Learning Brief

Livelihoods | Zambia

January 2011

ZARI organizes an exchange visit for farmers to see new good practices in growing maize.

More effective information flow between researchers, extension officers and farmers in Zambia

Lessons learned from the Zambian Agriculture Research Institute (ZARI)

This Learning Brief describes the lessons learned from the INFORNET (Development of an Effective Information Flow Network) project which was carried out by the Zambia Agriculture Research Institute (ZARI) with support from IICD. ZARI is a department within the Ministry of Agriculture and Cooperatives and has its headquarters at Mount Makulu Research Station near the capital Lusaka.

Authors: Davy Simumba, Martine Koopman

The INFORNET project improves the flow of information between researchers, extension workers and farmers by repackaging scientific research reports into relevant and readable agricultural Information Products that help farmers improve their crop production. The project will also improve communication between ZARI headquarters and the rural research stations, which in turn will bring information closer to the farmers and extension workers. These lessons are intended for practitioners in the field as well as organisations that would like to learn from the experiences of this project and implement similar activities.

Most of this brief's content is based on results from monitoring and evaluation exercises that have been performed with the help of the International Institute for Communication and Development (IICD) and the local Monitoring & Evaluation partner Travaillant vers une

Economie Liberale (TEL) in Zambia over the last two years. This M&E system, which was developed by IICD, consists of quantitative and qualitative assessments. Each year, questionnaires are filled in anonymously by the end-users of the project (a representative sample). The answers are then analysed to discover more about end-user profiles, levels of use and satisfaction, and the impact of the project. This process is complemented by periodical Focus Group discussions in the country which are attended by project staff and end-users in order to reflect on the data that has been collected through the questionnaires and discuss successes and challenges relating to the project, and possible solutions.

Context

Agriculture is the key source of income for more than 75% of rural Zambian households, most of which are involved in crop production as their major agricultural activity. At the national level, the agricultural sector has contributed around 18% of Zambia's Gross Domestic Product (GDP) during the last decade. Growth in the sector fluctuated, mainly because of a heavy dependence on seasonal rainfall, poor communication network and low farmer access to improved technologies that are resilient to sudden shocks caused by natural disasters such as drought, crop pests and diseases.

Despite the important contribution this sector makes to household food security and the national economy, it faces a number of challenges in its struggle to increase the productivity. These are not only natural calamities, but factors like agricultural inputs, credit facilities, market access and poor access to agricultural information. Farmers in Zambia are mostly small-scale farmers that produce very low yields. Low-income farmers, who are often illiterate too, tend not to have any access at all to agricultural research information and if they do then these highly technical reports tend to be too scientific for them. The resulting information gap is further increased by the weak links between agricultural researchers and extension agents (both from the Ministry of Agriculture and Cooperatives (MACO), and local NGOs). These factors lead to low adoption of improved new agricultural practices among the small-scale farmers. Consequently, production levels remain very low. Many institutions in the agricultural sector are not cooperating effectively with each other within the sector framework in terms of information sharing and management.

This was why, in 2002, the International Institute for Communication and Development (IICD) organised a Livelihoods Round Table in Siavonga in Zambia specifically for decision-makers from the Agricultural sector. Nineteen organizations were present, from the private sector to representatives of government. One of the Round Table participants was ZARI; a public research institute that conducts demand-driven research in soils and crops to promote sustainable agricultural production in Zambia. Their focus was to address the current obstacles to agricultural production by providing small-scale farmers with better access to relevant information.

A second workshop was held at ZAMCOM Lodge in the capital, Lusaka for potential project coordinators. Initially,

Zambia Profile

Zambia	
Surface Area (sq. km):	752.6 km²
Population:	12.9 million
Life expectancy:	45 years
School enrolment, primary (% gross):	119%
Human development index (UNDP):	150

Source: World Development Indicators database, 2010

Access to communication technologies
per 1,000 people

Mobile subscribers:	280
Internet users:	55,5
Personal computers:	11,2

Source: UN eGovernment survey 2010

Data on the project

Sector:	Livelihoods
Number of users:	110
Number of beneficiaries:	9,000
Target groups:	Researchers, Extension workers, farmers

