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
horticulture services
Tanzania; agricultural production; marketing; home gardening; consumption patterns

Presents facts and figures about urban agriculture in Tanzania's three largest cities, looking at: production of fruits and vegetables, consumption patterns, and marketing systems. A major, thorough study, putting in evidence differences between the cities due to differences in climate, land use patterns and population growth rates. (WB)

Sumberg, James; Kleih, U; Grand-Pierre, Reginald **(1994). Production and marketing of vegetables in the Port-au-Prince periurban area: a sub-sector study. CARE International. 56 p.**
horticulture services
periurban agriculture; Caribbean ; Haiti; marketing; policy; trade; information

This report considers the production of vegetables and flowers for the daily Port-au-Prince market. It defines the periurban agriculture sector as dominated by 10,000 small-scale producers in two districts and proposes ways to improve both food distribution to the city and to improve the income of the farmers. (JS)

Tadros, HR; Feteeha, M; Hibbard, A **(1987). Squatter produce market vendors in Egypt. Cairo: Social Research Centre, American University in Cairo**
services food security and nutrition R&D methodology
Egypt; street vendors; marketing; food supply; food distribution

This document presents the results of a study (83-0056) carried out with support from the International Development Research Centre (IDRC) in 18 squatter markets in different districts in Cairo. The methodology involved direct observation, surveys,

and interviews with government officials and 192 vendors. Commodities available through these vendors included vegetables and fruit; meats; prepared and processed foods and beverages; nonfood products; and services. The researchers noted business hours, environmental problems, characteristics of vendors, reasons for entering the vending business, and the role of the market "Sheik" or informal leader. Data was also collected on vendors' Suppliers and customers; the effect of vending on other marketing systems; vendors' relationship to the government; and attitudes of government officials and authorities toward vendors. The findings indicated that markets were relatively stable operations, generated jobs, and were well integrated into the city's social structure. The recommendations called for up-to-date statistics on squatter markets, better cooperation between vendors and authorities, and improvements to the market organization. (HC, IDRC)

UNICEF **(1984). Urban examples for basic services development in cities. UNICEF Newsletter no. UE-9. UNICEF**

services food security and nutrition

community gardens; home gardening; multi-sector approach; food production; market gardening

An early UN document on examples of programmes to improve or expand city food production. Seven examples from Latin America, Asia and Africa are presented. Topics range from community gardens, to comprehensive city wide food and fuel self-reliance to centrally planned systems of suburban food production and market gardening. The examples are organised around a basic facts sheet and a project summary. (NB)

Wade, Isabel Mary **(1986). Food, transport and zoning. In: Development: seeds of change vol. 1986 no. 4 p. 30-34**

services food security and nutrition land use planning

food security; selfreliance; urban planning

A systems approach to food self-reliance. This early publication on urban agriculture examines the question to what extent self-reliance efforts in city farming can be incorporated in long-term food policy. As is shown, the role played by land use planning, or zoning, is pivotal in developing an effective food policy strategy. The article compares various not only zoning strategies within the city bounds, but also different periurban zoning options, in recognition of the traditional important of periurban agriculture in supplying food to cities. (WB)

Wheatley, C. **(2001) Fostering innovation in urban and periurban based clusters of small-scale agrifood enterprises. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology services

Philippines; micro-entreprise; agri-food

In the world of research and development practitioners, small enterprise development has long had an urban bias, with relatively little attention to given to agri-food based enterprises, that are seen as falling within the ambit of rural development. Meanwhile, agriculture has long suffered from the view that it is essentially rural and production-oriented, with little emphasis given to a market- or enterprise-orientation. However, the current competitive “operating environment” of small-scale agri-food based enterprises in the developing world is one in which markets and enterprise increasingly matter. In many countries, and especially in Asia, groups of similar micro and small-scale enterprises are commonly found in concentrated geographical areas, or clusters.

Working with clusters of enterprises and their associated support services, rather than on individual enterprises, can be both efficient in using scarce resources and effective in facilitating change in a wide number of enterprises, through a small intervention leveraged across the cluster.

Yeung DS **(1997). Policy intervention in the streetfoods trade and its effects on health and livelihood: a case study of Quezon City, Philippines. (MA thesis) Vancouver: University of British Colombia**

services economic impact

Philippines; Manila; urban livelihoods; street vendors; street food; marketing; policy development; social participation; food supply; food distribution

A case study of the process of developing a municipal ordinance on street food activities was carried out in Metro Manila. The author examined three themes: the creation of institutional linkages between local government units and community organizations to develop and deliver support services for street food vendors; the impact on health and livelihood of the introduction of a municipal ordinance regulating street food vending activities; and the implications of street food activities for the municipal planning process. The principal findings were that urban planning interventions of a regulatory nature are insufficient to deal with street food issues; the participation of interested community groups in the development of such policies is very important for their effective implementation; and education and awareness-raising must take place both within government agencies and within the community in order to obtain support for policy provisions. It was concluded that street vended foods are an important link in the urban food delivery system - some regulation of their nutritional content and safety is an effective intervention in managing the health of the urban population, especially the urban poor; that street food vending is an important means of income generation for many of the urban poor, especially women - recognition of the activity is therefore an effective means of addressing the employment issue; and that street food vendors have intimate knowledge of their business needs — they should be consulted by government officials in the process of developing a street foods policy. (HC, IDRC)

Zapata, Juan **(1997). Financiando la ciudad. Universidad Nacional de Cuyo, Argentina**

services

urban financing; accounting; Argentina

Treats urban finance using cases from Argentina. Emphasis is on decentralisation and optimisation of services. (WB)

3.6 Rural-Urban Linkages

City life style in rural setting.

(Picture: René van Veenhuizen)

The Rural Urban Interface

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Urbanisation

More than half the world's population lives in and around urban areas. In developing countries this proportion is higher and increasing. The impact that this growth has on food security and urban livelihoods has been dealt with in other sections. In this part of the bibliography those references are brought together that look at the fringe of the expanding cities.

The border between urban and rural areas used to be considered as a clear-cut line in the landscape; clear-cut both in the physical and organisational sense. However, increasingly it is recognised that rural and urban features tend to coexist within cities and beyond their limits. The interface between urban and rural domains, or the periurban area, as it is more often called, is under continuous change, driven by the expanding urban areas and the (still) strong linkages with the rural hinterland. Urban population growth has now overtaken migration in terms of influx of persons in the periurban area. Still, one can speak of a meeting of two worlds, the rural and the urban, since migration is still quite substantial. The urban agriculture practitioners are therefore accordingly diverse in background and farming system.

Major challenges exist in this highly versatile area from an environmental, social and economic perspective; but also on issues such as planning of construction sites and green areas, development of markets, waste disposal, availability of clean water, labour etc. The relationship between the challenges and the ability of rural, urban or new institutional arrangements to cope with them seem to be key points for the design of proper planning and management in these areas, so as to guarantee a living environment for the inhabitants, especially the poor, while enhancing sustainable development.

The periurban areas are heterogeneous in social composition, which is characteristic for fast changing environments, but the lower income communities seem to prevail (Allen, 2001). This group is particularly vulnerable to the negative impact of rural and urban surrounding systems, and moreover easily dominated by wealthier players and ignored by the authorities in the absence of clear rules and regulations. Risks have to be faced, under uncertain livelihood strategies (Tacoli, 2001). These risks include health and physical hazards related to the occupation of unsuitable sites, lack of access to basic water and sanitation and poor housing conditions.

The sustainability of both urban and rural areas is affected by the dynamic and changing flows of commodities, capital, natural resources, people and pollution in the periurban interface (Allen 2001). Despite this fact, development policy and systems of governance continue to treat rural and urban development as independent, largely unconnected sectors (Rabinovitch, 2001).

Concepts

Development and urbanisation have been traditionally structured around dichotomies such as urban-rural, traditional-modern, formal-informal, etc. There is no, or at the most an uneasy, attention to periurban areas. Problems in these periurban areas, are most often characterised by a lack of 'urban' values, such as the lack of adequate infrastructure, services and regulations etc., or the vanishing of ‘rural’ values, like the high prices for the land, loss of fertile soil, social cohesion, etc. This distinction between urban and rural territories is insufficient to characterise the communities and the landscape of periurban areas as ‘border’ territories. There is still a call for a clearer definition of the periurban area, periurban interface, or rural-urban fringe, but the fact that rural and urban features should be seen as co-existing within and along cities seems to be gaining support.

There are different methods of defining the periurban areas. MDP (2001b) identify four main classes based on:

- Physical criteria including street patterns and housing density.
- Functional criteria encompassing communication systems, employment levels and transportation networks.
- Social and socio-psychological criteria involving the determination of the urban life quality and the general social life of the people.
- Administrative criteria covering the local authority boundaries

As can be seen from this collection of references the number of publications on periurban areas is rather limited, several belong to one or two conferences related to the subject. Adell (1999) summarises several conceptual approaches to periurban areas (he refers to the periurban interface or PUI) but it remains unclear how many authors adhere to each of the categories given. Going from the least to the most integrated concepts, a first, and most common, approach is the *periphery of the city*, much applied in management interventions. A second approach is that applied by those who see the fringe as a socio-economic system, as a social category with a *dual urban-rural orientation* in social and economic terms, regardless of its spatial location. Yet another approach views the periurban areas as the interaction of *rural-urban flows*, by looking at the dynamics of rural-urban links and flows at the regional level. Finally, a particular group of authors see the periurban areas as a particular *ecological and socio-economic system*.

Under all conceptual approaches, though, the particular features of the periurban areas are based on the mix and coexistence of urban and rural features. Iaquinta and Drescher, give five periurban typologies, and new abbreviations, but state that rural, periurban, and urban form a linked system, a “multidimensional continuum” (Iaquinta and Drescher, 2001)

Farming Systems

Farming systems are a response to both ecological and socio-economic conditions. Farming systems in the periurban areas are a “result” of migration from rural areas, absorption of former rural enterprises (Bentinck, 2000), urban farmers seeking expansion possibilities in the fringes, or banned by the urban authorities (most often livestock, see Nunan, 2000). Both urban and periurban farming systems are highly diverse, and generalisations are difficult to make.

Many papers in the proceedings edited by Grossman et al. (1999), argue that in Africa farming in urban areas, notably relying on rain-fed crops and animals, is more a survival strategies, an expression of poverty and food insecurity, and therefore that urban agriculture will remain a marginal activity. Others show the development and importance of highly technological, high input and commercial aquaculture (see for instance for Calcutta in India, Edwards, 2001, and Ivory Coast, Lazard, 1998) and horticulture systems (Moustier, 1999, de Bon et al., 1998) and Gockowski, 1999) in and around the cities, that rely on national and even international markets.

Although the notion of urban agriculture carries an intrinsic "small scale" connotation, experiences all over the world (Cuba, Argentina, Lebanon, Vietnam) show that agriculture in the fringe of the city is practiced on larger plots and larger enterprises than in the city centres. Even if they are not on a large scale or fully commercial, the systems often combine other urban occupations (generating 'off-farm' income). In the Congo, periurban operations can be seen as a complement to rural areas but should be considered in any rural development scheme, since more than 80% of the people live in towns (Belantsi and Torreilles, 19..).

Farming systems change in response to urbanisation. Livelihoods in the periurban areas are affected by changes in, for example, land-use, employment, markets, etc. Some groups benefit from new opportunities and develop accumulation strategies, while emerging constraints can force vulnerable groups with limited assets to rely on survival strategies (Tacoli 2001).

Several examples of this are provided in the literature. The Niayes Zone in Senegal, could be seen as one large periurban zone, with horticulture and livestock systems, poultry dominating (Touré Fall, 2000). On Lebanon's heavily urbanised coastal zone, intensive agriculture occupies large areas, and competes for space with human settlements (Zurayk et al. 2000). Urban farming here is favoured by a mild climate, the availability of water and closeness to the markets. In Harare, Zimbabwe, ideas are currently being developed to change land belonging to commercial farmers (considered rural) to small plots for the urban poor.

Issues

Although the attraction of cities to those migrating to seek a living within its borders has not decreased, urbanisation today does not add up to the ideal of the city as it used to be, especially not in developing countries. This is reflected in the inner-urban areas, but is most apparent on the fringes of the cities. Here, the size of the problem is determined by the speed and nature of development and urbanisation. Major problem areas are the lack of governance, or rather a lack in clarity in responsibilities between urban and rural authorities; lack of adequate services, like the availability of electricity and water, and when water is available, a lack of adequate sewage systems or waste-water treatment facilities.

Land disputes

A major issue resulting from an uneven process of urbanisation under missing or overlapping regulations, are disputes over access to land and land tenure. Some authors identify the access to land as a key issue (MDP, 2001a). Lack of regulation and social cohesion, as well as the coincidence of poverty and environmental stress may lead to conflicts, and are often used as reason by the urban authorities to deny adequate public services to the, often illegal,

inhabitants of periurban areas. As stated before, this weakens the livelihood strategies of the periurban inhabitants further.

In the study by MDP (2001b), the difference between land tenure planning on one hand and land tenure regularisation on the other, was emphasised. These terms are mistakenly used interchangeably in some instances, while in others they are believed to be totally isolated concepts. In actual fact, these two are related concepts, but with different meanings. *Land tenure planning* refers to the anticipation of future trends in land tenure changes and the implementation of policies and plans aimed at harnessing the negative impacts of uncoordinated and haphazard developments. *Land tenure regularisation* on the other hand is about the official recognition, realisation, and/or legalisation of already existing land tenure systems. This could be achieved by ensuring security of tenure to vulnerable groups (such as the poor, women and children) in society

Waste and Wastewater

One could conclude that most of the literature on the periurban areas that is reviewed here, places attention on waste, that is, the dumping of refuse, reuse of (treated and untreated) wastewater, sanitation and environmental management in general (a large amount of publications on the latter, are related to the research programmes in Ghana, Kumasi city and India, Hubli Dharwad city).

