



Connecting People's Capacities

Dairy Investment Opportunities in Ethiopia



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LIST OF ACRONYMS

AADI	Addis Ababa Dairy Industry
AADPA	Addis Ababa Dairy Producers Association
ACSI	Amhara Credit and Saving Institution
ADA	Ada District Agricultural Development Project
AI	Artificial Insemination
BOAM	Support to Business Organizations and their Access to Markets
BOI	Bureau of Investment
CADU	Chilalo Agricultural Development Unit
COMESA	Common Market for Eastern and Southern Africa
CSA	Central Statistics Authority
DDA	Dairy Development Agency
DDE	Dairy Development Enterprise
DRDP	Dairy Rehabilitation and Development Project
EAC	East African Community
EARO	Ethiopian Agricultural Research Organisation
EC	Ethiopian Calendar
EDDP	Ethiopian Dairy Development Project
EIA	Ethiopian Investment Authority
FAO	Food and Agriculture Organization
FINNIDA	Finnish International Development Association
FTA	Free Trade Area
IDF	Import Declaration Form
IFAD	International Fund for Agricultural Development
MOA	Ministry of Agriculture
MOH	Ministry of Health
MoARD	Ministry of Agricultural and Rural development
NAIC	National Artificial Insemination Centre
NGOs	Non Governmental Organizations
OSCSC	Oromia Saving and Credit Share Company
QSAE	Quality and Standards Authority of Ethiopia
SNV	The Netherlands Development Organisation
SPDDPP	Smallholders Peasant Dairy Development Pilot Project
UHT	Ultra-High Temperature treated
VAT	Value Added Tax

Executive Summary

This paper assesses the development of the dairy sector in Ethiopia over the last four decades, with the objectives to: (1) generating information useful in directing and advising on the need for investment in the dairy sector; (2) providing guidance on the nature, scale and location of investments if the sectors prove to have opportunities for enterprising venture; and (3) identify investment opportunities in the dairy subsector of Ethiopia through value chain approach to find out entry points into the business.

Ethiopia has the largest livestock population in Africa and the contribution of livestock and livestock products to the agricultural economy is significant. Recent figures indicate that the livestock sector contributes about 12-16% of national GDP, 30-35% of agricultural GDP, 15% of export earnings and 30% of agricultural employment. Livestock contribute to the livelihoods of 60-70% of the population

Smallholder farmers represent about 85% of the population and are responsible for 98% of the milk production. Productivity however is relatively low, quality feeds are difficult to obtain and support services are inadequate. There is an immediate and growing shortage of dairy products in all major cities of Ethiopia and the trends of economic prospects for dairy industry performance and development are rather good both at small holder level and on more commercial level. During the last decades the import dependency of Ethiopia for milk and milk products has increased. To bridge the gap between supply and demand, dairy imports increased significantly partly due to increased food aid (WFP) milk powder imports, reached a peak of 314,700 metric tons in 1986. Further, it is estimated that imported milk powder accounted for 23 percent of Addis Ababa market.

Rapidly increasing population size with a growing urban population is resulting in a growing demand for dairy products. Dairy development can lead to income generating activities in the rural areas increasing farm incomes and employment opportunities. However, the available high potential land is intensively cultivated and fodder supply is insufficient leading to often serious environmental consequences as inappropriate husbandry measures are applied in non-suitable areas. Besides low milk production levels, milk collection, processing and marketing are not developed. A chain approach aimed at a sustainable development of the dairy sector is lacking.

The Government aims at stimulating dairy industry (milk marketing and processing) in potential areas. It is believed that development of milk marketing structure will create the incentive to improve production. Urban, peri-urban and rural milk production systems are dominated by informal marketing systems. The formal market also appears to be expanding with the private sector (Sebeta Agro Industry, several other private milk-processing plants) entering the dairy processing industry in Addis Ababa. Besides, smallholder dairy production, also commercial specialized dairy farms around the urban centers start to develop with their own processing facilities and marketing schemes. There have been and still are several initiatives to stimulate milk production, collection, processing and marketing at village level (among other Land O' Lakes, Finnish Bilateral Aid, ILRI, various NGO's often related to local development).

At the moment The Netherlands Development Cooperation (SNV), the USAID supported Land O' Lakes, ILRI and few other international organization provide support to the development of the dairy chain through the different but complementary programmes aimed at increasing access to production and market for quality milk. As part of this approach, SNV wishes to increase investment in the dairy sub sectors in Ethiopia.

Conducive government policies, laws and regulations as part of the economic liberalization program besides investment incentives are necessary to smooth the progress of easy entry in to and expand the investment opportunities in the Ethiopian dairy industry. To this effect, with the objective of promoting smallholder and commercial dairy production and the inflow of foreign capital and technology into the country, the Ethiopian government provides various packages of fiscal incentives to both foreign and domestic investors engaged in establishing new enterprises and expansions. The prominent provisions of the Ethiopian investment regulatory environment like equity restrictions (obligation of local partners, foreign ownership of agricultural land); incentives to investors (duty and VAT) exemption on machineries, equipments and raw materials, tax holiday, liberal depreciation rate, loss-carry forward, among others.

It must be clearly embedded that to build a successful and sustainable dairy industry, all parts of possible entry points for intervention across the milk value chain have to be identified; from cow to

consumer. Possible interventions on the *supply side* could be strengthening of raw milk supply, improving milk collection centers, provision of feed, logistics and breed improvement. In the processing chain quality improvement, business linkages, training, and technology transfer are important activities to be considered. Different parts of the value chain need different kinds of support and intervention where the situation of course requires various case to case interventions. Several entry points could be identified across the dairy value chain with varied degree of resource requirement and level of competitions.

The development of successful and sustainable dairy industry could be realized by strategic interventions into all parts of possible entry points along the milk value chain. In view of that, several entry points including the innovation of new products are identified as intervention opportunity with varied degree of resource requirement and level of competitions.

A closer look at livestock sub-sector in general and the dairy industry in particular reveals that, this huge resource do not make a substantial contribution to the national income taking into account its size due to numerous socio-environmental factors. These constraints include a variety of socio-economic and institutional considerations. The major socio-environmental factors represent underlying opportunities for increased trade that may be tapped by dairy businesses in Ethiopia and COMESA to expand trade and enhance their long term return on investment goals are: low per capita consumption, low demand and high transaction costs, poor animal health, lack feed, low productivity and genetics, quality and health problems, lack of institutional support, lack of infrastructure, lack of access to land and credit, seasonality of supply, collection problem and long fasting periods.

The analysis of the support market and dairy business services reveal that the dairy industry is immature and young, competition barely exist, basic services are either not existing or inadequate. In general, it offers wide opportunity for investment in dairy and related businesses.

The role the government pay in the market linkage has been reversed towards marketing cooperatives and private dairy enterprises: Since recent years, as a result of establishment of producers and marketing cooperatives and private dairy enterprises, the government role and share in milk marketing and processing services in urban and peri-urban areas has reduced. The dairy marketing cooperative are playing a significant role in providing the marketing services by buying milk from members and non members, process it and sell products to traders and/or local consumers.