ZARI experienced some difficulties with formulating the project proposal. Dr. Lemba Nyrenda was an external consultant who helped ZARI develops the project proposal. It took a long time to identify the users and beneficiaries, but after a while it was clear that the main users would be the researchers. The project should support them to carry out better, more relevant research, and publish the results for extension workers and farmers. The proposal process also took much longer because ZARI, being an agricultural research institution, did not fully understand the technology and because ZARI did not understand clearly what IICD expected from them. "I got to know the IICD process better" explained Davy Simumba after attending a Cross Country Learning Event (CCLE) in Uganda in 2003 which was organised by IICD for all of its partners from the Agricultural Livelihoods sector. "It takes a while before you understand the added value of ICT in Agricultural Research. The CCLE gave me inspiration and encouragement. I recognized that others had gone through the same process as well. The CCLE in Uganda helped to finalize the proposal process."

Project Description

After the proposal was approved the "Development of an Effective Information Flow Network (INFORNET) was born. The objectives of the project are:

- To improve the effective communication between researchers, extension workers and small-scale farmers by:
- Giving access to information for farmers (direct or

Farmers at Kanakantapa listen to the ZARI Researcher during the Farmer Field Day.

indirectly via stakeholders like extension workers)
- Providing an appropriate format and relevant content for farmers
- Including feedback from farmers and stakeholders to improve research and Information Products
- Share information between researchers of different research stations

ZARI does not have the ability to interact with farmers directly outside sporadic field demonstrations and tests. Therefore, ZARI should explore different channels to reach out to farmers in a different way, for example; via the extension services.

The project would contain five different steps:

- An information needs assessment
- Procurement of hardware
- Mainstreaming of information management in the organisation
- Developing and disseminating content
- Sharing information about the project with other stakeholders.

The first step was to conduct an information needs assessment. This research was conducted among extension providers and small-scale farmers in two districts in Zambia: in Kasama (in the Northern part of the country, a 12-hour drive from capital city, Lusaka) and in Kafue (45 km south of Lusaka). Specific information about the catchment area was collected through consultations at district level, institutional mapping and through household interviews (75 in each camp). The two districts were chosen, because of a distinctive climate difference between the two and therefore different crop production processes and experiences. In Kasama, which has a higher level of rainfall, corn, cassava and beans are the main crops and in Kafue corn is the main crop. In each district, two camps (smallest unit of a district for extension services) were selected. One camp had relatively high productivity levels while the other showed relatively low productivity. The needs assessment addressed three key questions:

- What is relevant information for extension workers and farmers?
- What content should Information Products include?
- What are the current major sources of information for extension workers and farmers?

The profile that came out of the needs assessment was also relevant for the design of the project. Most farmer households had either low levels of education or no education at all and were illiterate, especially households led by women. The suitability of materials for illiterate people would be very relevant. Most farmers agreed that it was vital to have access to information such as improved crop production, information about fertilizers, and disease control information. One big difference between the districts was that, in Kasama, 95% of land preparation was still done manually, while in Kafue most farmers used animal draught power.

Before the project started the main source of information for farmers were the extension workers from the Ministry of Agriculture (MACO), but community-based organisations (CBOs) like farmer associations, cooperatives, women's groups and youth organisations play a role as well. In Kasama, Community Information Centres now exist that worked well to distribute printed agricultural information. In both districts, the farmers are highly organised, which could help to target farmer associations in the distribution strategy. ZARI had centred their research around four thematic areas: crop improvement and agronomy, soil and water management, plant protection and quarantine, and farming systems. The INFORNET project would focus on improving access to information for farmers in these four themes to increase agricultural production and productivity levels.

INFORNET commenced in two places and these places are: (1) Misamfu Research Station in Kasama and (2) Mount Makulu Research Station (near Lusaka). At the start it was already clear that a lot of information was being generated

at Mount Makulu but that it was not being shared effectively with other research stations. Equally remote research stations have generated a lot of information which does not reach headquarters at Mount Makulu.

The second step was the procurement of the equipment. This had to be done through the procurement system of MACO, under which ZARI falls. They were not used to buying major ICT equipment. The specifications for equipment, which were worked out in collaboration with IICD and a local consultant, were not met by the procurement system. "We knew which models were good, but we struggled with the government procurement system which forced us to buy different brands of equipment". ZARI ended up with equipment that was more expensive than it had originally budgeted for, yet with lower specifications. For example, computers procured under the project started giving problems with the monitors barely four months after purchase. One of the reasons afterwards was that the Permanent Secretary (PS) was informed too late in the process. This could have made a difference and helped avoid a power struggle between Procurement and the Supplies Unit (PSU).