Much of the wastewater produced in urban and periurban areas is already used, directly or indirectly, for irrigation almost always without treatment. It appears that suitable technologies for decentralised treatment are available but that other barriers to the wider adoption of the decentralised approaches exist. These barriers include lack of finance and suitable land, deficiencies in knowledge and skills and a lack of flexibility in official design standards (Parkinson, J. and K. Tayler 2001). Advantages are sought in decentralised management, including compatibility with decentralised approaches to: urban management and reuse needs, particularly those of the periurban poor; cost reduction and increasing agricultural productivity. The challenge for activists and planners is to create informed demand for improved systems, focusing on health and on the improvements that may be achieved for the household economy through participation in improved wastewater management (for instance in Dakar, Senegal; own observation).

Urban and Rural Planning

A distinctive characteristic of periurban areas is the lack of institutions capable of addressing the links between urban and rural activities. Moreover, sectoral policies are generally defined under the assumption that the physical distinction between urban and rural areas is self-explanatory and uncontroversial Tacoli (2001).

Allen (2001) therefore argues that environmental planning and management in periurban areas cannot simply be an extrapolation of planning approaches and tools applied in rural or urban areas, but that they need to be based on the specific situation. Jarlov (2001) argues that there is gap between the real problems among the poor in and around the cities and the conventional planning view where people mainly get their food from buying by means of salaries and wages (based on field work in Port Elizabeth in South Africa).

Future Research

According to Allen (2001) the most important aspect of a strategic planning for the periurban area is, obviously, related to the possibility of participation of the poor themselves in the definition of priorities and in political decision-making. Integration of urban and rural policies, and multistakeholder participation in planning is a central element in the relationship between sustainability and poverty alleviation.

The periurban concept itself should be considered as a definition that can be useful in certain cases but not in others. Without wasting too much time in seeking the right definition, social and environmental management of the periurban areas of growing cities should try to tackle the problems mentioned in close collaboration with the people involved.

Areas for further research and development are, firstly, land tenure, legislation and urban land use planning (including agricultural activities). The need for land tenure planning and regularisation, as well as institution building in order to reverse the effects of tenure insecurity in periurban zones is evident (MDP, 2001a). In many cities where men have traditionally been the holders of land titles, laws for women's tenure are urgently needed. Another field is that of applicable methodologies in working with stakeholders in sustainable (peri)urban development, including agriculture. Working with planners to include agriculture in environmental planning, as a part of greenbelts, city parks and open spaces can create mutually beneficial results, as farmers can gain access to land that is protected from future urban sprawl, and planners can justify the space as being productive. Institutional assessment and development of new institutions or new institutional arrangements is a related area. Development of urban and periurban markets and support to commercial and subsistence horticulture, aquaculture and livestock systems is yet another field of interest.

The rural-urban interface is moving, but not vanishing. It is characterised by a series of flows, like migration and growth (people), goods, capital, natural resources and waste (water and nutrients), and information. Each of these flows has multiple components and impacts, feature different spatial and temporal linkages, and thus need adequate policies. Advice to policy makers should identify and assess the impact of rural-urban linkages by integrating the following factors into their policy frameworks: emerging global-local realities of rural-urban integration; concern for poverty alleviation, income improvement, well-being and sustainable development of the regions. It has to be investigated whether this needs improved use of existing policies or new policies all together.

Rabinovitch (2001) identifies six major policy areas:

1. Strengthening capacities of local and regional government;
2. Encouraging participatory modes of development, fostering gender sensitive approaches and enabling collaboration among all stakeholders;
3. Localising production linkages to diversify local economies;
4. Assisting in the formation of group co-operatives and enterprises;
5. Providing public infrastructure and urban and rural services;
6. Ensuring safety and security of the movement of people, goods and capital;

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Touré Fall S. A. Salam Fall , Ibrahima Cisse (2000) Urban livestock systems in the Niayes zones in Senegal . In: Urban Agriculture Magazine, no 2, Urban Livestock, October 2000, RUAF, Leusden The Netherlands.

Zurayk, R., S. Talhouk, J. Chatila and L. Abdul-Samad. (2000). Environmental costs of periurban agriculture in coastal Lebanon. In: H. Hoffmann, K. Mathey (eds.). Urban Agriculture and Horticulture, the linkage with Urban Planning. 2000. International Symposium. Berlin, July 2000. (on cd-rom).

Adell, G. **(1999) Theories and Models of the Periurban Interface: A Changing Conceptual Landscape. Draft for discussion.**

rural-urban linkages

India; concepts; periurban interface

This document is written under the Periurban Interface Production System Programme of the Development Planning Unit of University College London, UK, aiming to reduce poverty and mitigate environmental problems in these areas. This literature review consists basically in a thorough desk-based research of available material linked to the subject. The the aim of this literature review is to examine the complexity of the theoretical discussion on concepts and models of regional development, where the PUI finds a theoretical place within the broader literature on rural-urban interactions and linkages. The validity of a rather old concept (first discussions date from the 1950s) will be assessed, and its evolution when confronted with new theoretical contexts such as globalisation will be examined.

L'agriculture périurbaine entre ville et campagne: les enseignements d'exemples ivoiriens **In: Agriculture périurbaine en Afrique subsaharienne p. 93-100**
rural-urban linkages
sub-Saharan Africa; periurban agriculture; case studies; Ivory Coast;

This paper looks at the particularities of periurban agriculture in Abidjan, Bouaké and Touba. Periurban agricultue is an unstable, changing place. In the case of Abidjan the edge is characterised by its extension, related to the size of the city and to het ago-industrial blocks pushing periurban farming further outwards. The example of Azaguié area demonstrates the complexity of the situation and processes. (NB)

Allen, A.. **(2001) Environmental Planning and Management of the Periurban Interface. Key note Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**
rural-urban linkages
environmental planning; periurban interface

There is increasing recognition among development professionals and institutions of the fact that rural and urban features tend to increasingly coexist within cities and beyond their limits. This paper argues that environmental planning and management of the periurban interface cannot simply be based on extrapolation of planning approaches and tools applied in rural or urban areas, but need to be based on the specific situation.

Allison, M **(et al.) (1998). A review of the urban waste in periurban interface production systems. 2 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**
waste recycling wastewater reuse rural-urban linkages R&D methodology
urban wastes; organic wastes

Provides a dense overview of uses of urban waste and wastewater and examines factors affecting the use of wastes in agriculture. Attention is drawn to the fact that there are important gaps in our knowledge about the quantitative need for organic wastes in urban and periurban agricultural systems and about the potential to satisfy these needs. (WB)

Arbelot, B.; Dayon, J.-F.; Merouan, N**. Développement et organisation des filiéres avicoles autour de Dakar. Agriculture périurbaine en Afrique subsaharienne p. 161-166**
rural-urban linkages
poultry farming; Senegal

Periurban poultry farming in Senegal has developed considerably in response to an

increased demand for proteins. The Projet de Développement des Élevages à Cycle Court (project for the development of short life cycle livestock, PRODEC) set up a diagnostic laboratory at ISRA-LNERV as well as a training structure. After three and a half years of operation the project succeeded in setting up a fee-paying poultry pathology lab, introducing surveys to ensure greater control of on-farm pathologies and training technicians, farmers and veterinarians. The strength of PRODEC is to tackle the poultry farming problems at different levels despite a number of problems encountered. (NB - Abstract adapted from original)

Atkinson, A. **(2001) Changing Perspectives about Rural-Urban Links and their Role in the Development Process. Key note Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**

rural-urban linkages

concepts; policy

This paper takes a strategic look at the problems emerging in the periurban interface around cities in the South, from a historic perspective. It ends with a brief look at the current potential social, ideological and political forces for positive change.

Baker, J; Pedersen, PO **(1992). The rural-urban interface in Africa: expansion and adaptation; seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies)**

rural-urban linkages R&D methodology

Africa; Botswana; Zimbabwe; Ghana; urban poor; survival strategies; urban development

In September 1990, a conference entitled “Small towns and rural development in Africa under conditions of stress — adaptive strategies and survival mechanisms” was organized jointly by the Scandinavian Institute of African Studies and the Centre for Development Research, Copenhagen. This book is based on the papers that were presented at the conference. Chapters two and three outline the conceptual and theoretical contexts of the role of small towns in development. The next four chapters examine linkages between small towns and both rural areas and larger towns in Sudan, Somalia, Zimbabwe and Ethiopia, respectively. The following three chapters examine the role of entrepreneurship in small town development in Botwsana, Zimbabwe and Ghana, respectively. The section entitled “Living conditions and labour markets” examines urban textile workers as farmers in the 1980s in Nigeria, the relationship between rural and urban life in Mtwara, Tanzania, and survival strategies of migrants to Makambako, Tanzania. The last, plus the four chapters in the final section, deal with urban agriculture and have been abstracted individually. (HC, IDRC)

Belantsi, R; Torreilles, JC**. Appui au développement agricole périurbain au Congo. Agriculture périurbaine en Afrique subsaharienne p. 53-62**

rural-urban linkages
periurban agriculture; Congo; development projects

In Congo, 75-80% of the people live in towns, hence it is crucial to take account of the urban factor in any sustainable development operations. Periurban operations are not merely a complement to rural supply zones, but can also be seen as reference sector for launching rural development. At the same time periurban activities have always been precarious, as they are subject to numerous constraints, which eventually jeopardise their development (e.g. land use pressure, anarchic urban development, theft). The periurban agricultural development structure as developed by Agricongo helps to stabilise and sustain the profession. In the paper, emphasis is put on how the project helps the marker gardeners, how professional groups are developed and how information systems are set in collaboration with CIRAD to monitor the sector and spread information to the stakeholders. (NB - Abstract adapted from original)

Bendavid-Val, Avrom **(1989). rural-urban linkages : farming and farm households in regional and town economies. Review of Urban and Regional Development Studies, Vol. 1, No. 2 (July 1989) p. 89-97.**
rural-urban linkages
Africa (Eastern); Somalia; Kenya; urban economy; household economy

Agricultural expansion is recognized as critical to growth in nonfarm sectors of rural and urban regions. However, the extent and mechanisms of economic interdependency between agriculture and other sectors remain an inadequately understood aspect of the rural-urban economic growth dynamic. Least well understood are the linkages between household farm income and the development of town and city economies. The paper presents findings from research on rural-urban exchange - including periurban agriculture - in Kenya and Somalia. It provides insights into the relationships between agriculture and the urban economy, and offers conclusions for regional development economies. Data is presented of the percentage of town dwellers that farm and rural households that are engaged in urban economic activities. (adapted from original by JS)

Bentinck J. **(2000) Delhi's Urban Growth and the Stray-Cattle Controversy. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock rural-urban linkages
India; urbanisation;

The streets of urban India are characterised by the presence of animals: cattle, bullocks with carts, monkeys, dogs, elephants, and occasionally some scavenging pigs. Cows are certainly the most visible fauna. The presence of dairy farming in the city is explained here by the way that villages and its people become urbanised. It may look that this is an undisputed part of city life, but the case of Delhi shows that it is surrounded by controversy, which calls for creative policy action.

Berg, Leo van den **(2001) Farming downstream from Hanoi. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**
rural-urban linkages
Vietnam; irrigation; urbanisation; horticulture; aquaculture

The paper outlines the nature of the land conversion processes that take place in the southern outskirts of Hanoi, in Thanh Tri District. The responses of farmers to these challenges include turning to more intensive horticultural production and fish farming on the one hand and demanding higher compensations for lost land on the other.

Bergeron, Bernard **(1998). Agriculture péri-urbaine au Gabon. 4 p. Ministère des Affaires Etrangères, Coopération et Francophonie, Bureau Production Agricole, Industrielle et Echanges**
rural-urban linkages services
Gabon; periurban agriculture

The 'Institut Gabonais d'Appui au Développement (IGAD) is closely involved in shaping periurban agriculture around Libreville, mostly commercial. The underlying paper describes the development methodology of the IGAD. Focus is on horticulture, food processing and training. (WB)

Bibangambah, JR **(1992). Macro-level constraints and the growth of the informal sector in Uganda. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 303-313**
economic impact rural-urban linkages
Uganda; informal sector; survival strategies

The author reviews a number of works on urban agriculture in Africa, with particular reference to Kampala, Uganda. He calls “unhelpful” those who argue that urban agriculture has an important contribution to make to Africa’s economic development. He counters that, like other aspects of the informal economy, it is a manifestation of the socioeconomic decay representative of Africa’s development crisis: the decay of institutional capabilities, infrastructures, and social values and standards. Uganda’s economic crisis (1970-1985) featured: marked decline in the capital-intensive industrial sector; drastic decline in major export crops; increasing dependence on coffee for foreign export earnings; smuggling of large quantities of primary produce and imported goods across Uganda’s international borders; outflow of resources from the agricultural export sector into subsistence agriculture and informal trading; intensified problems of low income and absolute poverty; and extreme difficulty in getting imported inputs, spare parts and raw materials. It resulted in the collapse of the agrarian economy and the ruralization of the city, as even salaried employees took up subsistence farming to supplement unbearably low wages. He concludes

that it is necessary to transcend justifications based on mere survival and short-term crisis management, and examine the extent to which the informal sector is productive, unproductive or counter-productive. What is needed are institutional and policy reforms to reverse the negative economic trends, eliminate regressive forces and create an environment and framework for a progressive economy. (HC, IDRC)

Birley, MH; Lock, Karen **(1997). A review of the health impacts of periurban natural resource development. On: http://www.liv.ac/~mhb/publicat/periurban/start.html. 14 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK.**

health and environment rural-urban linkages

health hazards; natural resource management

Describes findings of a study to identify kinds of health hazards that natural resource managers, researchers and users should be aware of. The article gives numerous cases and health survey figures. (WB)

Birley, MH; Lock, Karen **(1999). The health impacts of periurban natural resource development. 185 p. ISBN 0-9533566-1-2. Liverpool School of Tropical Medicine, Pembroke Place, Liverpool, L3 5QA, UK**

health and environment rural-urban linkages

periurban areas; health hazards; natural resource management; diseases; health impact assessment