Milk and milk product market outlets: The dairy farmers have three market-outlets for the milk left out from consumption. These are to sell to neighbours in the informal marketing channel, dealers or milk groups/ cooperatives (in some cases retailers).The availability of these market-outlets through the establishment of milk groups and cooperatives as well as the milk-collection centers have given dairy farmers a broader choice of marketing their milk instead of depending on local traders and neighbourhood buyers.

The projected urban-market for liquid milk in 2015 has been estimated at 60 million litres. Supplying this quantity of fluid milk from domestic production in Ethiopia by 2015, would require an increase in production of over 35 million litres in order to provide the increased market requirements resulting from growth of urban population and increased consumer income (CSO-2005).

Feed supply: There is no reliable supply of feed for good milk production. Good dairy without supply of good fodder and concentrates is not thinkable. This existing condition stimulates the involvement private investment in the feed resources sector to enhance the development and production of high quality feed to increase milk production per cow per day.

AI service: The public sector support in import and testing of improved genotypes, supply of liquid nitrogen, quality assurance and regulatory services for promoting private AI service delivery is important.

Milk testing and quality control: The establishment of an independent laboratory (Accredited) for milk and milk product quality control (chemical and microbiological) enables to perform range of tests at milk production, collection and processing centres. The present system in Ethiopia for testing of raw milk and dairy products (with the exception of some research testing laboratories like ILRI) does not stimulate the production of good quality, biologically pure milk with high technological quality that meets the national/international standards. Currently there are no proper means for collecting and processing of information concerning the milk and milk products quality for marketing. Laboratories which offer a complete range

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of milk and milk product analysis, which determine the hygienic, chemical and microbiological quality of raw milk and dairy products all along the value chain remain the major requirement and concern for the development of dairy sector in the country.

Veterinary and pharmaceutical services, finance services, feed supply, artificial insemination, and improved bull services, transportation and hardware supply are the major components in the development of dairy industry and yet in Ethiopia they are at their rudimentary stage or even do not exist at all. These important key dairy business/ market services serve as an opportunity to penetrate into untapped dairy industry of the country.

After the economic and policy reform that took place in the country since 1991, the dairy industry in Ethiopia is just starting to appear out of the obscurity of the past three decades. Ethiopia's main preoccupation for now is to meet and satisfy this domestic demand (~80 million people). The recognition calls foremost an establishment, long overdue to oversee the development of the dairy industry including promotion, regulation and coordination of the industry. The challenge is to organize the collection of safe good quality milk and provide a constant supply of good quality milk and milk products to meet market demands. At the same time, the market demand for value added products for a range of income levels should be met. Governments are also looking to find ways to reduce imports

The investment opportunities are immense. The potential is within the grasp of investors. It only needs adapting the technology, capital and human resources to specific market niche and opportunity excising or to be developed a new.

1 Introduction

1.1 Background

In an attempt to develop dairy production system of Ethiopia, dairy supply and marketing system needs to undertake radical changes. First of all, dairy farming needs to move out from the traditional subsistence mentality and develop a more market-oriented approach. For such a radical change to happen farmers need to be sure that what they will gain from the market will be more than what they will lose. For example, if market-oriented farming means selling to the local community, farmers may not perceive it as a profitable change, since the local demand may be limited and not sufficient to bear the costs of adapting the production system. A viable market-oriented farming system requires a wide access to market, including local but also remote markets. To get access to distant markets farmers need to link up with manufacturers able to extend the shelf-life of farmers' supply, as well as with traders and retailers, which can ensure a capillary distribution of final products. In short, dairy products cannot be expected to flow across Ethiopia unless a supply chain, bridging rural supply and urban demand, is in place.

Business Organisations and Access to Markets (BOAM) is a programme of the Netherlands Development Organization (SNV) in Ethiopia that promotes agricultural value chains and comprises two mutually complementing components - the private and public sector development. Milk and milk products value chain was selected among others for the capacity development of service providers in areas relevant to constraints and opportunities identified in the respective chains. The ultimate goal of the intervention in the Milk Value Chain is to increase rural incomes by increasing the number of rural households deriving their livelihood from dairy business through managing high productivity enterprises while delivering, through a competent and efficient processing sector, improved quality and affordable dairy products to the market.

To this effect, SNV seeks to promote enhanced productivity, employment and income generation in various sub sectors in East and Southern Africa for the purpose of poverty alleviation. In this regards, SNV connects firms, practitioners, researchers, policy makers, investors with each other and with information, services and markets promoting investments in dairy industry and markets in Kenya, Uganda, Rwanda and Ethiopia. This study is commission to contribute to this regional vision.

1.2 Objectives

The aim of the study is to portray current and future dairy investment opportunities in Ethiopia. The specific objectives of this study are, among others, to:

- review and document the regulatory framework promoting/ hindering investment in the dairy industry
- asses key technical, institutional and socio-environmental challenges and opportunities for investment in the dairy industry
- review business organisation and access of Ethiopian dairy products to domestic and regional markets
- analyse scope and scale of support services and business service markets required for growth and competitiveness of the dairy industry, and
- identify investment opportunities in the dairy subsector of Ethiopia through value chain approach to find out entry points into the business.

1.3 Methodology of the Research

The study has mainly focused on desk research. It is supplemented with consultation and key informant interviews with individuals who are practitioners or officials in the dairy industry, public institutions and non-governmental organizations.

Relevant literatures were reviewed to obtain secondary data. The secondary data were collected from SNV-BOAM, Dairy Development Agency (DDA), Land O'Lakes, Dairy Development Project in the Ministry

of Agricultural and Rural Development, Ethiopian Agricultural Research Organization (EARO) and International Livestock Research Institute (ILRI) and extensive internet search (see References section).

Relevant literature was also reviewed from other surveys, evaluations, and project progress reports. Moreover, interviews were held with key government, non-government and private firms involved in the dairy production, promotion, regulation and marketing.

1.4 Limitation

The dairy sector does not have specific institution or custodian which collects, collates and analyses dairy related data that can be used to inform investors, policy makers and other industry stakeholders. Except the professionals in public or non governmental institutions, only a few stakeholders were willing to share information about their business operations. There is lack of reliable, up-to-date and consistent information in the sector and in some cases conflicting information were also observed in the process.

1.5 Coverage

This document is divided into eight chapters: Chapter 2 presents an overview, including key phases, in the development of the dairy industry in Ethiopia. It examines trends in production and consumption and policy changes. The Ethiopian laws & regulations influencing the investment in dairy sector and the ease of entry into the dairy business are explained in chapter 3. Chapter 4 and 5 identify key policy and technology issues as well as socio-environmental factors to be considered in designing of appropriate strategies for promotion of the dairy industry. Ethiopian dairy market access and trends are highlighted chapter 6, with regard to Economic blocks and domestic market,

The support market/ business services for effective dairy industry development are analyzed in detail under chapter 7. The paper also draws together evidence on investment opportunities, dairy product market access and market trends at all levels. The last chapter summarizes the way forward.