Capacity building was also a major cornerstone of the project. The first step was to build the capacity of the Project Implementation Team (PIT). One of the workshops in 2007 looked at: "How to use ICT in Research". This training course focused on how to go about publishing scientific information. Advanced word-processing skills and spreadsheets to improve the utilization of functionality was part of it. "We also did not know much about PDF files and how to simplify research reports and boil them down into information products, yet now we are able to publish electronic booklets and articles that are much easier to access," according to one of the participants. There are many kinds of information products ranging from agricultural publications, various reports, brochures, flyers, maps, picture stories, videos, slides, posters, TV broadcasts, radio broadcasts, newsletters, etc. The electronic publications are much cheaper than the hardcover books ZARI used to print. The Capacity Building component was initially too heavily focused on the Project Implementation Team and not enough on the researchers. "We underestimated the difficulties scientific researchers had to produce simple documents instead of scientific research publications and also their ability to share knowledge in general" explained one of the Project Implementation Team members. This was addressed later on in the project, whereby researchers from other research stations were involved in capacity building. A two-day workshop was organised at the ColdReed Training Centre in Lusaka with Programme Officers and selected researchers.

Stakeholder meetings between researchers and extension workers were set up to raise more awareness in the researchers about the type of information products that are needed for the extension workers. This gradually helped to improve the quality. Different training sessions were conducted on a variety of topics, from "web design to maintenance and trouble-shooting". Not only for people from the two research stations, but also for staff from other research stations. At the moment, ZARI has developed around 150 Information Products, although not all of them have been published on the website. ZARI, through the project, eventually realised the importance of collaboration and asked IICD to fund one of the key stakeholders the

A staff member of Misamfu Research Station works in the Internet Resource Centre.

"We did not know how to simplify research reports and boil them down into information products, yet now we are able to publish electronic booklets and articles that are much easier to access."

National Agricultural Information Services (NAIS). NAIS uses radio, TV and other multi-media to reach farmers. Today ZARI is collaborating more effectively with NAIS to reach farmers.

Very soon after starting the project it was clear that a paradigm shift was needed from a supply model of scientific research publications to a more demand-driven model to provide access to relevant Information Products for farmers and extension workers. That means that the information flow within ZARI had to be improved from scientific reports only, into more accessible Information Products for extension workers and farmers. That could be done by improving communication between research stations and the Project Implementation Team. First, the focus was on developing and producing the Information Products, before the distribution to others could be improved. The project has achieved an improved communication flow between headquarters and the research stations. A good example of this can be found in the following story: "The Permanent Secretary (PS) requested a concept note about setting up a bio-fertilizer plant in Zambia and gave us only 2 days to complete it. The document required input from the Microbiology Officer at Misamfu Research Station (a 12-hour car drive from Lusaka). We were able to scan and email it, so that he could send his remarks back to Lusaka the very next day. The 13-page concept note was delivered to the PS within the requested 48-hour time-limit, where usually this would have taken several weeks to process".

Project sustainability

ZARI has invested outside IICD funding in ICT for the other research stations. At the start of the IICD-funded project, only Mount Makulu had a few computers. There was only one computer connected to the internet via a dial-up connection and researchers had to write messages on paper and give them to the Programmes Officers' Secretary to email. The Secretary would later print incoming emails and give them to respective researchers. There are now more than 60 computers at ZARI headquarters alone, all of which are connected to the internet via a Local Area Network (LAN). Meanwhile, all nine research stations have at least two computers with internet access. There was no budget code for internet connectivity in the Ministry of Agriculture and Cooperatives but, through the project, this has been added. Most research stations have been able to procure more computers.

The turning point for ZARI regarding ICTs was the grant that it received from the Melinda and Bill Gates Foundation which would not have been possible otherwise. Researchers in the Soils and Water Management Division have been able to successfully put up a project proposal because of access to various scientific literatures on the internet. The exchange of prompt information with donors was made possible because of the availability of ICTs at Mount Makulu brought about by the project. Management had already started to incorporate ICT and internet access within the ZARI budget in 2008, but 2009 was the moment they realised they could not work without ICTs anymore.