This important monograph is based on a report commissioned by the UK Department for International Develaopment (DFID), which is conducting research into natural resources in periurban areas through its Natural Resource Systems Programme. In this study, the various health hazards in connection with the periurban interface are identified and systematically examined. Health issues are organised into categories of communicable diseases, non-communicable diseases, injury, malnutrition and psychosocial disorder. In a way, periurban communities may have to face the worst of two worlds, being subject to both traditional and modern health hazards. All major natural-resource-management themes in the periurban setting are closely examined, such as energy, agriculture, fisheries and waste management. The authors, however, do not stop at this examination but also provide techniques for safeguarding health. Also, a procedure for health impact assessment is described which can be used in project design and operation. The final chapters provide a synthesis of important linkages and give a state-of-the-art overview of researchable themes that require collective, natural resource-, social- and health-specialist inputs. Highly recommended reading for an audience of non-health specialists, such as managers of NRM projects, researchers and recipients of development aid. It contains a well-stocked bibliography on urban-health research. (WB - from executive summary)

Bom Konde, P**. Les migrants et les institutions dans l'évolution des activités agroalimentaires périurbaines. Agriculture périurbaine en Afrique subsaharienne p. 81-87**
rural-urban linkages
periurban agriculture; sustainability

Migrants from different regions offer a potential for product diversification, which can help to encourage the growth of periurban agrifood systems. In Cameroon, agrifood zones have been seen to develop on the edge of large urban agglomerations and medium sized towns. Their emergence is facilitated by the proximity to available land and all the different technical operations involved. Periurban activities are very unstable due to urban sprawl. Preliminary results of the study indicate that activities in the maize and cassava sector is based on processing from products of urban origin. This confirms the idea that immigrants in periurban areas are able to adopt new products, insofar as such products are not found in their region or origin. There is however little sign that maize and cassava processing is diversifying. Thus one can assume that the potential for diversification is still spreading. To support this the local component of the expertise diffusion methods as implemented by the AVAL project could prove to be useful in periurban areas. (NB - Abstract adapted from original)

Bon, Hubert de; Ducelier, D.; Hernandez, S.; Temple, L. **Appui aux productions maraîchères et fruitières périurbaines de Yaoundé. Agriculture périurbaine en Afrique subsaharienne, p. 89-92**
rural-urban linkages horticulture
periurban agriculture; marketing; vegetables; sub-Saharan Africa

Vegetable crops are intended to be marketed and are often produced by young farmers, new to the business. The major species grown are: African spinach, jute, Solanum aethiopicum and lettuce. Green peppers, parsley, basil an dokra are also grown. CIRAD-FLHOR works on improving the production techniques practised and the sanitary quality of the marketed produce. The agronomic support for fruits aims to diversify the range of products with species adapted to the prevailing conditions. A number of varieties already has been selected and distributed. Vegetable and fruit crops from the periurban zone play an essential role in market supplies. A study under way includes quantifying fruit and vegetable movements and monitoring and analysing prices and urban market supplies. Major surveys of markets, notable in Yaoundé will determine the role of fruits and vegetables from urban and periurban areas compared to produce from further a field. (NB - Abstract adapted from original)

Bos, Liesbeth van den; Helmsing, Bert **(1998). Restructuring and rural-urban relations: a survey of the literature. 123 p. Institute of Social Studies Advisory Service (ISSAS), PO Box 29776, 2502 LT The Hague, The Netherlands**
rural-urban linkages
economic aspects; structural adjustment programmes; urban development; rural-urban migration

A scientifically oriented literature study on the economics of rural-urban linkages. The study examines how these linkages are affected by economic restructuring since the 1980s. Links between small towns and surrounding rural areas are analysed. A number of aspects are highlighted in this very dense publication:

- The influence of structural adjustment programmes on economic opportunities for small and intermediate cities;
- The effects of agricultural deregulation and the growth of small and intermediate towns;
- The possible influence of decentralisation to local governments on the service rendering role of small cities with regard to
- the rural hinterland, notably effects on markets and rural area services;
- The effect of restructuring of industry on the economy of small and intermediate cities;
- The extent to which all these changes have had an influence on migration patterns.

For a scientific audience of economists. (WB)

Corten, Irma **(1998). Het proces: stad-land: succesfactoren en belemmeringen in stad-land projecten. Werkdocument IKC Natuurbeheer no. 163. 113 p. National Reference Centre for Nature Management (IKC-N), PO Box 30, 6700 AA Wageningen, The Netherlands**

rural-urban linkages

urban planning; planning approaches; methodologies; political aspects

Aims to provide lessons from practical experiences with planning approaches. These cases have been analysed on factors determining successes and constraints. Sheets are presented in which specific recommendations are presented under: process; plan; policy and legislation; knowledge and skills. (NB)

Craddock Williams, Vivian **(1997). Neither urban, nor rural. TRContinental development, PO Box 7558, Kampala, Uganda**

rural-urban linkages

Uganda; settlements in transition; urban planning

The author argues that the easy urban-rural dichotomy is upset by the realities of agro-industrial linkages and by residential allegiance in Africa. The focus should thus be on growth centres that are able to convert low-cost inputs into relatively high-rate growth. (NB)

Dávila, Julio **(2001) Guidelines for Strategic Environmental Planning and Management of the Periurban Interface. Paper for topic 1 of the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D methodology rural-urban linkages
urban planning; environmental planning; periurban interface; guidelines

The traditional separation between urban and rural authorities makes intervention's, aimed at supporting periurban farming, difficult. The aim of this paper is to present the principles and components of a strategic environmental planning and management of the periurban interface – and, by extension, of urban and periurban agriculture as salient activities in it – in a developing country context. The work presented here is the result of a research project aiming to produce a set of guidelines to be used as the basis for action at the local and periurban levels.

Dengu, Ebbie; Mugova, Alex **(1996). Urbanization and land policy in Zimbabwe. In: Appropriate Technology vol. 23 (1996) no. 1 p. 5-8. Intermediate Technology Zimbabwe, PO Box 1744, Harare, Zimbabwe**
Supplier: Intermediate Technology Publications
land use planning rural-urban linkages
housing; urban infrastructure; land tenure; tenure rights

In the light of the recent events in Zimbabwe with regard to land tenure rights, this article gives important background information. The land division dating back to the land Apportionment Act of 1930, has led to deterioration of agricultural productivity of the Tribal Trust lands and, hence, to urban migration. The article describes how Harare's infrastructure, especially, has been unable to cope with this influx of people. (WB)

Development Planning Unit, University College of London **(2001)**
Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001. Conference Papers and Proceedings.
rural-urban linkages
urbanisation; wastewater; waste recycling; concepts; policy

In this one-and-a-half-day conference participated academics, practitioners, and donor agency representatives, with experience in the integration of local environmental management, traditionally separated into "urban" and "rural". The event aimed to take stock of progress in what is a new field of investigation and action and to set directions for the future, attaching priorities to common issues, to give structure to what is currently ad hoc environmental management of the periurban interface, and to mark out the current limits in understanding the environmental problems and opportunities created when activities of the city and countryside meet. The conference papers were handed out at the conference and will be available in the course of 2002 at http://www.ucl.ac.uk/dpu/pui/conf.htm.

Drakakis-Smith, David **(1992). Strategies for meeting basic food needs in Harare. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Sseminar proceedings no. 27. Uppsala: Nordiska**

Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 258-283
food security and nutrition rural-urban linkages
Zimbabwe; food security; surveys

A survey was carried out in three areas of varying socioeconomic status in Harare to establish patterns of food production and purchasing. In descending order, these were Mabelreign, a formerly white but now ethnically mixed area; Glen View, a sites and services area reasonably well provided with garden space; and Epworth, a squatter settlement in the process of being formalized. Certain basic items (bread, sugar, tea/coffee, beef and mealie) were purchased by nearly everyone. But, the people of Mabelreign spent the most on food in absolute terms but the least in relative terms. In Mabelreign and Glen View, some four-fifths of those interviewed grew food crops in their gardens. In Epworth, the two-thirds that had gardens used them to grow food. Virtually all of the crops grown in urban gardens were consumed. Only in Epworth was a small proportion (about 5%) sold. A fairly high proportion of families kept chickens. Only 10% admitted to cultivating another plot of land — probably an underestimate as much of such cultivation is illegal — and most of these were in Epworth, where there was more open space and the influence of the authorities less marked. Other sources of food were purchase, cultivated land outside Harare and gifts from rural relatives. It was suggested that governments recognize the importance of urban agriculture by providing garden space in low-cost housing schemes, by regulating land use on the urban periphery and by designating organized areas for cultivation. (HC, IDRC)

Drechsel, P.; Quansah, Charles; Penning De Vries, F **(1999). Urban and periurban agriculture in West Africa: characteristics, challenges and need for action. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 19-40. International Board for Soil Research and management (IBSRAM)**
rural-urban linkages R&D methodology
urbanisation; ecology; nutrient cycling; waste contamination

Urbanisation poses challenges for food security, sanitation and poverty alleviation. Periurban and urban vegetable production will play a multiple role in achieving development goals. At the moment mainly high–value perishable products are produced. Nutrient recycling is pre-requisite to maintain these functions. Care must be take of waste contamination by agro-chemicals and pathogens. For future planning it is important to fully understand urban-rural linkages. (NB)

Drechsel, P.., Cofie, O.O.., Vázquez, R. and Danso, G.P.. **(2001) Technology development for municipal organic waste recycling for urban and periurban agriculture - A holistic approach.. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**
R&D Methodology waste recycling rural-urban linkages

poultry; Ghana; nutrient recycling; sanitation; FAO; IBSRAM; West Africa

One of the challenges of rapid urbanisation is how to make sufficient food available on a sustainable basis for the increasing urban population. The increase in urban food demand is giving way to intensive food production systems in and around cities often specialised on perishable crops or poultry, and also to export-oriented agriculture using the advantage of urban infrastructure. These types of agriculture require large amount of inputs, including plant nutrients. Once the food is consumed or processed in the city, related market and household refuse as well as human excreta contribute to urban pollution due to the common lack of adequate sanitation services or end in landfills. In both cases large amounts of nutrients are simply 'wasted'. This situation calls for an analysis of options for municipal organic waste recycling for the benefit of agricultural and environmental sustainability in the rural-urban continuum. An international workshop on (peri)-urban agriculture and nutrient recycling was organised for Africa in 1999 by FAO and IBSRAM, where knowledge gaps in waste recycling were analysed and recommendations developed. Many scientists, farmers and decision makers emphasised the need for more information on viable and acceptable options for the recycling of municipal and agro-industrial waste, especially for farmers in urban and periurban areas. Subsequently, the Canadian donor IDRC agreed to co-sponsor a corresponding project in three agro-ecological zones of West Africa addressing variations in organic waste generation, quality and availability. The project is an attempt to develop recycling strategies that should result in closing the rural-urban nutrient cycle as well as preserving the quality of the urban environment by reducing the (pollution effects of) waste accumulation. The analysis and its different components are described in this paper.

Drescher, Axel W.; Iaquinta, David **(1999). Urban and periurban food production: a new challenge for the Food and Agriculture Organization (FAO) of the United Nations. 53 p. Food and Agriculture Organization (FAO), Via delle Terme di Caracalla, 00100 Rome, Italy**

food security and nutrition rural-urban linkages
policy development; CGIARs; development strategies

Addresses both urban and periurban agriculture (together coined PUA), sets the scope, provides definitions of concepts of PUA, describes the institutional framework and gives a large number of examples. This paper serves to make a contribution to strategy development in the framework of the 15th session of the Co-ordinating Committee for Agriculture (COAG). (WB)

Driss, Ben Ali, Di Giulio, Antonio, Lasram, Mustapha & Lavernge, Marc **(1996). Urbanisation et agriculture en Méditerranée: Conflits et Complémentarités. Editions L`Hamattan, Paris (Histoire et perspectives Méditerranéennes.**

land use planning rural-urban linkages food security and nutrition
land use; policy; urbanisation; planning; Mediterranean ; environment rural-urban linkages environment

This publication is a collection of articles on urbanization and agriculture in the

Mediterranean. Most of the articles are in French, some in English. Maps, pictures, and tables enrich the book a lot. In the first part the book deals with problems of urban planning mainly from experience of Magreb countries. The multifunctional character of urban agriculture is pointed out by one article. This paper propose a systematic mode of representing agriculture through a set of indicators, meant as a tool for choosing appropriate planning strategies. In the second part the book deals with specific problems caused by the conflict between urbanization and agriculture, like e.g. water problems and other environmental problems. In the last part the book mainly deals with rural urban linkages [AD].

Ellis, Frank; Sumberg, James **(1998). Food production, urban areas and policy responses. In: World Development vol. 26 (1998) no. 2 p. 213-225**
rural-urban linkages food security and nutrition city ecology
Africa; rural-urban linkages; food policy

A literature review focusing especially on food production in and around sub-Saharan cities and towns. The authors emphasise the importance of rural-urban interactions in resource management and output markets. At the same time, they warn against too high expectations about the role of urban agriculture for food security of urban dwellers. (WB)

Fleury, André**. Définitions et contours de l'agriculture urbaine à partir d'expériences en Europe. In: Agriculture périurbaine en Afrique subsaharienne p. 17-27**
rural-urban linkages
periurban agriculture; municipal policies

The reason for periurban agriculture moving back towards the towns is possibility of urban citizens expressing their ideas more forcefully. Farmers have been quick to see new opportunities and transform their production practices, whilst elected representatives and urbanists have come up with new town plans. Municipalities and governments have been developing new types of urban development by implementing agri-urban policies. It is essential to analyse the relations between periurban agriculture and towns, and how they have been transformed. A distinction can be made between spatial relations (where agriculture is practised) and socio-economic relations. Lastly how the idea of town planning and the means at the disposal of the authorities have changed is discussed. (NB - Adapted form original abstract)

Foeken, Dick; Mwangi, Alice Mboganie **(1998). Does access to land have a positive impact on the food situation of the urban poor? A case study in Nairobi. In: East African Social Science Research Review vol. 14 no. 1 (1998) p. 1-15. 15 p.**
land use planning food security and nutrition rural-urban linkages
Kenya; urban poor; food security; land rights; access to land

Examines the vital issue of whether and how access to farm land influences the household's food and income situation. There is a general introduction into coping strategies of the urban poor as well as an interesting review of existing access rights to urban land in Nairobi. Interestingly, for this aspect hardly receives any attention at all, the authors also investigate the phenomenon of urban households realising part of their livelihood from rural sources, through access to rural land, in particular. Previous surveys had revealed that this was the case for Kenyan middle income groups, in particular. The land is not necessarily farmed by the urban dweller himself / herself: often, it is a member of the family. The authors conclude that having access to a rural plot seems to have a positive effect on income and that, in addition, they seemed to be better off than those with access to an urban plot. Mechanisms involved are not entirely clear, however. A paper with a refreshing view. (WB)

Gefu, JO **(1992). Part-time farming as an urban survival strategies: a Nigerian case study. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 295-302**

food security and nutrition rural-urban linkages

Nigeria; survival strategies; surveys; urban poor

Several survival strategies are being adopted in the wake of structural adjustment in Nigeria. One of these is part-time farming. This chapter presents the results of a survey questionnaire on part-time farming that was distributed to 550 academic and non-academic staff members of Ahmadu Bello University, Main Campus, Zaria. A total of 110 questionnaires were returned. All of the respondents indicated that they were involved in a variety of part-time farming activities, ranging from home gardening to commercial production. The involvement of all but 16% predated structural adjustment. Maize and cowpeas were the most commonly cropped grain, maize for sale and cowpeas for home consumption. A variety of vegetables were grown for home consumption around the house or on small patches of land near residences or office buildings. About 81% of the respondents kept some livestock: goats, poultry and sheep, in that order. Most kept fewer than five units of any one species (except poultry), indicating that livestock raising was geared to home consumption. The profit margin was very narrow. It was concluded that urban agriculture is likely to remain a prominent feature of the informal sector in urban Nigeria. It is recommended that urban farmers form their own producer associations the better to take advantage of government-subsidized production inputs and obtain credit.