2 Dairy Industry Development in Ethiopia

2.1 Overview of Livestock Sector

The Ethiopian economy is highly dependent on agriculture. Despite being more subsistence, agricultural production plays an important role in the economy. In the late 1980s, agriculture contributed about 45% of national GDP while the livestock sector, despite large population size¹, contributed about 12-16% of national GDP, 30-35% of agricultural GDP, 15% of export earnings and 30% of agricultural employment.

Livestock contributes to the livelihoods of 60-70% of the Ethiopian population² (Aklilu 2002; Ayele et al. 2003; Ejigu 2003) in one way or the other. It is raised in all of the farming systems by pastoralists, agro-pastoralists, and crop-livestock farmers. The rural dairy system is part of the subsistence farming systems that are mainly concentrated in the highlands, but also in the lowlands. Pastoralism is the major system of milk production in the lowlands. It is estimated that about 30% of the livestock population are found in the pastoral areas³. Nevertheless, because of the erratic nature of rainfall that results in shortage of feed availability, milk production is low and highly seasonal.

Over the last 30 years, national and per capita production and consumption of livestock products have declined (Ayele et al. 2003). During 1993-2001, per capita income remained at about USD100. Livestock production increased by much less than the production increase for the agriculture sector as a whole, so relative share of livestock to agricultural GDP declined. Hence, per capita livestock output fell by 5% while crop and agriculture grew by 14 and 6% respectively (Halderman 2004).

2.2 Dairy Production Systems in Ethiopia

Ethiopia holds large potential for dairy development. In addition, the country enjoys diverse topographic and climatic conditions favourable for dairying. These consist of a high central plateau ranging from 1,800 to 3,000 metres above sea level, a rift valley that divides the country from north to south with altitudes ranging from 1,000 to 1,800 metres above sea level and lowland plain areas of less than 1,000 metres above sea level in altitude. Depending on the altitude difference, temperature ranges from less than 10° C in alpine areas to 35° C and more in lowland areas. Moreover, rainfall in most of the country is adequate for crop and pasture production. The favourable climate throughout the country supports use of improved, high-yielding animal breeds and offers a relatively disease-free environment for livestock development. Given the high potential for dairy development and the ongoing policy reforms and technological interventions, success similar to that realized in the neighbouring Kenya under a very similar production environment is expected in Ethiopia (see Table 1 for the potential of the dairy sub-sector).

The Ethiopian highlands possess a high potential for dairy development. They occupy the central part of the Ethiopia, cover over 40% (approx. 490.000 km²) of the country area and are the largest of their kind in Sub-Saharan Africa. In the highland areas, the agricultural production system is predominantly subsistence smallholder mixed farming, with crop and livestock husbandry typically practiced within the same management unit.

The dairy sector in Ethiopia can also be categorized based on market-orientation, scale, and production

Table 1: Ethiopian Livestock and Livestock product potential

	Year -2004
Cattle (Number)	35,500,000
Butter and Ghee (MT)	17,550
Butter of Cow Milk (MT)	1,950
Ghee from Cow Milk (MT)	15,600
Cheese Whole Cow Milk (MT)	5,850
Beef and veal Meat (MT)	304,000
Cattle Hides, fresh (MT)	58,905
Cow Milk, whole, fresh (MT)	1,450,000

Source: FAO, EEA

¹ Ethiopia currently manages the largest livestock population in Africa, estimated at 29 million cattle, 24 million sheep and 18 million goats, 7 million equines, 1 million camels and 53 million poultry. The country holds 2.4% of the world, 3.4% of developing countries and 15.9% of Africa cattle population (ILRI, 2000).

² When considering the economic dependency of the rural population it was estimated that 7.8% are purely livestock dependent, 14.6% predominantly livestock dependent and 74.5% dependent on crop production (Winrock, 1992).

³ The pastoralist livestock production system which supports an estimated 10% of the human population covers 50-60% of the total land area mostly lying at altitudes ranging from below 1500 masl.

intensity into three major production systems: traditional smallholder, private/ state-owned commercial⁴, and urban/ peri-urban.

The **traditional smallholder system** corresponds to the rural milk production system. Both the pastoralists and smallholder farmers produce 98% of the national milk production (MOA, 1993) and 75% of the commercial milk production. The majority of milking cows are indigenous Zebu breeds with low production performance (average age at first calving of 53 months and average calving intervals of 25 months). Cows had three to four calves before leaving the herd at 11-13 years of age and the average lactation yield is 524 litres/ cow for 239 days (of which 45% is off take for human use while 55% is suckled by the calf).

The **state dairy farms** used to be known as the Dairy Development Enterprises. The farms mostly use grade animals (those with more than 87.5% exotic blood) and are concentrated within 100 km distance around Addis Ababa.

The first attempt to introduce **modern dairy production** in the country was made by the Imperial regime in 1947, when 300 Friesian and Brown Swiss dairy cattle were received as a donation from the United Nations Relief and Rehabilitation Administration. A small milk processing plant was established in Addis Ababa to support commercial dairy production (Yigezu 2000). With the introduction of these cattle in the country, commercial liquid milk production started on large farms in Addis Ababa (and Asmera). Most interventions during this period was focused on urban-based production and marketing. During the second half of the 1960s, dairy production in the Addis Ababa area began to develop rapidly as a result of the expansion in large private dairy farms and the participation of smallholder producers.

With the advent of modern dairying, the government established the Addis Ababa Dairy Industry in 1966 and, later on, the Dairy Development Agency (DDA) in 1971 to control and organize the collection, processing and distribution of locally produced milk. By 1972, the DDA was receiving about 21,000 litres milk/ day for processing, of which 57% come from 65 large farms. In addition to collecting milk, the DDA sold milk and dairy products through its kiosks and shops as well as to institutions. It also facilitated the creation of dairy cooperatives to ease the provision of credit and technical and extension service to dairy producers.

In 1979 it was merged with numerous other nationalized dairy farms to establish the Dairy Development Enterprise (DDE). The DDE includes large dairy farms, milk collection networks, and a processing plant. The DDE, which is privatized in 2007 and changed its name to Lame Dairy, has a capacity to process 60,000 litres of milk at its inception (Yigezu, 2000). DDE is privatized and re-named as LAME.

With the downfall of the *Derg* regime in 1991, as a result of the country's policy reforms that aim to bring about a market-oriented economic system, the private sector has begun to enter the dairy sector and market as an important actor. Many private investors have established small and large dairy farms. This commercial farms use grade and crossbred animals that have the potential to produce 1120-2500 litres over 279 day lactation. This production system is now expanding in the highlands among mixed crop-livestock farmers, such as those found in Selale, Ada'a and Holetta, and serves as the major milk supplier to the urban market. Additionally, some ten private investors and one cooperative union have established milk-processing plants to supply fresh processed milk and dairy products to Addis Ababa, Dire Dawa and Dessie towns.