There are a number of opportunities which have come about in ZARI as a result of this IICD-supported project. For example, ZARI has been identified as a focal point institution for the Southern African Development Community – Implementation and Coordination of Agricultural Research and Training (SADC-ICART) Project in Zambia as well as Strengthening Capacity for Agricultural Research & Development in Africa (SCARDA) under the Forum for Agriculture Research in Africa (FARA).

Zambia has also participated in a number of capacity-building workshops, including one about Web 2.0 under SADC-ICART. Zambia has received two servers from FARA under the Regional Agricultural Information Learning Systems (e-RAILS) project. Again ZARI is the focal point institution collaborating with the Food and Agriculture Organisation (FAO) and FARA on the Zambia Agricultural Research for Development Information Network (ZAR4DIN). The goal of the ZAR4DIN project is to develop a national network of institutions and individuals involved in agricultural research for development (AR4D) information/knowledge generation, management, dissemination and exchange, and learning in order to facilitate access to AR4D information and knowledge. All agricultural research institutions in Zambia have acknowledged that ZARI can take a lead in ICTs because of the background established with IICD.

Target group

In 2008 and 2010 a questionnaire-based survey was conducted among the users. In 2008, nineteen participants filled in the questionnaire and in 2010 twenty-seven users were interviewed. These groups are too small to be able to draw any general conclusions, but provide a good starting point for a discussion within ZARI to reflect on the project. The user group of ZARI is dominated by men. In 2008, 84% of the end-users were male and in 2010 this was still high at 74%. This is representative because ZARI has more male staff members than female ones. Most are between 41-50 and have tertiary-level education. More participants from Misamfa (75%) filled in the questionnaire than from Mount Makulu. In 2008, the system was used on a daily basis by most participants, but now 37% use the system daily and 40% weekly. The target group (users) of the project are the researchers and staff of ZARI. Although the target group consists of the researchers, this is expected to have a trickle-down effect to extension workers and farmers.

Satisfaction
Respondents were asked to indicate their level of satisfaction with various services provided by the project. They expressed various levels of satisfaction across the 11 dimensions measured. The top three most satisfying services in 2008 were: Quality of information (70% highly satisfied), timing of information (65%) and Access to electronic information (50%). This changed in 2010 to Access to electronic information (57%), technical support (48%) and three dimensions with 44% as third: quality of information, timing of information and the website). In general, the level of satisfaction was lower in 2010 than in 2008, but that happens a lot in projects, often because as end-users become more used to working with ICT their expectations become even higher. Least satisfied were users with training and seminars (only 5% highly satisfied in 2010 compared to 29% in 2008) and the access to information for women (15%). The main reason for people to join the project was "to have access to information in order to understand more about my own profession". Sixty-six per cent (66%) achieved their goals because "this is a faster and easier way of sending and receiving documents" or, as another participant explained: "I have managed to secure funding for my research using ICT and a scholarship to present my research results abroad"; a third one mentioned "I have shared information with other research organisations in my field" as a reason to achieve goals. The major complaint for not achieving goals was the slow internet connection, although ZARI has upgraded the connection in October 2010, the number of staff connected and the usage of the internet is growing faster. One of the most concrete actions done after participating in the projects was a user who "carried out research on the control of termites - and internet provided me with a rich source of information"

Impact

IICD measures perceived impact through Monitoring & Evaluation (M&E) questionnaires which cover: awareness, empowerment, economic, sector, gender and negative impact.