Gockowski, J**. Intensification of horticultural production in the urban periphery of Yaoundé. Agriculture périurbaine en Afrique subsaharienne p. 63-79**

rural-urban linkages horticulture

Yaoundé; Cameroon; periurban agriculture; surveys; farming systems

Population growth of more than 6%, proximity to the largest urban centre and high

rural population densities all contributed to intensification and diversification in Beti farming systems around Yaoundé. A random survey of 208 households in 16 villages 12 to 90 km from Yaoundé was conducted. Sixty-five % of the households interviewed adopted an intensive monocrop horticultural system with on average 3 monocrop fields per adopting household. They maintained roughly the same number of traditional field-systems as non-adopters, indicating an increased mobilisation of labour and increased tomatoes, okra, sweet green and hot peppers. Pests and diseases were cited most frequently as the major agronomic constraint. Variation in market access resulted in significant price differentials as a function of distance to market. The valuable genetic diversity in local land races of tomatoes and the indigenous West African okra is in danger of being lost. Many indigenous leafy vegetables are very important particularly to the urban poor. These crops have largely been neglected by research with the same risk of genetic erosion as farmers turn to cabbages and tomatoes. Rootknot nematodes were the most cited problem among commercial producers. Efforts to develop improved fallows at IITA and elsewhere need to focus on the impact of fallow species on cyst populations. Given the lack of resources at the disposal of public research instates results should be shared through regional organisational frameworks. (NB - Abstract adapted from original)

Grossman, David; Berg, Leo van den; Ajaegbu, Hyacinth I **(1999). Urban and periurban agriculture in Africa. xviii, 335 p. ISBN 1_84014_910_8. GBP 45.00 Supplier: Ashgate Publishing Direct Sales, Bookpoint Limited, 39 Milton Park, Abingdon, Oxon OX14 4TD, UK**

rural-urban linkages

periurban agriculture; conferences; farming systems; Africa; food security

Very elaborate proceedings of a conference examining the state-of-the-art in urban and periurban agriculture in Africa. The text highlights the differences between these, in terms of availability of land and water, policies with regard to open public spaces, accessibility of markets, pollution hazards, and use of inputs. There are four parts: the first two contain regional studies, respectively field studies from eastern & southern Africa, and periurban studies from the Jos Plateau in Nigeria. Part three deals with economic or methodological aspects of access to resources and inputs. Part four is about theoretical and policy issues, notably with regard to development. Many papers insist on the fact that in Africa, farming in urban areas by growing rain-fed crops and raising animals in the urban space is more a survival strategies than market gardening: it is primarily an expression of poverty and inadequacy of existing food supply. The book argues that, in the African setting, the role of urban agriculture lies primarily in securing income and providing food security for the producers: most of the produce comes from outside the city. The role of urban agriculture, it is argued, in feeding the cities will remain a marginal one. There is a clear split between urban subsistence, thought to have little perspective, and emergent commercial farmers, mainly in periurban areas, believed to be much more promising. Many authors insist on the importance of promoting self-help and participatory development rather than relying on top-down projects. A number of recommendations have stemmed from this conference, rather difficult to extract from

the text: (1) The formation of growers' associations to address issues in connection with access to land issues and to interface with consumers; (2) Transfer of Technology for water management; and (3) Maintaining a clear focus on ecological aspects of urban and periurban gardening. Much of the attention is on the reuse of urban waste products. This used to be a tradition in many African cities in the Sahel, but has become a debatable phenomenon as the waste is often polluted with batteries, plastics, and industrial effluents. Low-cost laboratory facilities are needed to check inputs like irrigation water and manure and also produce sold to the market. The book is self-confessed research oriented, but policy makers may also find much relevant information here. (WB)

Hargesheimer, Ken**. Urban agriculture: gardening, market gardening, mini-farming, mini-ranching. Gardens / Mini-farms Network, Lubbock, TX, USA**

horticulture economic impact rural-urban linkages

home gardening; gardening techniques; urban livestock production; youth; United States

Focuses on the potential of various forms of urban agriculture, notably from the perspective of an opportunity for youth employment. Much of this paper is a mapping of production techniques. In addition, a condensed overview is given of important publications and suppliers' addresses, for the American market. (WB)

Holm, M **(1992). Survival strategies of migrants to Makambako - an intermediate town in Tanzania. In: The rural-urban interface in Africa: expansion and adaptation / Baker J. & Pedersen P.O. (eds). Seminar proceedings No. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 284-294**

food security and nutrition rural-urban linkages

Tanzania; rural-urban migration; survival strategies; surveys

This chapter examines the phenomenon of rural-urban migration in Tanzania, in general, and Makambako, in particular. Makambako is a local transit and trade centre with limited infrastructure and opportunities for employment. Nevertheless, it draws large numbers of migrants, mainly from among the “better off” rural inhabitants. Researchers interviewed 283 migrant households using questionnaires and talked with key informants in Makambako and the surrounding villages, in order to shed light on their survival strategies. They noted that after taking up residence as urban dwellers, migrants tended to continue a rural lifestyle. The 280 economically active heads of households had a total of 342 occupations. More than half were farmers, one-third were in business and one-quarter worked as wage laborers. The 249 economically active wives of heads of households held a total of 295 occupations. More than four-fifths were farmers, 14.8% engaged in business and 12.3% were wage laborers. A large proportion of both male and female migrants practiced a combination farming and business, often selling their surplus production. Migrants tended to retain close ties with their area of origin and one-fifth received food from their home village. The implications of migration for rural-urban equity are

discussed. It was concluded that Makambako needed a better infrastructure, facilities to process local resources and a powerful local government with local participation if it were to function effectively as an intermediate centre for the rural hinterland. (HC, IDRC)

Jacobi, Petra **(1998). Food production as a survival strategies for urban households: state of knowledge and state of research in Tanzania. 10 p. Urban Vegetable Promotion Project (UVPP), PO Box 31311, Dar es Salaam, Tanzania**
economic impact food security and nutrition rural-urban linkages
horticulture; Tanzania; urban livelihoods; food security

Provides an overview of urban agriculture in Dar es Salaam with its estimated 3 million inhabitants and its growth rate of 8%. In such a setting, urban food production has revealed itself to be very important as a survival strategies for the urban poor. The paper provides interesting figures and statistics out of which emerges a varied picture as to who is practising urban agriculture, with what purpose, scale of production, and more. Various production systems are presented and typified: crop based systems, periurban crop production, open space production, homegarden production, and livestock based systems. (WB)

Kamal, Ashrat and Ayman El-Hefnawi **(2001) Infrastructure Led Development and It's Impact on Peri-Urban Areas: The Case of Giza City, Egypt . Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 UTI (Urban Training and Studies Institute)**
rural-urban linkages
Eqypt; periurban area; settlement areas, Africa (Northern)

This paper outlines the Egyptian perspective of peri-urban (PU) areas. It analyses the experience in constructing huge infrastructure projects that passes in the PU areas without enough study of the peculiarities of these areas with special reference to its fragile socio-economic structure. It also reviews an existing case study that was developed in the urban training institute a year ago, where the main objective was to study these areas thoroughly, especially in case where there are huge national infrastructure projects. The study's outcome was used as a means to increase the awareness of the decision makers in the ministry of housing about the possible negative impacts that might occur if such project has been implemented without enough socio-eeconomic considerations. And also the study was used as training materials for the trainees of the urban management and the environmental management programs implemented in the urban training and studies institute.

The paper is documenting a study that took place in Giza city, where this city is well known of its drastic containment of informal settlements build over agricultural land, which forms a huge number of periurban areas, contained within the urban fabric. Moreover, the city is known, among practitioners and researchers in Egypt, because 75% of the urbanisation in the city is informal and most of these informal settlements were built ove rthe most fertile agricultural land in Egypt.

The paper testifies, through using the environmental profile approach, the severity of the environmental problems in the PU areas of Giza and shows the impact of the ring road on these problems. Moreover, it analyses changing livelihood strategies of its occupants from being rural-based into urban-based identified through demographic and employment pattern changes that happened before and after the construction of the ring road.

The paper will demonstrate the absence of PU areas linkages in government' decision-making within the Egyptian context. These areas are not managed by traditional environmental institutions; rather by ad-hoc number of initiatives as part of th eministry's of housing and agriculture efforts to control urbanisationover agricultural land in those zones. In essence the paper will testify the lack of an Egyptian acknowledgement to the mutual relationship between its rural and urban agglomeration of cities.

The paper will end with some basic conclusions which all call for a special kind of institutional settlements and policy instruments to manage these areas. The institutions must work using participatory approach in identifying their problems and setting agendas for interventions. Infrastructure led development could be one approach for controlling development and hence preserving the rural-urban linkages. It, therefore should not be applied in these areas without enough socio-economic studies.

Katzir, Raanan**. Agroecological aspects of the periurban process. Urban agriculture notes: http://www.cityfarm.org/israel.html - israel**
city ecology rural-urban linkages
periurban agriculture; agroecology

Looks at the consequences of urbanisation from an agroecological point of view, covering aspects like water, soil, city waste, and industrial residues. In addition, the paper looks at implications of periurban farming, such as production of special crops, exporting, agrotourism and handicraft work. (WB)

Knierim, Andrea **(1996). Agricultural development potential around Dolisie in the Congo: a case study in the catchment area of a small town. In: Agriculture + Rural Development vol. 3 (1996) no. 2 p. 51-54**
Supplier: Technical Centre for Agricultural and Rural Cooperation (CTA), PO Box 380, 6700 AJ Wageningen, The Netherlands; Deutsche Stiftung fuer Internationale Entwicklung / Zentralstelle fuer Ernaehrung und Landwirtschaft (DSE/ZEL)
economic impact horticulture rural-urban linkages
Congo; periurban agriculture; socio-economic aspects

Examines the potential of periurban agriculture around the city of Dolisie in the Congo. Technical issues are addressed, but also who are the target groups for agricultural innovations and intensification activities. In this analysis, a distinction is made into 3 agricultural circles in and around the town: (1) lots within the town and around its fringes; (2) areas within a radius of 10 to 15 kilometres; (3) villages in a

radius of up to 50 kilometres. All 3 different circles are farmed by different groups of producers. (WB)

Kuiler, Esther **(1998). Toekomstperspectieven voor biologische stadslandbouw in Nederland: stadslandbouw als onderdeel van de urbane bosbouw. AV no. 98-07. 72 p. Departement Omgevingswetenschappen, Sectie Bosbouw, Agricultural University Wageningen, The Netherlands**
horticulture urban forestry rural-urban linkages
landscape design; urban livelihoods; biological agriculture; home gardening; Netherlands

Looks at urban agriculture from the livelihood point of view and examines its contribution to creating an attractive urban landscape in the setting of The Netherlands. In Dutch. (WB)

Lamb, Gary **(1994). Community supported agriculture: can it become the basis for a new associative economy? In: Biodynamics Nov-Dec 1994 p. 8-15. Bio-Dynamic Farming and Gardening Association**
community development rural-urban linkages economic impact
community initiatives

Describes the intricacies of Community Supported Agriculture (CSA), a community-based organisation of producers of consumers. This concept has spread primarily in the USA since the beginning of the 1990s. CSA is an approach and common understanding rather than a blueprint. The close links between producers and consumers have the potential of adapting offer and demand much more adequately to each other and to seek for optimisation instead of maximisation of production. In practice, the production-driven focus of farmers is not easy to wipe out. As much of the support work is done by volunteers, the movement may find itself to weak to provide proper guidance and support in the long run. Still, this is a very interesting and important approach in the light of urban and rural renewal. (WB)

Laquinta, D. and Drescher, Axel W.. **(2001) Defining Periurban. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**
rural-urban linkages land use planning
periurban; natural resources

This paper uses definitions and concepts of the periurban area, and explores the implications for planning and management of natural resources in the rural-urban interface. In exploring this, the authors attempt to define the *social footprint*, with the aim to foster effective interdisciplinary discussion.