- The Sebeta Agro Industry, the biggest dairy-processing in Ethiopia, has a capacity to process around 30,000 litres of milk per day. Around 6000-10000 litres of this milk come from the owner's dairy farm with 600 cows. Currently, the market share of this company has exceeded that of the DDE's (now LAME).
- The other private milk-processing plants established in and around Addis Ababa are FAMILY, LEMA, Genesis, Ada'a dairy cooperative and Dinsho dairy industries that have already started marketing their products. Although their market share are still small compared to DDE and Sebeta Agro-Industry.
- Selale Milk Producers Cooperative Union is established by thirty-two milk marketing cooperatives that have been established by the Small Dairy Development Project (SDDP) of MoA financed and

⁴ The development of modern dairying is comparatively recent and its start-up only dates back to the post world war II time.

technically supported by FINNIDA⁵. These groups buy milk from both members and non-members; process it into cream, skim milk, sour milk, butter and cottage cheese; and sell products to traders and local consumers.

2.3 Trend and Performance of Dairy Industry

Between 1961 and 1974, milk production increased by 16.6% from 637,400 to 743,100 metric tons with an average annual growth rate of 1.6%. This growth was largely due to the economies of scale in production as well as marketing, subsidies in transport to the formal market, secured land tenure and an active free market for feed and other inputs (Staal et al., 1996). On a per capita basis, however, milk production declined during this period at an average rate of 0.87% per annum. Processed milk production has stagnated in the early 1960s but expanded significantly in the second half of 1960s and early 1970s.

To bridge the gap between supply and demand, dairy imports increased significantly beginning from 1978. This was partly due to increased food aid milk powder imports by WFP, and a level of dairy production development that lagged far behind the demand. Imports reached a peak of 314,700 metric tons in 1986 during the drought period (Reda, 2001). During the period between 1977 and 1989, dairy imports as a percent of total consumption increased from 4.1% to 12.8%. Commercial imports grew rapidly at 24.2% per year (Felleke and Geda, 2001). Further, it is estimated that imported milk powder accounted for 23% of Addis Ababa market.

Post 1991 producer groups such as the Addis Ababa Dairy Producers Association (AADPA) emerged encompassing 90% of all urban dairy producers and a large proportion of peri-urban producers within a radius of 100km of Addis Ababa (Staal 1995). Milk production grew faster in the post reform period, at an annual growth rate of 3%. Per capita milk production stagnated though grew at a positive but insignificant rate. This represents a reversal or termination of the negative trend in the growth of per capita production during the previous two phases. Using rough estimates from the FAO database and available information from DDE and Felleke and Geda (2001), the contribution of imported milk to total milk consumption declined from 24% in 1985 to less than 1% in 2000. At the same time, the share of government-owned enterprises in total milk production decreased markedly. In contrast, the share of smallholder production in total consumption increased by 30% from 71% to 97%.

To sum up, total milk production in Ethiopia increased during the 1961-2000 period at an average annual rate of 1.55% though per capita production declined as a result of the high population growth rate. However, during the last decade production grew at a higher rate of 3%. The increased coverage of extension services (such as better management skills) and increased use of improved inputs (improved breeds and feed) and policy changes promoting dairy production have contributed to faster growth of the sub-sector. Dairy product imports during this period were relatively smaller than the previous three decades. Most of the growth during the 90's is concentrated in the peri-urban and rural production systems. The emergence of private processing industries and marketing units have stimulated producers in the peri-urban areas and rural production systems as it offered them a new market for their milk production.

On the whole, dairy processing and marketing function was being performed at various levels; parastatal sector (DDE) had dominated the dairy industry scene until late 90's where private sector and co-operative sector appeared to play significant roles in collecting and processing milk. Under the current market-oriented economic system, private sector involvement in milk marketing was emerging alongside co-operative marketing organizations. The privatisation of DDE in 2007 marked the end of the parastatal dairy production system in Ethiopia.

2.4 Dairy Marketing System

As is common in other African countries (e.g., Kenya and Uganda), dairy products in Ethiopia are channelled to consumers through both formal and informal dairy marketing systems. Until 1991, the formal market of cold chain, pasteurized milk was exclusively dominated by the DDE which supplied 12% of the total fresh milk in Addis Ababa (Holloway et al., 2000). Even though the proportion of milk

⁵ Two are established by FAO/TCP (Technical Cooperation Programme) and World Food Programme.

channelled through the formal markets is still small, since 1991 the supply of milk and other dairy products from non-state actors (private and cooperatives dairy firms) have increased.

The **informal market** involves direct delivery of fresh milk by producers to consumer in the immediate neighbourhood or sale to itinerant traders or individuals in nearby towns. In the informal market, milk may pass from producers to consumers directly or through two or more market agents. The informal system is characterized by no licensing requirement to operate, low cost of operations, high producer price compared to formal market and no regulation of operations.

In Ethiopia, 95% of the national milk is marketed through informal channels and is unprocessed. The traditional processing and marketing of dairy products, especially traditional soured butter, dominate the Ethiopian dairy sector. Only 5% of the milk produced is marketed as liquid milk due to underdevelopment of infrastructures in rural areas. Hence, the informal (traditional) market has remained dominant in Ethiopia. Production is non-market oriented and most of the milk produced is retained for home consumption.

Formal milk markets are particularly limited to peri-urban areas and Addis Ababa. The formal market appears to be expanding during the last decade with the private sector entering the dairy processing industry in Addis Ababa, Dire Dawa and Dessie towns.

The Lame Dairy (formerly DDE), collects milk for processing from different sources, including large commercial farms and milk collection centres that receive milk from smallholder producers. The enterprise operates 25 milk collection centres located around Addis Ababa, of which 13 located around Selale, 5 around Holetta and 7 around Debre Brehane.

Ten private milk processing plants have entered the milk marketing and processing, increasing the amount of milk channelled via the formal markets.

Recent study by Teferra Abreha (2006) indicates that in Addis Ababa milk shed there are about 66,770 cattle of which 46.5% were estimated to be crossbred dairy cows. The peri-urban milk system includes smallholder and commercial dairy farms found in the proximity of Addis Ababa, secondary and other regional towns. In some case intensive production units based on stall feeding of crossbred and high grade cows is practiced. This sector controls most of the country's improved dairy stock. The urban and peri-urban dairy farmers produce 2% of the total milk production of the country. The total estimated milk supplied to Addis Ababa annually is 65 million litres (see Table 2).

Sebeta Agro Industry established the first UHT⁶ dairy processing facility in the country. The new production lines will produce 500ml carton pouches (Tetra Fino Aseptic) and 250ml portion packages (Tetra Brik Aseptic). The DDE, now LAME, produces pasteurized milk in 500ml plastic pouches. The introduction of UHT dairy products on the market is a great step forward to offset the seasonality in milk production and consumption.