Awareness indicates the changes in their levels of awareness for the importance of ICT for their work. In 2008 this was 82% and in 2010 it dropped to 60%.: This decreasing percentage could be explained that as time passes, awareness is already no news anymore for most users. That the users value ICT is clear: "ZARI could not do without ICT anymore. If tomorrow a truck would come to collect all the computers and the satellite dish we would not know as staff what to do anymore"
Empowerment is an indicator that measures what people have done as a result of their increased awareness. Overall in 2008 this was 78% and in 2010 it dropped to 46%. But for the scientists ICT was indeed a form of empowerment "The effects of ICT for the scientists were clear± we had better access to experts and scientific research in our own field, but are also able to present our own research at international conferences which gives us and ZARI more recognition" and other respondents commented: "Access to information means access to current scientific publications. We used to have hardcopy, out-of-date journals, but now we have access to the newest publications and you can be on top of developments in the global arena."
Economic Impact is an indicator of the economic impact of the project in terms of financial gain (more income, more productivity). In 2008 this was 50% and in 2010 this was at an all-time low of 9%, although the impact of ICT for ZARI was big as an institute at the economic level. "We can now have quick inputs from our research stations on project proposals with tight deadlines; for example with the Bill and Melinda Gates Foundation we needed input within a couple of hours. Without ICT this was impossible. We now have three grants of $1.5 million for more research" and one of the ZARI managers commented: "virtual communication is much faster and cheaper to deliver information. We do not have to travel as much to deliver or collect reports"
Sector Impact is the influence from the project on the sector as a whole. In 2008 this was 77% and in 2010 only 33%. This is strange because many new sector-level activities are taking place, such as the website: "The ZARI website can be used within ZARI like at the Research Stations, but is also used by partners like the National Agricultural Information Service (NAIS) and the Zambian National Farmers Union (ZNFU) for annual reports and other Information Products". Te E-Brain forum of Zambia, the national ICT4D network, has also established an agricultural thematic group consisting of IICD partners in the Agricultural Livelihoods sector and other stakeholders from the sector. There are discussions and opportunities for knowledge sharing on the electronic Discussion Group, but the group's long-term sustainability and ownership by the members is still an issue. But more can be done to increase the impact of the website, as summed up by one of the staff members: "Services like soil testing, plant quarantine and export certificates could be formed into online services to create more sector impact for ZARI"
Gender Impact is an indicator to measure if users noticed a positive impact on gender roles and responsibilities. In 2008, this was 64% and in 2010 this was reduced to 21%. Gender impact is certainly one of the issues that ZARI would still like to address, but so far other priorities have been addressed first.
Negative Impact measures (unexpected) unwanted impact of the project on the lives of users. This registered as non-existing for the ZARI project with both years showing 0% for the negative impact.

Lessons learned

- More attention should have been paid to making the researchers aware **to customize their scientific reports** into a format that extension workers, especially farmers, could also understand. It was assumed that this would be an almost automatic process. If researchers are more encouraged to go into the field with extension workers they will become more aware of the farmers' and extension workers' information needs. Some researchers test their Information Products in the field: they train the extension workers as trainers in the power point presentations and electronic publications they

Chawama Youth Project Director Justin Somi prepares the Kanakantapa Farmer Field Day with the ZARI Researcher.

have produced. The extension workers are able to translate this into local languages. The examples of tight links have shown that this improves the quality of the information and the access of farmers to relevant information. This could be encouraged more by ZARI management.

- A good example of **collaboration with other partners** is the collaboration with another IICD-supported project; the Chawama Youth Project. They have started an agricultural project in Kanakantapa (80 km from Lusaka). They also organised a Field Day with ZARI where Information Products and posters were tested and farmers could give feedback. New production methods were demonstrated and Chawama was linked by ZARI to the Seed Control Certification Institute (SCCI) so that next year the farmers can produce their own seeds. They can use them for a higher yield or resell them to increase their income directly.
- **The procurement system of the Zambian Government is difficult.** The purchased equipment was outside ZARI's control and done by the procurement department based on price and not on specifications. This caused lower quality equipment than intended to be delivered. The lessons from this project were shared with other IICD-supported projects, which in turn helped them to formulate clearer specifications for the procurement department.

Challenges

What are the key challenges at the moment within the project?