Lazard, J**. La pisciculture périurbaine en Afrique. Agriculture périurbaine en**

Afrique subsaharienne, p. 111-121
rural-urban linkages
aquaculture; periurban agriculture; Ivory Coast; Niger

Technical and economical requirements, in terms of agricultural by-products and existence of an urban market, resulted in a concentration of pisciculture in periurban areas. The article presents a case of fish farming in Ivory Coast and one case in Niger. Both cases are set in a different environment in which fish farming is carried out and in production system. In Ivory Coast fish farming is profitable. In Niger, the need to practise pisciculture cages and (not fixed to land tenure) and as part of a commercial chain in which it is essential to organise production, means that the farmers need fairly advanced technical and management skills. As a result only a limited number of people will qualify, at least for the time being. (NB - Abstract adapted form original)

Lewcock, Chris P **(1996). Periurban interface research: workshop proceedings. ODA London & British Council Kumasi Ghana; 80 p.**
R&D methodology rural-urban linkages
Ghana; Geographic Information Systems; waste management; horticulture; environment; post harvest operations; sustainable agriculture; wastewater; rural-urban linkages; information systems; erosion

This workshop aimed first to introduce the periurban interface research being carried out by NRI to Ghanaian leadership. And it explores several relevant aspects as listed above in the keywords. (JS)

Little, Peter D**. The dairy commodity system of the Kismayo region, Somalia: rural and urban dimensions. 13 p. Institute for Development Anthropology, 99 Collier street, POB 2207, Binghampton, NY 13092, USA**
Urban livestock rural-urban linkages
Somalia; livestock; marketing; dairy production

The paper discusses the dairy commodity system in the Kismayo region in Somalia with an emphasis on marketing aspects rather than on the production dimensions of the system. (NB)

Mbiba, Beacon M **(1994). The cattle of Chitungwiza: conflicts on the rural-urban fringe. In: ILEIA Newsletter vol. 10 no. 4 (December 1994) p. 22-23. Mexico City: DDF. Department of Rural and Urban Planning, University of Zimbabwe, PO Box MP 167, Harare, Zimbabwe**
Supplier: Information Centre for Low-External-Input and Sustainable Agriculture (ILEIA), PO Box 64, 3830 AB Leusden, The Netherlands
urban livestock rural-urban linkages
animal production; home gardening; livestock farmers; rural development; urban environment; Zimbabwe

Expanding cities are engulfing farmland without providing alternative land for the displaced rural people, often peasants without land title. Herders continue to use the unbuilt spaces, the "city commons", but many residents do not appreciate the presence of cattle. Beacon Mbiba looks at this potentially conflictual situation in urban Zimbabwe. (ILEIA)

Mbiba, Beacon M. **(2001) Periurban transformations and livelihoods in East and Southern Africa: the Peri-NET experience. Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**
rural-urban linkages R&D Methodology
networking; research; Southern Africa; Eastern Africa

This paper describes the origins and operations of Peri-NET a research network in South-Eastern Africa on Urban and Periurban Africa.

Mbiba, Beacon M **(2001) The Political Economy of Urban and Peri-Urban Agriculture in Southern and East-Africa: Overview, Settings and Research Agenda. Draft paper prepared for the MDP/IDRC workshop on 'The Political Economy of Urban and Peri-Urban Agriculture in East and Southern Africa' in Harare, Zimbabwe, 28 February to 2 March 2001, Urban and Peri-Urban Research Network (PeriNET)**
rural-urban linkages
urban agriculture; periurban agriculture; workshops; research; Africa (Eastern), Africa (Southern)

This paper attempts to set parameters for a debate and research program on the political economy of urban and peri-urban agriculture in East and Southern Africa. It argues that the political economy issues at stake revolve not only around control and access to the land resource but also have to do with competing ideas about the city and the planning process. Control and ownership of this process as well as the outcome is a political process whose content affects the nature of urban and peri-urban agriculture in the region. The range of theoretical reflections on these issues are outlined together with current development concepts that could guide future research. Reflections are made on options to the institutional location and organisation of possible regional research.

Mlozi, MRS; Lupanga, IJ; Mvena, ZSK **(1992). Urban agriculture as a survival strategies in Tanzania. In: Baker J. & Pedersen P.O. (eds). The rural-urban interface in Africa: expansion and adaptation; seminar proceedings no. 27. Uppsala: Nordiska Afrikainstitutet (The Scandinavian Institute of African Studies). pp. 284-294**
food security and nutrition rural-urban linkages
Tanzania; survival strategies; urban poor

The urban agriculture research project was carried out by Sokoine University of

Agriculture, with support from the International Development Research Centre (IDRC). Researchers interviewed 1 800 respondents in six towns: Dar es Salaam (700); Dodoma, Morogoro and Mbeya (300 each); and Makambako and Kilosa (100 each). The sample covered both high density and low density settlement patterns: it included political and non-political leaders, farmers and non-farmers, and men and women. It was noted that urban agriculture was practiced not only by the urban poor, but also by members of the middle class. About 90% of home gardens and out-of-town fields were used to grow field and vegetable crops for home consumption, as a cash-saving strategy. The middle class in medium-density areas and the well-off in low-density areas were the main livestock producers: they sold milk and eggs as a means of maintaining their standard of living in an inflationary context. Constraints to farming included access to inputs such as land, finances, labour, water, etc., especially by the poor; theft of crops; pests and diseases; destruction of crops by people, stray animals, vehicles, municipal employees, etc.; and contamination of crops by refuse. This chapter describes the factors that have contributed to the growth of urban agriculture in Tanzania; discusses the implications of coexistence between agricultural activities and normal urban life and activities; and draws conclusions and makes recommendations as to how the government can handle the growth of urban agriculture as an income earner. (HC, IDRC)

Moldakov, O. **(2000) Urban Agriculture in St Petersburg, Russia. In: *Urban Agriculture Magazine*, no 1, Maiden Issue, July 2000, RUAF, Leusden The Netherlands.**

rural-urban linkages community development

Russia

The St. Petersburg Downtown Gardening Club is one of the six Eastern European organizations active in SWAPUA, SWAPUA stands for “Soil and Water Management in Agricultural Production in Urban Areas in CEE/NIS Countries”. In this contribution the author who is involved in the St. Petersburg Downtown Gardening Club shows that the urban gardening movement in St. Petersburg has a long-standing history, both as a strategy to overcome shortcomings in food availability and for income improvement.

Moldakov, O. **(2001) The Problem of UPA Planning. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning rural-urban linkages

Russia; policy; NGOs

In Russia, agricultural activities of the urban inhabitants are taking place at significant distances from their urban homes. The term "urban agriculture" refers more to agricultural activities of city dwellers than to agricultural activities within the city boundaries only. The agricultural sites, usually with a house, are called dachas and are located between 6 and 60 km from the city. This article call for the necessary inputs by ngo's and farmer rganisations to improve technical know-how and improved use of the facilitating infrastructure to urban agriculture in St.

Petersburg.

Mougeot, Luc JA; Egziabher, AG; Lee-Smith, Diana; Maxwell, Daniel G.; Memon, Pyar Ali **(1994). Cities feeding people: an examination of urban agriculture in East Africa xiv, 146 p. ISBN 0_88936_706_X. GBP 9.95. International Development Research Center (IDRC), PO Box 8500, Ottawa, Ontario, Canada K1G 3H9 Supplier: Intermediate Technology Publications (ITP), 103-105 Southampton Row, London WC1B 4HH, UK**

food security and nutrition rural-urban linkages economic impact
case studies; Africa (Eastern); farming systems; food production; urban communities

Urban agriculture is gaining importance in order to reduce developing countries' dependency on food imports in order to feed rapidly growing urban populations. The underlying book studies urban agriculture in four East African countries: Tanzania, Uganda, Kenya and Ethiopia. In these countries, IDRC began examining impact and feasibility of urban agriculture a number of years ago. Urban agriculture has long been neglected by researchers as a marginal, unproductive activity undertaken by the urban poor. However, under the pressure of falling per-capita food production in Africa south of the Sahara, and subsequent migration to urban areas resulting in high unemployment, urban agriculture can no longer be ignored as an important part of the urban informal sector, providing income or income-substituting food. An important aspect of the study of urban agriculture is that the approach that looks at rural and urban economies as completely separate entities is seriously questioned. In reality, these economies have many links, although they do not necessarily appear in official statistics. Better land use agreements are needed for urban food production to flourish. More government involvement and interest in urban agriculture will be necessary to achieve this. (WB)

Moustier, Paule **(1999) Définitions et contours de l'agriculture périurbaine en Afrique subsaharienne. In : Agriculture périurbaine en Afrique subsaharienne, p.29 - 42**

rural-urban linkages food security and nutrition
periurban agriculture; sub-Saharan Africa; land use

In this paper an attempt is made to outline the boundaries of periurban agriculture in Africa. The term "Periurban agriculture" refers to the influence the town has in terms of demand but also in terms of resources for which alternatives between agricultural and non-agricultural uses generate competition and complementarities. Its importance is parallel to the dynamics of urbanisation in sub-Saharan Africa. The involvement of urbanites inside and around cities is related to their employment and food situation. This involvement is neither marginal nor transitory but rather in constant change. The interface of the urban area and agricultural activities creates changes in resource uses, choice of marketed products and marketing strategies. The economic and agronomic sustainability of the industries is in question. There have been different foci in the available research: spaces influenced by cities; natural resource management; strategies of urban residents; production systems;

commodity and food systems. The analysis of vegetable commodity systems in different towns suggests ways to improve the comparative advantages of periurban agricultural commodities versus rural sources and imports, by supporting marketers in securing their supply in quantitative and qualitative terms. To ensure the sustainability of periurban industries it is necessary to cross-cut approaches on management of space and commodity system approaches which aims at favouring actors' consultation on the same commodity characteristics. (NB - Adapted form original abstract)

Moustier, Paule **(1999). Complémentarité entre agriculture urbaine et agriculture rurale. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 41-55. Centre International en Recherche Agronomique pour le Développement (CIRAD), Département des Productions Fruitières et Horticoles (FLHOR)**

rural-urban linkages

production; marketing; economic aspects; food security; employment; waste management

Urban agriculture meets the demand for food, employment and urban waste management. Given the increasing demand for land, a scrutiny of efficiency and sustainability of urban agriculture becomes urgent. Products of rural and urban origin show strong complementarity in terms of products and seasonal variation. Support programmes for producers and traders should target urban, periurban and rural areas in different but complimentary ways. (NB)

Municipal Development Programme Regional Office for Eastern and Southern Africa (MDP) **(2001) Periurban Land Tenure Planning and Regularisation in Eastern and Southern Africa: case studies from Kenya, Malawi, Tanzania & Uganda; a Research report. Studies Commissioned by: The Food and Agriculture Organisation Regional Office for Southern Africa (FAO-SAFR)**

rural-urban linkages

Kenya; Malawi; Tanzania; Uganda; FAO; land tenure; Southern Africa

This research report will serve as a foundation document for subsequent activities by FAO-SAFR to develop guidelines for planning as well as regularizing land tenure and security. Also, the report will form the basis for the design of programme interventions in the focus countries. The governments of Malawi and Uganda have requested FAO-SAFR to design programmes for implementation in the field of land tenure planning and regularization. Country case studies were commissioned and conducted in Kenya, Malawi, Tanzania and Uganda.

Muwowo, Paul **(2001) Political Economy of Urban Agriculture in Eastern and Southern Africa: The Case of Zambia. Paper prepared for the MDP/IDRC workshop on 'The Political Economy of Urban and Peri-Urban Agriculture in**

East and Southern Africa' in Harare, Zimbabwe, 28 February to 2 March 2001
rural-urban linkages
urban agriculture; periurban agriculture; workshops; Africa (Southern), Africa (Eastern), Zambia

Urban agriculture is as old as the cities themselves. In Zambia, many cities are experiencing a decline in the formal economy for a number of reasons. The low-income groups haven taken up Urban Agriculture in the cities as a survival strategy. Some quotas of the society view Urban Agriculture as a manifestation of rural habits and that this activity in the cities a problem rather than a solution. Urban Agriculture has received little or no support from local authorities.

Production of the staple food prevails in the rain season while vegetable production in the dry season. Some households keep chickens in their backyards, garages and kitchens. Studies have shown that Urban Agriculture contributes to household food security in town directly by providing food and indirectly by providing income. Urban Agriculture can also provie a lot of other opportunities such as creation of employment, use of solid waste as compost, recycling carbon dioxide and recreation. Despite all these facts, the local authorities consider urban agriculture an illegal activity.

Inadequate water supply, lack of micro-lending facilities, land tenure and inadequate extension service have a negative impact on Urban Agriculture. There is need to analyse the negative impacts in detail and come up with possible solutions. This will benefit the vulnerable groups in society, expecially those in the squatter settlements, who partly or wholly depend on Urban Agriculture.

Natural Resources Institute (NRI) **(1995). Periurban interface research: workshop proceedings, 23-25 August 1995, Kumasi, Ghana. 80 p. ISBN 0_85954_436_2. Natural Resources Institute (NRI), Central Avenue, Chatham Maritime, Kent ME4 4TB, UK**
rural-urban linkages
periurban agriculture; food production; health; waste recycling

Contains descriptions of a number of projects of the Department for International Development related to periurban food production. Trying to cope with an overwhelming urbanisation, many Third World cities are spreading their boundaries, reducing agricultural areas around these cities. This negatively affects people whose survival is based on the production of food which is sold in the cities. Some of the contributions deal with problems the people in periurban areas are facing, while others are looking at the very concept of periurban agriculture, and how is it different from rural and urban food production. Themes dealt with are: improving utilisation of urban waste by farmers in periurban areas, and health impact of periurban natural resource development. (WB)

Niang, Demba **(1998). A statistical look at the Senegal River delta's economy: urban domination and activities linked to the agri-food sector. In: Club du**

Sahel: The Bulletin no. 18 (March 1998) p. 2. Organisation for Economic Co-operation and Development (OECD), 2, rue André-Pascal, 75775 Paris Cedex 16, France
economic impact rural-urban linkages
Senegal; Saint-Louis

Examines city-countryside linkages in the Senegal River Delta. The author concludes that, in spite of a poorly developed modern sector, the economy has essentially urban traits. Economic development of the Delta must be sought both in increasing agricultural productivity and in strengthening the capacity of the urban world to develop its agriculture-based activities. (WB)

Nitsch, Egbert; Aue, Christina; Schmitt, Brigitte **(1998). Zur staedtischen Land- und Gartenwirtschaft in einer Welt: Beitraege der gruenen Veranstaltung vomm 22 Juni 1998 in Bonn. 139 p. Arbeitskreis II (Umwelt, Raumordnung und Staedtebau, Verkehr, Landwirtschaft) der Bundestagfraktion von Buendis 90 / der Gruenen, Bundeeshaus, 53113 Bonn, Germany**
R&D methodology rural-urban linkages horticulture
Agenda 21; Germany

Contains a number of papers presented in the framework of a seminar organised by the German Green Party. In quite a number of German cities, processes are taking place that are local implementations of Agenda 21. The underlying discussion aims at giving a more practical focus to the Agenda 21 discussion. (WB)

Nunan, Fiona **(1997). Improved utilisation of urban waste by near-urban farmers in the Hubli-Dharwad City-region. In: Urban Agriculture Notes. 3 p. School of Public Policy, University of Birmingham Edgbaston, Birmingham, B15 2TT, UK; Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling rural-urban linkages
waste management; India

Description of research on the problems in connection with access to urban waste by small and marginal farmers, including transportation costs and the poor quality of the mixed municipal waste from the dumpsites in Hubli and Dharwad. This summary gives details about the design of the research and a number of preliminary findings. (WB)

Nunan, Fiona. Bird, K., Bishop, J. with Edmundson, A. and Nidagundi, S.R. **(2000) Valuing Periurban Natural Resources: A guide for Natural Resource Managers. School of Public Policy, University of Birmingham.**
rural-urban linkages R&D Methodology land use planning

urbanisation; wastewater; waste recycling; concepts; policy; decision support; India; Ghana; natural resources; cost benefits

This booklet describes a decision framework to facilitate natural resource decision-making and management, particularly in areas where there are competing demands from urban development and "rural" uses of resources. It has been written for Southern Countries and is aimed principally at a range of public sector decision-makers. In part 1 the decision framework is described while part 2 gives experiences with applications in two cities; Hubli-Dharwad in India and Kumasi in Ghana.