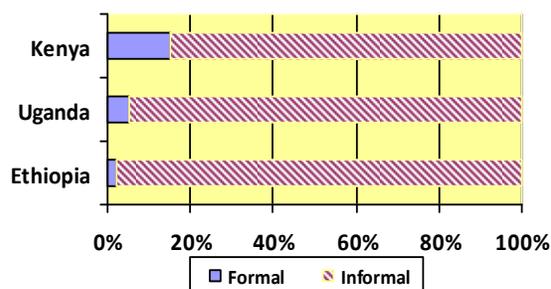
Share of milk sold in the formal market is insignificant in Ethiopia, less than 2%, compared to 15% share in Kenya and 5% in Uganda (Muriuki and Thorpe, 2001). This figure (see Figure 1) tell us that in Ethiopia there is no market for dairy, exception in few major urban areas. Absent markets affect the overall dairy production and consumption in the country.

Table 2: Annual Milk Supply to Addis Ababa

Supply Sources	Amount in litres
Addis Ababa urban dairy farmers	45,243,000
DDE (now LAME Dairy)	4,500,000
Sebeta Agro-Industry (Mama)	8,760,000
Individual Milk Collectors	4,000,000
Other suppliers	2,000,000
Total	65,503,000

Source: Teferra Abreha (2006)

Figure 1: Proportion of milk sold in formal market



Source: Compiled by Author based on Muriuki and Thorpe (2001)

⁶ UHT products are aseptically processed and packaged, which gives them a shelf life of 6-12 months without the need for cooling during storage and transportation.

2.5 Milk Consumption in Ethiopia

Milk Consumption in Ethiopia shows that most consumers prefer purchasing of raw milk because of its natural flavour (high fat content), availability and lower price. Specific upper income market segments prefer and can afford packaged processed milk. Packaging costs alone may add up to 25% of the cost of processed milk depending on the type of packaging used. Polythene sachets of processed milk are cheaper alternatives.

Ethiopians consume less dairy products than other African countries and far less than the world consumption. The present national average capita consumption of milk is 19kg/year as compared to 27 kg for other African countries and 100kg to the world per capita consumption (FAO, 2003). The recommended per capita milk consumption is 200 litre/year. On the other hand, they regularly consume other dairy products such as butter, ayib (cottage cheese) and fermented milk.

According to the Central Statistics Authority (2005) only 15.4% of the milk produced is sold in the market where as 54.7% milk produced is consumed at home (see Table 3 and Figure 2). The remaining, 29.5% of the milk produced, is converted into butter and cottage cheese or ayib using traditional processing technologies. It is to be expected that these proportions would start to change as collection-infrastructures improve around the country.

There are differences in the demand for milk between rural and urban population. The demand for milk in rural areas is mainly for fresh whole milk and this demand is partially satisfied by home production and or purchased from neighbouring producers. The demand for processed milk in the rural areas, is currently nil and expected not to change significantly in the near future.

The potential market for surplus milk which will have to be processed is found in the 7% urban population, i.e. 4 million people. Sixty five percent of this market is formed by Addis Ababa and the surrounding districts. The principal demand will continue to be fluid milk, much of which will be supplied through informal channels. In rural areas, consumption of milk and milk products is heavily influenced by livestock ownership, but in the urban areas, in particular, the principal determinant of consumption levels is income. The growth in demand resulted from rapidly growing population, urbanization, change in life style and consumption behaviours, and some increase in per capita incomes.

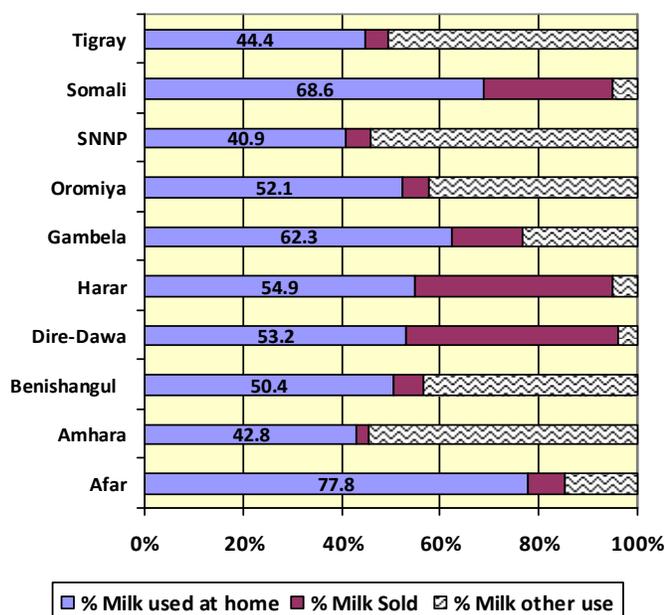
In general, the milk market is characterised by low per capita consumption of milk which reduces

Table 3: Amount of milk produced & consumed by regions

Regions	Cows pop. in '000	Annual production in million	% Milk used at home	% Milk Sold	% wage spent on milk	% Milk other use
Afar	176.1	63.5	77.8	7.5	0.22	14.5
Amhara	1018.1	466.7	42.8	2.4	0.65	54.1
Benishangul	65.9	20.1	50.4	5.8	0.55	43.3
Dire-Dawa	18.8	4.5	53.2	42.7	0.02	4.1
Harar	8.2	3.1	54.9	40.0	0.01	5.1
Gambela	47.6	15.9	62.3	14.2	0.36	23.2
Oromiya	3988.3	1,145.3	52.1	5.7	0.14	42.1
SNNP	2817.1	723.8	40.9	5.0	0.28	53.8
Somali	107.3	49.9	68.6	26.2	0.18	5.0
Tigray	284.0	130.3	44.4	4.8	0.59	50.2
Total	8531.4	2,623.1				
		Average	54.7	15.4	0.3	29.5

Source: CSA, 2005

Figure 2: Milk use patterns by Region



Source: Compiled based on CSA, 2005

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effective demand; and limited dairy education, research and promotion on consumption of milk. Seasonal variations and fasting periods affect also consumption. There is inadequate marketing, cooling, bulking, processing infrastructure and market information for traders and dairy industry actors. This limited processing facilities on one hand and its concentration in/ around Addis Ababa results in inequitable consumption, as there is no enough milk packaged for non-milk producing areas. The milk marketing is also affected by poor quality and inconsistent flow of inputs like feeds, breeds, equipments, etc. to the dairy industry.

It is also characterised by imbalance between formal and informal milk marketing channels. This has significant impact on public health. Regulatory bodies need to impose strict regulations (e.g. in transport, handling, processing premises) that will force the non-compliers to quit. Those who comply will become formal; hence reduce the gap between the formal and informal market channels.

3 Ethiopian Dairy and Related Policies

3.1 Historical perspective

Political developments in Ethiopia coincide with three phases of dairy development policy and regulatory frameworks: (1) imperial regime (1960-1974) characterized by a free market economic system and the emergence of modern commercial dairying, (2) the socialist *Derg* regime (1974-1991) that emphasized central economic system and state farms and (3) the current phase (1991 to present) under the structural adjustment program and market liberalization.

The principal rationale for assessing subsequent political regimes in identifying phases of the dairy development is that during each of these three phases, the country followed a distinct political path and development policies that directly and indirectly influenced the dairy sector. These include land tenure and land policy, macroeconomic policy and orientation of development efforts.