- The **linkages between researchers, extension officers and farmers have improved**, but are still weak. Wherever they do exist they seem to be more on a personal basis and have not been institutionalised. Testing Information Products on extension workers and farmers does happen and is carried out by most researchers. This needs to be further encouraged to improve access to information for farmers. ZARI does not have a deliberate policy yet to be able to deal quickly in a systematic way with requests from stakeholders such as NAIS to create demand-driven Information Products at a timely moment. A good example of where this did work well is in the Sorghum Breeding Programme that has established very strong linkages with extension workers in thirteen districts. Researchers train the extension workers to give presentations at rural workshops.
- **Researchers have embraced ICT for their own scientific work.** They use it for networking with fellow researchers, to find scientific publications, to access funding and to receive fellowships to present at the international level. But they have not yet embraced ICT as a tool to reach more farmers with simplified Information Products. ZARI does not have an agricultural information policy to encourage the publication of Information Products. Maybe recognition by naming the scientist in question who produced the publication would help to increase the value for researchers.
- **ZARI uses a very centralised research system** from Research Station to Provincial to Headquarters. By the time the answer to the farmer about, for example, a pest in his or her field can be given, the field is already gone. A more decentralised network to empower extension workers and researchers at research station level with an information database to find quick referrals to experts and to find known treatments for certain pests could speed up the process.
- In the past, **the network suffered from many problems with viruses.** An antivirus program has now been installed everywhere to prevent future attacks.
- **Speed during peak hours is still too low.** Although the bandwidth increased last summer this is still a problem. The number of researchers and other staff that access the internet also increased. But internet access is still very expensive. Future access to glass fibre would help, but it is unclear when this will happen in Zambia.
- **The Project Implementation Team had a high staff turnover** after being trained in ICT. Therefore training had to start all

over again several times with the new staff. The Content Manager in particular was not adequately filled in until very late on in the project. This delayed the content development process because researchers were involved too late in the project to build up their capacity in information product development.

- **The ZARI library is still not suitable for electronic research.** Many scientific publications are accessible online, but the equipment at the library is still outdated. Researchers with a laptop can access information everywhere, but they still do not have access to the available electronic databases although researchers have been exposed to online journals like AGORA and PERI to improve their research capabilities and scientific report-writing skills.
- **More Information Products should be translated into local languages.** ZARI already collaborates with NAIS, but closer collaboration could improve both the suitability of the Information Products for the farmers as well as their translation into local languages.
- ZARI has also realised that there is a need to put **Agricultural Information Communication and Knowledge Management (AICKM) Strategies** in place in order to enhance the information flow at institutional level in line with Zambia's National ICT Strategy which was developed in 2008.
- **ZARI does not seem to have a strong Monitoring & Evaluation system in place.** This was found to be challenging, even at the project level, because researchers were not able to respond to questionnaires adequately and in time.

Next steps and future plans

There is no doubt that ICTs are embedded within ZARI at the institutional level. Internet access is part of the institutional budget and in proposals for funding to other organisations like in the proposal for Bill and Melinda Gates Foundation. More and more Information Products are produced, but even more has to be done to make the researcher aware of the value of relevant and simple information for farmers. The new network ZAR4DIN could help to improve the linkages between researchers and extension workers. If they can be provided with a steady flow of information, they can test them in the field and provide feedback to the researchers. More online services on the website so that farmers do not have to travel to ZARI itself anymore, but can access the services online either via extension officers or at an internet cafe could help to provide at least the literate farmer leaders with more access to information. ZARI was also able to acquire a server with support from the Forum for Agricultural Research in Africa under the African Development Bank, which could be used to improve data management and achieve faster internet access and management.

Mobile telephones are becoming increasingly available in the rural areas, but they have not yet been utilized for agricultural information access, except in some areas for market price information access (from ZNFU). These could be new projects for the future to really reach out to the farmers.

The development of sound agricultural information, communication, knowledge and management strategies for ZARI is very important. This could form the basis for the next steps and future plans for collaboration between ZARI and IICD. In addition, there is a need to further strengthen M&E within ZARI through capacity building.

Contact information

ZARI
Davy Simumba
Project Coordinator, ZARI
infornet@zari.gov.zm

IICD
Martine Koopman
Officer Knowledge Sharing Zambia, IICD
mkoopman@iicd.org

Links

ZARI website: http://www.zari.gov.zm/
IICD website: http://www.iicd.org

International Institute for Communication and Development
Visitor's address: Raamweg 5 | 2596 HL La Haye | Pays-Bas
P.O. Box 11586 | 2502 AN The Hague | The Netherlands
Phone: +31 (0)70 311 7311 | Fax: +31 (0)70 311 7322 | E-mail: information@iicd.org | www.iicd.org
Design: Frissewind visuele_communicatie (BNO) Amsterdam

iicd
People - ICT - Development