Nunan, Fiona; Shepherd, A **(1998). Where city meets country. Is the periurban interface a concept that counts? 2 p. Department for International Development (DFID), Natural Resources Systems Programme, 94 Victoria Street, London, SW1E 5JL, UK**

rural-urban linkages R&D methodology
natural resources

Examines management of natural resources in the periurban interface. This research was done in the framework of the Periurban Interface Production Systems Research programme, one of seven portfolios which together constitute DFID's Natural Resources Systems Programme. The research emphasises a move away from a simple geographic definition of the interface to an understanding based on intensive linkages and flows of, for example, commodities, wastes and labour. (WB)

Nunan, Fiona **(2000) Livestock and livelihoods in Hubli-Dharwad, India. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock rural-urban linkages
India; dairy; buffalo; policy

Small urban dairies and roaming pigs are a common sight in Hubli-Dharwad, India and make an important contribution to household livelihoods and urban food supplies. Policy measures, however, are threatening the legality of keeping livestock in urban areas and, therefore, livestock owners' livelihoods. This article gives more insight in this discussion.

Organisation for Economic Co-operation and Development (OECD) **(1998). Popular urban economy at the heart of the economy and of urban society. In: Club du Sahel: the Bulletin no. 18 (March 1998) p. 3. Organisation for Economic Co-operation and Development (OECD), 2, rue André-Pascal, 75775 Paris Cedex 16, France**

economic impact rural-urban linkages
Sikasso; Mali; San Pedro; Ivory Coast; added value; employment; informal economy

The modern sector of an urban economy provides a significant portion of the added value. Most jobs, however, are created by the popular urban economy sector which

is based on meeting basic needs. (WB - based on original abstract)

Ouedraogo, S; Zoundi, SJ **(1999). Approvisonnement de la ville de Ougadougou en poulets de chair. In: Agriculture urbaine en Afrique de l'Ouest: une contribution à la sécurité alimentaire et à l'assainissement des villes = Urban agriculture in West Africa: contributing to food security and urban sanitation / Olanrewaju B. Smith (ed.), p. 67-82. Natural Resources Management and Production System Department**

services food security and nutrition rural-urban linkages
poultry production; meat supply; economic aspects; employment

The contribution of modern producers to the urban meat supply system is low. Traditional producers are the main suppliers to the city. Most production comes form a range of 10 to 200 km from Ougadougou. (NB)

Parkinson, J. and Tayler, K. **(2001) Sanitation and wastewater Management in Periurban Areas: Opportunities and Constraints in Developing Countries.**

rural-urban linkages waste recycling wastewater reuse
waste recycling; Ghana; irrigation; decentralisation

The paper is concerned with the options for improved sanitation and wastewater management in periurban areas in developing countries, bearing in mind the fact that much of the wastewater produced in urban and periurban areas is already used, directly or indirectly, for irrigation, almost always without treatment. Options for reducing the strength of wastewater by either separating excreta from sullage water or treating wastewater to reduce its strength are explored. The focus is on the potential advantages of decentralised management, including compatibility with decentralised approaches to urban management and reuse needs, particularly those of the periurban poor, reduced costs and increased agricultural productivity. It appears that suitable technologies for decentralised treatment are available but that other barriers to the wider adoption of decentralised approaches exist. These include lack of finance, and suitable land, deficiencies in knowledge and skills and the inflexibility of official design standards. A key constraint is the limited demand for improved wastewater management. The challenge for activists and planners is to create informed demand for improved systems, focusing not only on health but also on the improvements in the local environment and household finances that may be achieved through improved wastewater management.

Plastow, John and Pantuliano, Sara. **(2001) Experimenting with PIM: the ACORD Sudan Urban-Rural Linkages Programme Experience of Adapting Participatory Impact Monitoring. Paper for the workshop "Appropriate Methodologies for Urban Agriculture", October 2001, Nairobi, Kenya. Proceedings, available On: www.ruaf.org.**

R&D Methodology rural-urban linkages

participatory monitoring; Sudan; migration;

This paper explores the way in which ACORD programmes in the Horn of Africa have adapted the GTZ inspired Participatory Impact Monitoring (PIM) to their working environments. It begins with an introduction to the methodology and the ways in which it was introduced to non-literate communities. Thereafter the paper explores the results and lessons learnt from a twenty-month action research in the use of PIM with the Urban-Rural Linkages Programme and three of its partner CBOs from amongst the Beja people of Eastern Sudan.

Pretty, Jules; Altieri Miguel **(1999). Best practices in land resources management to achieve sustainable food cycles. CGIAR CSD 8 Dialogue Paper No. 3.**
land use planning rural-urban linkages food security and nutrition
sustainable agriculture; environment; policy

This paper, prepared for the UN Commission on Sustainable Development, presents an approach to accelerating the trend to sustainable agriculture. It notes that although there has been increasing informal activity in the field only three countries have given explicit national support (Austria, Cuba and Switzerland). Sustainable agriculture is presented a multi-functional within urban and rural landscapes and economies (food and other goods, clean water, carbon sequestering, flood protection, environment for living, biodiversity). Four options for change are presented to the CSD: (i) better use of renewable resources, (ii) intensification of production, (iii) diversification of the agroecosystem, (iv) better use of non-renewable inputs. Institutions are urged to concentrate on process over product and to aim for win, win, win outcomes. (JS)

Rabinovitch, Jonas **(1998). Final summary report international workshop on rural-urban linkages, Curitiba, Brazil, 10-13 March 1998. 5 p. MDGD/BDP United Nations Development Programme**
rural-urban linkages R&D methodology
development policies; periurban agriculture

Reports on a UNDP-sponsored workshop. Main conclusions were: (1) rural-urban linkages add a crucial spatial dimension to understanding key development issues and formulating effective policies and programmes to address them; (2) ensuring reciprocal benefits from rural-urban linkages requires a localisation of planning and management capacities to assess rural-urban linkages issues and devise appropriate initiatives; (3) the conventional view of rural as equivalent to agriculture is no longer reflective of the reality of either rural regions or the rural component of rural-urban linkages. One of the recommendations of the workshop was for UNDP to set up a clearinghouse for the development of a network of members with a common interest in rural-urban linkage issues and policies. (WB)

Rabinovitch, Jonas. **(2001) Key note Paper for the Conference Rural-Urban**

Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.
rural-urban linkages
concepts; policy

This paper is a summary of the report “Rural-Urban Relations: an Emerging Policy Priority” issued by UNDP in December 2000. It further represents the joint efforts of all participants who presented their papers at the Workshop on Rural-Urban Linkages held in Curitiba, Brazil in 1998.

Richter, Juergen; Schnitzler, Wilfried H; Gura, Susanne (eds) **(1995). Vegetable production in periurban areas in the tropics and subtropics: food, income and quality of life. DOK no. 1721 A/a. 160 p. Zentralstelle fuer Ernaehrung und Landwirtschaft (ZEL), German Foundation for International Development (DSE), Wielinger Strasse 52, D-82336 Feldafing, Germany**
horticulture rural-urban linkages
Africa; Asia; Latin America; marketing; plant production; vegetable crops; case studies; Chile; food supply; urban planning; workshops

Urban agriculture is receiving more and more attention as a way to improve livelihood in third-world country cities. Ensuring food supply through boosting food production in rural areas and establishing storage facilities has insufficiently reached the newly established urban masses. A figure to illustrate the upcoming of this new activity: about 200 million urban dwellers in developing countries are now urban farmers, thereby providing food to about 700 million people. Also to be considered is the aspect of food quality: vegetables, a very important produce of urban agriculture, complete the food basket of the urban population. These proceedings primarily address an audience of researchers and policy makers and have for objective to analyse the contribution to food, income and quality of life by urban agriculture. From the conclusions it appears that most European-sponsored urban agriculture projects deal with genetics and breeding of a few species -legumes, potato, tomato- with little attention given to traditional vegetable crops. Most projects are in Africa, probably reflecting priorities of development policies of European countries. As a result of this workshop, a number of preconditions for successful interventions were identified with regard to social participation, resource use, infrastructure, marketing and credit facilities. (WB)

Rivera, J., H. Losada, N. Millar and G. Woodgate **(2001) The Spatial Distribution of Agricultural Activities in the Mountains Southeast of Mexico City. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 Imperial College at Wye, England / Universidad Autonoma Metropolitana**
rural-urban linkages
Mexico; farming systems; agricultural activity; urban agriculture; periurban agriculture; diversification; income generation, America (Central)

Mexico City has a long agriculture history of and in spite of constant industrial growth and urbanisation spaces of agricultural activities continues to be maintained within

its boundaries. Complex agricultural systems have their roots in the pre-Hispanic epoch. Since then they have been modified and adapted with the introduction of metal tools, domestic animals and crops during the Spanish colonial period. The Milpa Alta terrace areas form part of the mountain ranges to the South of the Valley of Mexico. This area is characterised by poor soils and uneven topography. As a consequence of these factors different agricultural production system tends to work independently with distinct practices defined by services and land area utilised.

Surveys and questionnaires were carried out to characterise the agricultural activities. Four agricultural sectors were identified; urban, peri-urban, interface and forest. The criteria for defining this spatial distribution were: a) infrastructure availability, b) market access, c) land tenure systems and, d) farming systems composition.

The high price of the land, its limited availability and the high profitability of agricultural production of the traditional crop nopal-vegetable (Opuntia ficus-indica) have limited the growth of the City, which also stopped the migration of local people. The forest system integrates distinct sub-systems of livestock and crop practices. The interaction of forest, maize and livestock in a relatively small space is the result of the high efficiency of resource management by local people. Each activity is seasonal, but together they provide year round employment and food for local people. Local knowledge and regional cultural values are the key factors that make both the systems work. The lack of detailed knowledge and integration of all the components and concerns over resource exploitation may represent future risks to the continuity of these traditional activities.

Rodrigues, MS; Lopez-Real, JM **(1999). Urban organic wastes, urban health and sustainable urban and periurban agriculture: linking urban and rural by composting. In: Urban agriculture notes, http://www.cityfarmer.org/urbanwastes.html**
Supplier: City Farmer, Canada's Office of Urban Agriculture
waste recycling health and environment rural-urban linkages
organic wastes; waste management; public health; periurban agriculture; horticulture

Looks at waste management systems, and at public health as a result of poor refuse disposal. The paper also examines the absorption capacity of both urban and periurban agriculture of this organic waste. (WB)

Satish Kumar, M. **(2001) Devouring Agglomerations and their Outgrowths in India: Beyond the Rural-Urban Divide. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001. School of Geography, Queen's University Belfast**
rural-urban linkages
India; environment; urbanisation, Asia (South-Central)

The spatial impact of globalisation processes has resulted in new urban forms.

These relate to flexibly specialised, industrial centres, which are deregulated, decentralised and relocated either in the metropolis or the regions adjacent to them. The Extended Metropolitan Region (EMR) is based on the notion that "region-based" as opposed to "city-based" urbanisation processes have resulted in deeper penetration by the metropolis into the surrounding rural hinterland. Such a relation of capital with space has resulted in new forms of capital accumulation, leading the rural inhabitants deeper into the urban way of life. The nature of environmental problems has also changed in cities of different size classes. This is even more true when cities move through a life cycle of growth, change, transformation and eventually stagnation and decline.

This paper attempts to provide a comparative context in which to identify and explain the nature of environmental issues faced by the metropolitan region along with their hinterland or peri-urban region in India within a given agro-climate niche. The question is how do we meet human needs in settlements of all size classes, without depleting essential environmental capital? How do we minimise the transfer of envrionmental costs to the inhabitants and ecosystems surrounding the metropolitan cities? Do we know enough about thesee peri-urban regions to introduce policy interventions at a macro scale? These are some of the questions raised based on the empirical realities of third world urban processes.