The objectives of various policies of the successive regimes have been to improve commercial dairy production in selected areas of the country, especially around Addis Ababa, through introduction of exotic and cross-bred cattle and related feed and management technologies, and development of a milk processing industry to supply the Addis Ababa market. The policy instruments and operational procedures employed to achieve these goals varied over time, reflecting the politico-economic philosophy of the respective governments.

The entrance of Sebeta Agro-Industry, a private dairy processing firm, in the late 1990s offering producers up to 2.00 birr/l of raw milk has stimulated competition and helped expand the formal market. This has caused many peri-urban producers to stop supplying to the DDE. Though the administratively set prices paid to producers have been raised, the informal sector continues to dominate the market accounting for about 80% of the milk market in the Addis Ababa milk shed (Staal, 1997).

To take advantage of the newly created market opportunities as a result of the economic reform measures, prominent dairy producers within a 100 km radius of Addis Ababa formed the Addis Ababa Dairy Producers Association (AADPA). By the end of 1992, 90% of all urban dairy producers enlisted. The main objective was the procurement of cattle feed rather than milk collection. The rural cooperatives were rebuilt giving attention to human capital (whose role would be to serve and not to govern) because of the lesson learned from the past of the undesirable role of the government in co-op affairs. A new proclamation in 1998 further helped to promote cooperatives of a new kind by liberalizing co-ops from direct government control to an advisory role. However, these multipurpose cooperatives were still primarily engaged in crop activities and input supplies for members and dairy was not yet a major activity, therefore had minor role in the milk market – formal or informal.

Among the development projects, FINNIDA implemented the Smallholder Dairy Development Pilot Project (SDDP) with additional funding from FAO and WFP covering two districts during 1991-1994 and 16 more districts during 1995-2000. Identifying marketing as the major constraint for dairy development, the SDDP organized small milk processing and marketing units to raise income and nutritional standard of smallholder farmers through improved dairying. About 30 cooperatives were formed in the peri-urban areas of Addis Ababa. Due to input limitations, the project had to reduce the number of contract farmers from 1000 to 500.

In addition to these focused projects, general improvement in veterinary services, breeding services including artificial insemination, and promotion of forage and feed production through the general extension service has also been observed. For example, between 1984/85 and 1999/2000, a total of 351 thousand inseminations were carried out through the artificial insemination networks throughout the country, but most of them in the Addis Ababa milk shed.

3.2 Dairy and Dairy Related Policies

In reviewing dairy and dairy related policies in Ethiopia the focus is generally on institutional and technical developments affecting the scope of dairy development in the overall development of the livestock sector. Development policies adopted by the Government may differ in form, declared or undeclared, which may affect the implementation according to legislations, regulations, orders and

decrees that may follow. Declared policies in the early period in dairy and dairy related developments are:

- Proclamation to provide for the control of animal diseases of 1961
- Order for the establishment of the institute of agricultural research of 1966
- Order for the establishment of the dairy development Agency of 1971
- Proclamation for the establishment of joint venture of 1983 and
- Proclamation for the establishment of the national investment policy of 2002.

Recent progress in development policy included the privatization policy, the reorganization of the Ethiopian Agricultural Research Organization and the establishment of the Livestock and Livestock Products Marketing Authority. See Table 4 for the relevant policies regulation, acts and standards relevant for dairy sector development.

The Ruminant Livestock Development Strategy and Livestock Development program, prepared in 1993 and 1997 respectively, were reviewed and acknowledged by the Government. To this effect, the National Livestock Development Project was formulated from the program and is under implementation virtually in all Regions from the finance obtained from the African Development Fund. As to the policies listed above, most are not declared policies to be enacted for proper implementation. Other policies which are the basis for the 'Dairy Development Policy of Ethiopia' are summarized as follows.

The animal health policy contained in Livestock Development Policy and the recently designed National Veterinary Policy (MoARD, 1999), have the general objective to provide veterinary services with the objective of securing the health, welfare and productivity of animals. The formulation of this veterinary policy may play a significant role in the improvement of livestock production and productivity. Thus, it could serve as a springboard for the dairy development policy. On the other hand there are no contradictory policy issues between the veterinary policy and the dairy development policy.

The Cattle Breeding Policy formulated by consultative group drawn from MOA, IAR, and ARDU (1986) was designed to address the preservation and improvement of the known indigenous cattle, sectoral breed substitution

programs and elite herd production, crossbreeding programs, artificial insemination and natural mating and Herd registration and performance recording. The role of institutions involved in livestock development, breeding policy for indigenous and dairy cattle production; and support services were also treated in the document. The policy was not further developed for implementation as declared policy. However it is serving as a guideline in breeding; the impact could not be evaluated

In light of constraints associated with low productivity of the dairy sector and the need to develop means to improve productivity appropriate policies should be in place to utilize the scarce resources the country has. Some of the issues that call for a policy action are listed below:

Table 4: Status of key policy issues relevant for dairy investment (by June 2008)

Issues	Position
Policy and strategy issues	
a) Agricultural Policy -	In place
b) Livestock Development Policy	Draft
c) Livestock Research Policy	In place (Amh)
d) Dairy development Policy	Draft
e) Livestock Master plan	In-preparation
f) Dairy Dev. Master Plan	In-preparation
g) Ruminant Livestock Dev. Strategy	Draft
h) Cattle Milk Research Strategy	In place
i) Animal Health Research Strategy	In place
j) Animal Feeds & Nutrition Strategy	In place
Dairy and related acts	
a) Dairy Regulation	Draft
b) Dairy Industry act	In place
c) Public Health act	In place
d) Cooperative Statute	In place
e) Regulations enforcement	Draft
f) Standard enforcement	In place
g) Veterinary surgeons act	Draft
h) The Pharmacy and Poisons act	??
i) Land act	In place
j) Factories act	??
k) Companies act	??
l) Animal Diseases act	In place
Standards	
a) HACCP	In place
b) Codex Alimentarius	In place
c) Standard acts	In place
d) local standards	Draft

Source: Compiled by Author

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- There is inadequate supply of milk and milk products to urban consumers. There is unstable supply of milk and milk products to urban consumers due to inefficient delivery system and inadequate market outlet for milk and milk products from rural areas.
- There is an ever increase in the import of milk and milk products. Moreover, the existence of distorted price for milk and other dairy products (especially of imported dairy products) discourage efforts to develop local production.
- There is low genetic makeup of the indigenous cattle for milk production.
- The livestock extension and services are inefficient in co-ordination of the dairy development activities, in controlling livestock diseases, improving forage production and promoting productivity of the sector.
- There is over grazing on the highlands due to communal grazing and overstocking.
- There is high and undesirable concentration of ownership of livestock (on the highland, handling self-replacement stock to provide traction power and subsistence supply of milk to the family; and on lowland, for prestige and wealth and against loss as risk aversion resort).
- Low recognition by government on land use (allocation of land rights for dairy, high and variable lease condition and the associated lack of security on land development for dairy production).

Increased domestic dairy production through the use of productive animals, particularly at smallholder dairy farm level, has the potential for dairy development. Hence, the focus of development should be on the large resource of indigenous livestock to address the majority of the population to generate income and employment and thus improve welfare on an economically sustainable basis. An appropriate policy is required to encourage the development of local dairy production to offset the shortfall in supply.

The *overall policy objective* of the Ethiopian dairy is to develop and utilize the available resources and increase its contribution as food and income to the social and economic development of the country. The specific objectives are to ensure self-sufficiency in dairy products, improve the nutritional standards of the population through the domestic provision of high quality, protein-rich dairy products, improve the incomes and living standards of farm families, create employment directly through investment on dairy, generate foreign currency through reduction of milk and milk product imports, encourage the production of necessary raw material inputs for the dairy industry, provide low cost produce of milk and milk products, conserve the indigenous breed characters, and conserve natural resources through proper land use and limitation of stocking rate according to carrying capacity.

The *short term dairy policies* are focused on the increasing the supply of milk and milk products by improving productivity through selection and management (utilize the potential adaptive genetic merit of the animals, raising the quantity of the feed available to livestock and improving management). The following are short term dairy policies:

- Improve productivity of local animals through selection and use of appropriate management
- Establishment of medium and large scale dairy farms in potential dairy development peri-urban areas
- Encourage participation of individuals, companies, co-operatives and the Government in the production and distribution of improved dairy stock
- Provision of services to private dairy farms to improve their productivity
- Control importation of milk, milk substitute and milk products for reconstitution and direct use to satisfy the ever-increasing demand for milk and milk products
- Develop and expand efficient marketing system in remote rural areas
- Organize farmers into milk producing, processing and marketing co-operatives
- Strengthen milk marketing system at national level
- Develop land use policy that encourages dairy development at all production system

The *long-term policy* on dairy development will focus on improvement of productivity of the available resource in terms of milk and meat (as a by-product of milk production). This will call improving the genetic merit of the animals, raising the quantity of the feed available to livestock and improving management at all levels from production to preservation, collection, processing and marketing until it is ready for consumption without losing any of its inherent quality and quantity. The long term dairy policy of Ethiopia is thus designed to utilize all means to achieve improvement in local milk production by increasing overall production by 4% per year. This is expected to supply adequate amount of milk, both

in quantity and quality to satisfy the minimum per capita requirement of milk for the whole population. These policies are:

- Increase the number of high milk producing animals
- Improve productivity of dairy animals under the different agro-ecological environment
- Develop appropriate dairy marketing system
- Establish an organization or institution responsible for dairy development (co-ordination in marketing, development and control of quality and pricing both at producer and consumer)
- Promote milk consumption by all sectors of the population through introducing quality and providing free and cheap but complete milk to vulnerable group and needy population
- Formulate land use policy that encourages dairy development at all production system

The above summary of reviewed dairy and related development policies have revealed the development efforts made in the sub sector which is important for the development of livestock sector, and the country at large. The formulation of the general and specific objectives as well as the role and responsibilities of concerned institutions and organizations that are involved in livestock development activities are described in the policy document.

According to Market-oriented Development Master Plan (MoARD), the strategy for dairy development include enhancing market oriented production system, development of appropriate technology packages and extension, training of farmers through the Agricultural TVET and Farmer Training Centres-FTC programs, integrating dairy development with promotion of dairy markets and concentrating development efforts in identified milk sheds. MoARD have dairy technology packages for extensive, semi-intensive and intensive dairy production systems since 2002. The goals of the development plan include increasing milk production from indigenous cows by 100% and that of the crossbred by 25%, increasing milk processing industries by similar orders of magnitude, increasing milk processing plants by three-fold, improving quality of the milk produced by 50%, increasing per capita milk consumption by 6 litres and increasing farmer's income from dairy by 50%

3.3 Ethiopian Laws & Regulations Facing the Dairy Sector

Ethiopia follows a market-oriented economic development strategy. In order to encourage, promote and expand private investment, the Government has issued a liberalized investment code (Proclamation No. 37/1996) and established the Ethiopian Investment Authority (EIA) and regional Investment bureaus. The EIA, in addition to the issuance of investment permits, provides one-stop investment services such as the provision of trade registration and operating licenses for private investors, granting of work permits to expatriate employees and facilitating the acquisition of land as well as utilities by private investors.

Cooperatives could not play its proper role in promoting smallholder production and marketing because there was little incentive on the part of the small producers to do so. Dairy production for majority of the poor small farmers remains a minor activity to complement mainly crop production. Due to low productivity of the animals raised, little income and marketable surplus is generated. On-farm processing of milk into butter and cheese is the responsibility of women but inadequate roads and market infrastructure constrain remunerative market access for products, so their return from value added activities remains meager.

With the objective of promoting smallholder and commercial dairy production and the inflow of foreign capital and technology into the country, the Ethiopian investment code provides the various packages of fiscal incentives to both foreign and domestic investors engaged in new enterprises and expansions. The prominent provisions of the Ethiopian investment regulatory environment like equity restrictions and incentives to investors are examined in the following sections.

3.3.1 Investment Incentives to Investors

Ethiopia's market-oriented economic development strategy embraces wide reforms, with incentives to both domestic and foreign private investments. The Ethiopian Government has further revised the investment code in order to encourage the private sector to invest in most areas of the economy. Even those economic areas hitherto exclusively reserved for the government, namely defence industries, hydropower generation, and telecommunications services are now open for private, domestic and

foreign investors. The revised code has also granted additional incentives to investments in health and education and other sectors. Moreover, the code provides a provision for individuals who were Ethiopian by birth but changed their nationality to be treated, if they wish to, as domestic investors.

Investors are eligible for investment incentives. Special incentive sectors and sub-sectors include agricultural development and agro-processing, agricultural production, manufacturing of equipment and machinery, spare parts, components and supplies, vehicle bodies, other products and assembly plants, and publishing of printed goods; large-scale road and building construction and other related works. Rural transportation facilities; and the purchase of spraying machinery, trucks fitted with refrigeration facilities, or other equipment for support services are also eligible for special incentive facilities.

To encourage private investment and promote the inflow of foreign capital and technology into Ethiopia, an investor in one of these specified areas who meets the conditions for a qualifying investment certificate, and who produces evidence showing the exact amount of the capital invested within 30 days of commencement of operation, may qualify for the following investment incentives.

i). Exemption from Customs Import Duty

One hundred percent exemption from the payment of import customs duties and other taxes levied on imports is granted to all investment capital goods, such as plant and machinery, equipment etc. Spare parts worth up to 15% of the value of the imported investment capital goods, provided that the goods are not produced and not available locally in comparable quantity, quality and price are also treated in the same manner.

Investment capital goods imported without the payment of import customs duties and other taxes levied on import may be transferred to another investor enjoying similar privileges.

Exemptions from customs duties or other taxes levied on imports are granted for raw materials necessary for the production of export goods.

ii). Exemptions from Payment of Export Customs Duties

Ethiopian products and services destined for export are exempted from the payment of any export tax and other taxes levied on exports.

iii). Income Tax Holiday

Any income derived from an approved new manufacturing and agro-industry investment or investment made in agriculture (like dairy industry) shall be exempted from the payment of income tax for the periods depicted in the following table, depending upon the area of investment, the volume of export, and the location in which the investment is undertaken.