Seré, Carlos; Neidhardt, Rainer **(1994). Stadt-Land-Integration im Rahmen periurbaner Tierproduktion. In: Entwicklung + Ländlicher Raum vol. 28 no. 2 p. 10-14**

rural-urban linkages urban livestock services

periurban livestock production; food processing; marketing

Addresses rural-urban linkages as a result of periurban animal husbandry. Contrarily to animal production in developed countries, animal husbandry near cities is very dependent on city waste as a source of animal feed. The nearness of the city allows for a low level of processing of the produce (packaging, quality control, transport, distribution) keeping sales prices low. This paper highlights the close links that exist between the city and its rural hinterland. A number of interesting case studies are presented from West Africa; Lahore, Pakistan; Montevideo, Uruguay; and Lima, Peru. (WB)

Steinberger, M., T. Amado and B. Ferreira Nunes **(2001) The Ecological-Economic Zoning as an Urban-Rural Instrument for Environmental Management: The Case of The Brazilian Amazon. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001. Nucleus of Urban and Regional Studies (NEUR), University of Brasilia**

rural-urban linkages

environmental management; periurban area, Brazil, America (Southern)

The aim of this paper is to investigate the possibility of introducing in the EEZ (Ecological Economic Zoning) the idea of urban space as a mediator of the interface

with the rural world. The argumentation will be done in three parts. First, we present the historical context for EEZ in Brazil and Amazon, highlighting the innovations and difficulties for its elaboration. We suggest that the urban space can contribute to make feasible the innovations and lessen the difficulties. The second point is related to the conceptual-theoretical mark which supports the urban/rural interface, showing that such approach is related to the actors that use the urban space as a meeting point, since it is there that most decision-making is carried out. Finally, as a third point, we stress some preliminary thoughts on actors and actions, drawing upon EEZs documents which are ready - for the states of Amapa, Acre and Rondonia. We got to such thoughts through an analysis of how the urban is presented in these EEZs and how their elaboration process was carried out.

Sumberg, James; Kleih, U **(1994). Fostering the development of periurban agriculture: the case of Port-au-Prince, Haiti. 14 p. School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK**

horticulture rural-urban linkages

Haiti; marketing; plant production; ; vegetable crops

Argues that an analysis of periurban production and marketing systems should go beyond a singular concern with the producer and consider a wide set of issues. The case of vegetable production and marketing around Port-au-Prince, Haiti, is used to briefly explore some of these issues. Vegetable production and marketing in Port-au-Prince is well established, significant in quantity and value and generating income. Public sector research and extension contribute little to the development of the sector while market opportunities, input Suppliers, farmer organisations and innovative farmers provide the stimulus for technical change. The main areas of concern are presented, among others: reduced turnover, low purchasing power of consumers, transport (costs and infrastructure), poor sanitary conditions and fluctuation in market prices. (NB)

Sumberg, James **(1996). Livestock production in periurban areas of Africa: an analysis of Dar es Salaam, Mwanza and Shinyanga, Tanzania. 79 p. Overseas Development Group, School of Development Studies, University of East Anglia, Norwich NR4 7TJ, UK**

urban livestock R&D methodology rural-urban linkages

animal husbandry; periurban livestock production; political aspects; food security

Describes and characterises livestock production in and around urban areas in Tanzania, focusing specifically on dairy, broiler and egg production. Contains a bibliography with nearly 450 references. The enclosed paper critically examines the large number of publications extolling virtues of urban agriculture for urban food security and poverty reduction. The authors stress the importance of rural-urban linkages in resource and output markets. At the same time, they issue a warning against attaching an exaggerated weight to the contribution of urban farming to food security of the majority of urban dwellers. Very detailed, very sound and very complete. (WB)

Swanepoel, Frans **(1996). Improved quality of life. 2 p. Foundation for Research Development (FRD), PO Box 2600, Pretoria 0001, South Africa**
R&D methodology rural-urban linkages
South Africa; development programmes

One third of South Africans have an income less than the accepted minimum subsistence level. More than 70% of these are based in rural areas. The Foundation for Research Development proposes a number of programmes to improve this situation, notably a food production and food security programme, both in rural, periurban and urban settings, and a rural and urban development programme, focusing on infrastructure and creating job opportunities. Principles and mechanisms underlying these programmes are elaborated upon. (WB)

Tacoli, C. **(2001) Livelihoods Impacts and Strategies of the Periurban Poor. Key note Paper for the Conference Rural-Urban Encounters: Managing the Environment of the Periurban interface, London 9-10 November 2001.**
rural-urban linkages
livelihoods; periurban

Livelihoods in the periurban interface are affected by transformations in land-use and by changing employment patters. Some groups benefit from new opportunities and develop accumulation strategies, while emerging constraints can force vulnerable groups with limited assets to rely on survival strategies. This paper describes main elements of changing farming systems in response to urbanisation from a livelihoods perspective.

Tegegne A., Tadesse, M., Mekasha, Y. and Yami, A. **(2000) Market-oriented Urban and Periurban Dairy Production Systems in Ethiopia. In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**
urban livestock rural-urban linkages R&D methodology
Ethiopia; farming systems; dairy; markets

The case study was designed to characterise the market-oriented urban and periurban dairy production systems in the Addis Ababa milk shed in Ethiopia. Seven sub-systems identified include traditional crop/livestock farms in rural areas, intensified dairy/crop livestock farms in rural areas, crop/livestock farms with intensive cropping in the Addis Ababa milk shed, specialized dairy farms, periurban producers in secondary towns, intra-urban dairy farms in Addis Ababa and urban dairy producers in secondary towns. It appears that cash income from sales of milk and milk products and/or young stock and breeding animals and utilisation of available resources such as capital, land, labor, etc are the most important reasons for keeping dairy animals. However, as the level of intensification increases, factors such as management skills, labour force, feeding resources and systems, genetic

improvement, control of diseases and parasites, udder health and mastitis, calf mortality, reproductive problems, waste management, quality control, processing and marketing and other socio-economic considerations are becoming important in influencing these urban and periurban dairy production systems.

Torres Lima, Pablo A **(1991). El campesinado en la estructura urbana: el caso de Milpa Alta. 131 p. ISBN 970_620_023_1. Universidad Autónoma Metropolitana, Xochimilco, Mexico**

community development rural-urban linkages R&D methodology Mexico

Describes the case of farmers in a commmunity that has provided a megacity with food while maintaining much of its traditional, rural, social tissue. The analysis examines various facors: natural resources in the region, type of population, structure of the labour force, land use, and socio-economic relations. (WB)

Touré Fall S., Salam Fall, A., Cisse, Ibrahima **(2000) Urban livestock systems in the Niayes zones in Senegal . In: *Urban Agriculture Magazine*, no 2, urban livestock, October 2000, RUAF, Leusden The Netherlands.**

urban livestock rural-urban linkages

urban livestock; production systems; Niayes; Senegal

In association with horticulture, livestock is one of the major activities well implemented in the urban agriculture system of the Niayes zone in Senegal. The area involves the main agricultural cities which generate more than two third of vegetable and fruit productions in Senegal. A low number of different species of domesticated animals live in the Niayes zone. A great diversity is observed in speculations but also huge potentialities that can be exploited in the Niayes. In association with livestock, urban agriculture is well implemented in towns even if multiple constraints make its sustainability questionable.Different types of waste recycling through animal feeding systems and, in feedback, organic matter utilization for improvement of soil status and animal traction are main ways of Livestock and horticulture integration in the system. Institutional constraints are observed that call for actions to improve economical environment.

Wandeler, K. de **(2001), The Unbounded Periphery: The Never-Ending Story of a Bangkok Soi. Paper prepared for the DPU International Conference: Rural-Urban Encounters: Managing the Environment of the Peri-Urban Interface, London 9-10 November 2001 CHORA Research and Consultancy**

rural-urban linkages

periurban area; urban fringe; urban construction, Asia (South-Eastern), Thailand,

In this paper, I (the writer) view the urban edge as a site where urban and rural life-worlds mesh. The process of developing urban frontier land draws on that constant shifting of actual and inverted realities and generates dynamics that exceed the

confines of rural-urban interaction. To support this argument, I draw on a study of soi, a dominant type of side-street neighbourhood that characterises urban expansion in Bangkok. I first describe what kind of a life-world these dwelling environments offer and then reconstruct how that life-world came about.

The predominant pattern of urban expansion in Bangkok follows the city's major transportation arteries and penetrates their hinterland thhrough soi, side-streets that stretch over several kilometers or ramify into an outgrowth of sub-soi. Soi are important carriers for the expansion of the city but to most city dwellers, they remain blind spots in the overall image of the city. And yet, in-depth research conducted in a soi neighbourhood in the northern expansion area of Bangkok suggests that contemporary soi are a concatenation of 'practised places' where a variety of city dwellers establish linkages between their everyday practices and the city.

The officially recorded history of this area began when title deeds were first allocated in 1902. By reconstructing how the fragmentation of property holdings meshed with changes in land use and shifts in the trajectories of inhabitants, a social history of the soi emerges. It reveals that soi neighbourhoods were not only context-driven, but also context-generative environments. Their inhabitants helped to create contexts that exceeded the material and conceptual boundaries of their neighbourhood and thereby significantly contributed to the reproduction of urbanness.

This case study suggests that the peri-urban interface draws its extraordinary dynamism not only from uniqueness of its geographical setting, but maybe even more from the imageries that this locality sets off in the minds of those involved in its conversion.

Weise K., Boyd, I. **(2001) Madhyapur Thimi Municipality, Nepal Urban Agriculture Support Programme Integration of urban agriculture in planning. In: *Urban Agriculture Magazine*, no 4, Urban Planning, July 2001, RUAF, Leusden The Netherlands.**

land use planning rural-urban linkages
zoning; Nepal

This article deals with land and other aspects of integration of urban agriculture into the land-use planning of Madhyapur Thimi municipality located in the centre of Kathmandu Valley in Nepal. Traditionally, municipalities in the country are defined on the basis of (the accumulation of) non-farm activities with agriculture considered a rural activity. This is one constraint confronted by efforts to promote urban agriculture. How this problem was overcome together with issues of land development strategy is narrated in the article.

You, Nicolas **(1981). Alternative strategies in urban development: some Chinese experiments in a quest for agrapolitan space. In: Third World Planning Review vol. 3 no. 1 (Feb 1981) p. 77-93**

land use planning community development rural-urban linkages
China; community initiatives; land use planning; rural-urban linkages

Gives a detailed account of land use planning in China since the era of the Han Dynasty up to our days. Rural-urban linkages have always been strong in China, urban dwellers maintaining close links with their ancestral home village. Since the 1950s, the relationship between city and countryside has known different levels of appreciation, but bringing the two closer together was always an overriding aim: 'urbanise the countryside, and ruralise the city'. This article provides interesting background reading and is very revealing about policy considerations of Chinese officials. (WB)

3.7 Extension Services for Urban and Periurban agriculture

Facilitator in interaction with locals concerning traditional medicine

Photo by the Foundation for the revitalisisation of local health traditions, Bangalore India

Extension Services for Urban and Periurban agriculture

November 2002

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Formal agricultural extension services in urban agriculture are extremely limited to not existent. In most developing countries all over the world, traditionally the extension services serve the rural farmers in staple food production. Periurban agriculture is sometimes an exception because rural extension delivers services to periurban farmer, especially regarding intensive livestock production and intensive horticulture.

Concepts for agricultural extension in the urban environment are missing due to the fact that „real agriculture“ was thought to take place in the rural sector only. Home gardening as an important part of the urban micro farming system was completely neglected in the past not only in the urban but also in periurban and rural areas. Nevertheless there is a great demand and need for extension and advice, especially in the highly sensitive sector of leafy vegetable production. For the welfare of the people it would be advantageous to increase the output of such gardens.

Urban agriculture is hardly ever recognized as being an important subject to agricultural extension. In those cases where urban dwellers have access to agriculture extension services, women's involvement has been widely ignored. Urban extension programs need to be specifically targeted to women farmers ensuring fair proportional access to women, particularly poor, women-headed households.

Through training, educational programming, communication and community organization, urban-based extension services can help urban and periurban agriculture farmers select appropriate crops, schedule production, improve harvesting techniques and reduce post-harvest losses, while ensuring that adequate attention is paid to food safety throughout the food chain (FAO 2001). Extension services can also help to bookkeeping of inputs and outputs, and credit.

In order to get familiar with the new environment and different technical and social context of urban and periurban agriculture the training of extension staff who will be called to work in this new context is an important activity to be promoted. Basically agro-technological issues in urban and periurban areas do not vary much from what is proposed to rural small-scale farmers. Nevertheless there are differences regarding scale of production, type of crops grown, and proximity to services and markets (FAO 2001). Sometimes, urban farming settings differ from periurban and rural, especially with regard to community involvement. Urban farmers, if organized in communities or associations, are much easier to reach as their counterparts in periurban or rural areas. In reality this is rarely observed and agricultural activities in cities are often individualistic enterprises. This underpins the importance for strengthening farming communities, both in urban and periurban areas.

In some regions, urban and periurban agriculture are market- and, sometimes export oriented. The most important requirement for export crops is quality, which in turn requires a high production standard. Farmers cultivating such crops must have the capacity and ability to use advanced agro-technology in the production process. Traditional farmers, willing to enter export markets, therefore, have to learn how to use advanced agro-technologies (Katzir 2002).

Extension methodologies in the past mainly followed the top down approach. In this approach the researchers developed technological packages based on increased yields without due consideration to the farmers (males and females) responsible for resource allocation at the household level.

In the recent past, extension has tended to shift towards privatisation. It is still a debatable issue whether the poorer farmers can pay for extension services or not in the developing countries. Most governments have tended to follow the condition set by the World Bank and other donor agencies to privatise extension service provision (Rivera et al 2000). But the justification of the "legacy" of urban agriculture is often based on supporting the livelihood of the urban poor or the underprivileged. These people cannot afford to pay for extension services. Their most important priority is to meet their daily basic requirement.

What are training and extension needs in urban and periurban agriculture[8]?

1. ***Land use and tenure issues***. How to integrated urban and periurban agriculture in land use plans, how to increase and secure farmers access to land and water, understanding of tenure arrangements and other legal issues, how to deal with the shifting urban frontier in the periurban zone; proper location of agricultural zones in relation to sources of pollution of water, soils and vegetation, zonification of various types of UA etc. (Drescher 2001). One main role of participatory extension could be assistance to community strengthening to better enable urban and periurban farmers to fight for their interest.
2. ***Food safety, nutrition, and health issues***. Nutritional impacts, sanitary monitoring, how to mitigate effectively the health risks of crop and livestock farming. An FAO training package, **"Improving Nutrition Through Home Gardening"** is designed for the instruction of agricultural extension, home economics and community development agents working with households and communities in Southeast Asia to promote home gardening for better nutrition. A new edition for the African continent has just be released (FAO 2001a). Extension workers can make a major contribution to improving food security and nutrition in urban areas by targeting food insecure households, promoting production of the foods required for a balanced diet year round and collaborating with relevant colleagues to ultimately ensure appropriate consumption of safe foods (FAO 2001). This could substantially minimise health risks during food production, processing and marketing.

[8] The extension needs are partly derived from Jacobi (2000) and Mushamba (2001) with additions by Drescher

3. ***Agronomic issues****.* Optimisation of farming systems by development of technology well adapted to the urban environment, ecological farming practices, safe/ efficient use of available resources including wastes and water (including waste water re-use), how to lower health risks e.g. by adequate crop choice and management practices; how to prevent erosion, damages to existing vegetation, contamination of ground water with agro-chemicals etc. Information on "Integrated Nutrient Management" and "Integrated Production and Pest Management", IPP (FAO 2001). Training on safe use of agro-chemicals for both suppliers and farmers. With respect to the health of the consumers and environmental impacts the use of pesticides in intra-urban agriculture is not at all desirable (Drescher 1996).

4. ***Marketing Issues*** Knowledge of markets and prices, adequate marketing techniques and channels, producer – consumer linkages and alternative food distribution systems, eco-products and eco-inputs production, certification, and micro-enterprise development. Horticulture, for example, has expanded in and around cities of many developing countries as an informal activity practiced by urban poor due to the closeness of the production sites to the markets (FAO, 1999). Aside of the production aspect, business opportunities in urban agriculture may also consist of ecological services (Holmer 2001). Extension services can facilitate the three-way flow of information, thus helping producers to know what consumers want and need (FAO 2001), mediate other market information as well as government regulations for example regarding food safety issues.

5. ***Environmental issues****.* Proper location of agricultural sites in relation to sources of air, water and soil pollution, bio remediation, how to reduce the use of drinking water for irrigation, how to organise decentralised and safe systems of waste collection, composting and re-use oriented systems of waste water treatment. Cities take in natural resources, process them, and in some way or the other create pollution. These open-loop polluting systems of the city can be closed through improved municipal solid waste systems in connection with urban agricultural activities (Holmer 2001).

6. ***Methodological issues****.* Participatory extension and technology development methods, rapid appraisal methods, impact monitoring and evaluation, multi-stakeholder analysis and planning, early implementation, gender issues, use of GIS etc.

7. ***Rural Urban linkages****.* Competition, exchange, complementarily between rural and urban components of the food production and distribution system, nutrient recycling etc. Extension services, well informed on rural agriculture can facilitate the information flow between these areas and help to identify the different needs and opportunities of farmers in all areas. For example, many urban livestock keepers are dependent on periurban or rural animal feed. This is a significant linkage between the different areas but often not sufficiently explored.

Who needs training?

Target groups for training on urban and periurban agriculture may include:

- agricultural extensionists;

- nutritionists; health workers
- urban and periurban small scale farmers (males, females, children)
- associated enterprises e.g. in input supply, processing and marketing
- consumers
- support providing institutions e.g. GOs, NGOs, donors and financial institutions, extension services;
- policy and decision-makers;
- institutions with legal functions, and
- planning authorities

Gender aspects of urban and periurban agricultural extension

In urban and periurban agriculture, the roles and access to resources vary according to sex. In many cities of Africa there are more women cultivating than men. Men and women tend to have different but often complimentary roles and perspectives in urban agriculture. This fact must of course be taken into consideration in the design of urban extension messages and approaches.

In 2000, Slater, in her studies in South Africa observed that women practicing urban agriculture formed social networks. These networks were used for sharing of ideas and as security against abuse (Slater 2000). The extension workers in this case were women and discussed women issues from different angles freely.

Distance to training sites, lack of transportation and child care facilities, unfamiliar jargon, and male trainer bias in workshops and training programmes have kept women farmers from participating. To increase the number of female beneficiaries receiving agricultural extension services, the number of female agricultural extensionists working in the field must increase.

In Lusaka district and the Lusaka Province of Zambia, there are more women extension workers in leading positions. However, it is not clear whether the filling of these positions were by design or merely a coincidence. During a recent farmer extension review meeting held in Lusaka, Farmers indicated that female extension workers were more reliable and good at keeping appointments than their male counterparts. In addition to the facts mentioned above, female extension workers are good at demonstrations such as food preparation and preservation. This is especially important with regards to nutritional aspects of urban agriculture and household food security[9].

In urban settings, labour division between gender shows different pattern than in rural areas. More men are involved in non-agricultural business, while women (especially in Africa and Asia) are often involved in street-food vending and informal vegetable and fruit marketing (either in the street or direct marketing). Street marketing is a crucial issue in many countries, and harassment by police and officials is frequently happening. Educational advertising

[9] and [3] Personal Communication from Paul Muwowo, Extension Methodologist, Ministry of Agriculture, Lusaka, Zambia.

regarding urban livelihood strategies is needed in this context and can be supported by urban extension staff.

Institutions and extension dynamics

There is a growing acceptance that state monopoly of agricultural extension service delivery is neither desirable nor sustainable (Rivera et al. 2000). There are a number of other institutions that provide extension today. These include Non Governmental Organisations (NGO), Community Based Organisations (CBOs) and the Private Sector. All the above sectors work to serve different categories of people in the society. According to Rivera et al. (2000) and Ashworth (1999), there are a number of advantages and disadvantages in private extension service provision. The commercial private sector can be more market oriented, more efficient due to profit incentives, allows the public sector to allocate resources to core functions while at the same time they have weak linkages with research. In most cases they have an agenda, which may be different to Government policy and pay little or no attention to environmental issues. Women, poverty groups and minority needs for extension services are usually neglected. The public sector on the other hand is more “in-tune” with Government policies, has greater concern for the environment, .. is more development and socially oriented, and pays more attention to the poor and poverty reduction. The most common shortcomings of public extension include bureaucracy, comparatively unresponsive to client priorities and lack of client .. focus. There is little relationship between performance and income with focus on controlling inputs rather than archiving outputs and goals. Management does not willingly take note of or act on advice and experience from lower level staff (Muwowo 2002)[10] .

As indicated above, it is possible to split the urban farmers into two categories, i.e. those able and willing to pay for extension services and the vulnerable groups. The former can be taken care of by the private sector while the government has the responsibility to help the poor, reduce poverty and improve the livelihood of the urban poor (either directly or through cooperation with NGOs and community based organisations).

Universities and Agriculture Colleges have a very important role in the development of appropriate technologies in cooperation with the urban farmers and support organisations. Universities should pay more attention to action research as opposed to contract research. The former takes a longer time and creates an enabling environment for stakeholder participation and development of extension staff skills (Muwowo 2001). There is need for the universities to work together with service providers and at the same time there is need for service providers to harmonise their service provision. Establishment of networks among stakeholders would greatly enhance service delivery and interaction among stakeholders and the target group (urban farmers). Analysing and strengthening existing informal linkages between various categories of urban producers, small and medium size enterprises (input delivery services, small scale processing industries, marketing services, etc.) and other stakeholders (moneylenders, local officers, land owners, etc.) has not been sufficiently taken into consideration in the past. All these form part of the well functioning of the urban food system and could be promoted by research and extension.

Extension methodologies and requirements

Depending on the specific setting in a given city, methodologies and requirements for training differ. Demonstration plots within urban and periurban areas improve the access to the urban farming community. Such plots could be community or allotment gardens, school gardens, or training gardens based in colleges or universities. These areas offer opportunities to organize ***farmers field days*.** The main objectives of field days are to show how successful a technology/farming practice or cultivars have performed. This approach was and is still very popular among the rural farmers in Africa. Community gardens offer excellent multiplier capacities for participatory training and learning from each other. Observations during a past FAO/UNESCO school garden program showed a clear multiplier effect of school gardens on the establishment of home gardens. An average of 10 home gardens can be the positive result of one school garden (FAO 1974).

Farmers field school (FFS) is a group based extension approach which has worked well in the rural communities and . communities where kinship is very strong. Farmer field school is based on the participatory learning approach principle. It has been stated that *"nobody knows nothing and nobody knows everything"*. In this type of extension approach, both the experts/extensionists and farmers learn from the "School". The experts come with their technical and expert knowledge on their area of specialization while the farmers come with a wealth of experience and problems encountered in their agricultural activities.

Participatory Training and Extension (PT&E) is a training and extension approach that is based on a participatory analysis of the constraints and opportunities and based on the outcome of this analysis the introduction of new and appropriate technologies. Group based extension and training activities that enhance farmers' capacities and skills, as well as capacity building of the staff involved in the extension activities go hand in hand. For example, PT&E has been used as . a tool to reach the goal of improved Farmers' Water Management (FAO 2001).

The provision of information systems translated into farmers' language, including capacity building in marketing/business and the documentation of indigenous knowledge of urban and periurban agriculture (Drechsel & Kunze 1999) can well be integrated and partly be derived from FFS.

"Ward Profiles": Basic information for extension services can be obtained through the elaboration of so-called "ward profiles", which is a participatory method in assessing agricultural activities. This tool was introduced in the Urban Vegetable Promotion Project in Dar es Salaam to indicate entry points for extension officers to offer services to urban farmers and assess the agricultural potential of their ward. In the process all urban agriculture related activities practised in the area, services and potential links (e.g. credit-providing NGOs and input shops) relevant to improve the service delivery in the site to urban farmers are indicated. The ward profile has been used to monitor changes in agricultural land use through periodic updates (Jacobi & Kiango 2001). Participatory approaches need to come to terms with the very wide range of stakeholders present in the urban context with different and competing interests. Stakeholder analysis emerges as an absolutely key tool and starting point, whether we are pursuing research, planning or local development goals. It is very usefully applied to understanding the different kinds and styles of farmers and gardeners involved in urban and periurban agriculture, which in turn will help to target likely partners in participatory technology development and interventions to support micro-

enterprises. This differentiation is also important for identifying particular groups in which non-sustainable practices affecting health and the environment and in urgent need of attention. In fact, a clear conclusion is that in the context of urban agriculture, there should be intensive, participatory stakeholder consultations ahead of any interventions (RUAF 2002).

Information and Communication Technologies (ICT)

Telelearning – distant learning: Information and Communication Technologies (**ICT**) have become a driving force in both the industrialised and in many developing countries. The new emerging telelearning-systems linked to the existing traditional education and training institutions offer great opportunities for information transfer and sharing. In order to facilitate this trend further the World Bank just launched the "Global Distance Learning Network" and the "Global Development Learning Network" and among those the for example the African Virtual University (http://www.avu.org/) (GDLN 2002). It would be useful to start thinking on how to make efficient use of these existing structures for the purpose of UPA – extension. Radio, television, Internet and E-mail are instruments to be used in this kind of learning and information sharing process.

Radio and Television: In most countries, especially in Africa, Radio and Television stations have special programmes that address specific areas of Agricultural development. All these programmes target the rural population for agricultural production. The radio/television programmes could have three types of design, namely the expert subject specific presentation, phone-in programme, and group radio approach. The first will allow expert to discuss specific issues related to best agricultural practices, cultivars and related topics while the second will allow the interaction between the experts and the actual and potential urban and periurban farmers to ask specific questions to the experts on the live radio programme presentation[11]. Group radio approaches proved to be more efficient for learning and sharing of information, than single radio listening. Groups can be formed on both ends, in the studio and on the receiving sites.

Internet and E-mail: *Internet and E-mail, have been generally been accepted as the modern and fastest way of communication and updating information. There are many virtual resources centres on the Internet, providing information on a wide range of topics. Nevertheless restricted access to these resources in developing countries are limiting these opportunities.*

E-mails have been used as a most efficient and cost effective means of communication and in the recent past e-conferences have been successfully conducted bringing together a wide range of people with diverse backgrounds to discuss different issues.

The Internet offers great opportunities for information provision for the better off market oriented urban and periurban farmers, for example for agronomic aspects like crop water requirements, water management issues, but also for latest market information.

[11] Personal Communication from Paul Muwowo, Extension Methodologist, Ministry of Agriculture, Lusaka, Zambia.

Extension has not exploited these tools very much. This is probably due to the high costs of telephone calls and computer hardware. The use of CD-Rom could reduce these costs temporarily. There is hope that when costs become favourable, it will be a good and cost effective tool for urban agricultural extension. Extension with e-mail could take two forms, i.e. as a discussion list, which is available and open throughout the year or direct advice requests to the experts or extension officers and experts.

Conclusions

The available literature on urban agriculture **extension** is contradictory in its conclusions. Some sources indicate that urban farmers are highly dynamic and innovative (hydroponics, warehouses, drip irrigation, rooftop farming, reuse of organic wastes and waste water, niche products) due to its closeness to markets and urban consumers, better possibilities for contacts with exporters (flowers, herbs, mushrooms, etc.) and closeness to suppliers of inputs (de Zeeuw, 2002).

Some of the urban farmers are farmers by choice who try out new products and techniques not hindered by the traditions in rural farming. Urban farmers also have the advantage that the head offices of most extension organisations and research institutes are in the cities and interaction with them is easier as soon as access has been obtained.

A major challenge for the coming years is to prepare extension services (be it governmental, municipal, university services, NGOs or private sector) better for providing relevant advice to urban farmers, since most of their knowledge is based on rural experiences and does not necessarily apply in the cities This applies both to the methodologies applied as well as to technical knowledge diffused. Successful rural extension and training methodologies (e.g. the farmer to farmer approach, farmer field schools, participatory technology development) need to be adapted to the urban conditions. The same applies to the technologies that are promoted. The urban setting requires technologies that are ecologically friendly, use little space and highly productive, make use of urban resources such as organic wastes and waste water, can be combined with other functions (e.g. recreation, landscape management, water storage) and result in safe food.

Market information systems need to be adapted to the information needs of urban and periurban farmers. There is growing attention being paid to informal food marketing and distribution systems, and on alternative marketing systems especially related to organically grown food.

Urban small scale enterprises are often overlooked by informal sector programmes and more attention is needed for provision of training, management assistance, credit and marketing information to these micro- and small entrepreneurs (de Zeeuw, 2002).

Bilateral transfer of knowledge between urban and periurban farmers and extension officers is required to understand the urban farmers livelihood strategies, land use system and management strategies properly.

The opportunities offered by new information technologies needs to be more elaborated. Distant- and telelearning approaches offer great opportunities for the urban farming sector.

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