Profit tax holiday of up to five years is granted for investors based on industry type (new or expansion/ upgrading), level of export-orientation (see Table 5 for details). An additional one year profit tax exemption is given if the investment is made in the under-developed regions like Gambala, Benshangul Gumuz, Afar and Somali regional states.

On the other hand, if an investor engaged in *Expansion or Upgrading* of agro-industry (like dairy industry) activity where the expansion or upgrading increases the existing production by 25% in value and 50% of the production is to be exported shall be exempted from the payment of income tax for the period of 2-3 years depending upon the investment regions. Any investor, foreign or local, is entitled to have

Table 5: Areas and periods of tax exemption

Conditions for Profit Tax Eligibility	Profit tax exemption
An investor engaged in a new manufacturing or agro-industry activity:	
a) If he exports at least 50% of its products	5 years
b) If he supplies at least 75% of its products, to an investor, as an input for the production of export items	5
c) If it exports less than 50% of its products	2
d) If the project is evaluated under a special circumstance by the BOI	up to 7
e) If the production is for the local market	2
f) If the production mentioned above in (c) is considered by the BOI to be a special one	5
Expansion or upgrading of the above projects:	
If the expansion or upgrading increases the existing production by 25%, in value and 50% of the production is to be exported	2

Source: Investment Proclamation No. 280/2002

deduction of expenses incurred for research, improvement studies or training from his taxable income. The Council of Ministers may also award profit tax holiday for more than seven years.

iv). Exemption from Payment of Taxes on Remittance of Capital

Any remittance made by a foreign investor from the proceeds of the sale or transfer of shares of assets upon liquidation or winding up of an enterprise is exempted from the payment of any tax.

v). Loss Carry Forward

All investors investing in areas eligible for incentives such as agro-industry (dairy industry), when business of their enterprises suffer losses during the tax holiday period can carry forward such losses following the expiry of the exemption period for half of the income tax exemption period which could be from 3 to 5 years depending on the location.

vi). Liberal Depreciation Rate

Depending upon the choice of the investor, either a straight line or an accelerated method can be employed for the calculation of depreciation allowances.

vii). Provision/ Allocation of Land

According to the Urban Land Lease Holding Proclamation of 1993, the Government possibly will provide land with public tendering which is to be utilized for investments. Accordingly, land for dairy industry investment purposes is obtained on lease and with prices set by periodic auctions. Land leasehold regulations vary in form and practice from region to region. Nonetheless, they all are best in attracting investments. Land could be obtained by paying nominal or fair charges. In some priority investment areas, land could be availed even free of charges. There are also industrial zones with adequate infrastructure facilities.

Likewise, when a Regional Government receives an application for the allocation of land for an approved agro-industry or dairy development investment; it shall, on the basis of the Federal and its own laws, deliver within 60 days, the required land to the investor. The Region shall allocate land for investment activities and transmit information on such allocations to the appropriate investment organ. Each Region shall, in the allocation of land, give priority to approved investments. The appropriate investment organ shall, in cooperation with the concerned regional executive organs, facilitate and follow up the allocation of land for approved investments.

3.3.2 Equity Restrictions

Both foreign and domestic private entities have the right to establish, acquire, own, and dispose of most forms of business enterprises with up to 100% equity ownership. There is no equity restriction in sectors like agricultural development and agro-industry including dairy industry. In addition to this, Ethiopia has ratified:

- the convention establishing the Multilateral Investment Guarantee Agency of the World Bank.
- signed bilateral investment promotion agreements with a number of OECD countries.
- signed the World Bank treaty on "the International Convention on Settlement of Investment Disputes between states and nationals of other states (ICSID)".

Moreover, the Ethiopian constitution gives protection to private property. The investment proclamation also provides investment guarantees against measures of expropriation and nationalization. Expropriation or nationalization may only occur either in the public interest or in compliance with the requirement of the law. Where such expropriations are made, the government guarantees to provide adequate compensation corresponding to the prevailing market value of the property and such payment shall be effected promptly.

Capital repatriation and remittance of dividends and interest is guaranteed to foreign investors under the Investment Proclamation. Any foreign investor has the right, in respect of an approved investment, to make the following remittances out of Ethiopia in convertible foreign currency at the prevailing rate of exchange on the date of remittance:

- Profit and dividends accruing from an investment

- Principal and interest payment on external loans
- Payments related to technology transfer or management agreements
- Proceeds from sale or liquidation of an enterprise
- Proceeds from the sale or transfer of shares or assets, and
- Compensation paid to a foreign investor.

Conversely, there are various forms of investment which could be taken up by investors be it in agro-industry or dairy sector or others. The two major ones are joint venture and wholly foreign owned investments.

Joint Ventures: A foreign investor can team up with a domestic investor or company for a joint investment, usually in the form of a partnership, private limited company or a share company. Under the Investment Proclamation No.280/2002, a foreign investor requires a minimum equity capital of USD 60thousand to enter into a joint venture partnership with a domestic investor to establish new or expanding the existing manufacturing or agro industry. The minimum equity capital can be raised either in cash or in kind, in the form of capital goods such as machinery, equipment or other tangible assets, imported specially and exclusively to establish the enterprise. There is no equity restriction at all in share ownership in a joint venture.

Wholly Foreign Owned Investments: when a foreign investor, who intends to invest on his/her own, in manufacturing or agro industry including dairy development, is required to invest not less than USD100thousand in cash and/or in kind as an initial investment capital to start business. This is a minimum capital required of a foreign investor investing in these sectors.

3.4 Tariffs and Subsidies in the Dairy Sub-Sector

Some of the regulations that affect the domestic and cross-border trade in dairy products negatively hinge on the need to protect the local industries. Some of the regulations that counteract dairy sector development are: the barrier created by imposing a suspended tariff and non-tariff duty which creates abnormality by imposing and eroding the competitiveness of traders in dairy industry both domestic and intra-regional. Especially, the non-tariff charges have annulled and lower the benefits obtained from dairy products by traders in the sector.

Intra-Regional trade in dairy products among the EAC and COMESA region countries ranges from 0% to 10% for COMESA Free Trade Area (FTA) countries. Import duty on dairy products from third countries ranges between 0% in Mauritius and 60% in Kenya, with all the other countries charging varying duties within this range.

Ethiopia applies 18% to 30% import duties on COMESA and other countries' products depending on the dairy product and country of origin (see Table 6). Lack of harmonized tariff on intra-regional trade in dairy products is quite evident. Similarly, there is lack of a common policy on how the region relates with third countries with regard to imports of dairy products. There is disparity in external tariff policy, a phenomenon which creates opportunity for trade diversion from the regional countries to the third countries. A common external tariff policy stimulated by the need to promote regional dairy sector is needed.

Non-Tariff Charges

In addition to import duties, Ethiopia like COMESA and EAC member countries impose other non-tariff charges. Ethiopia imposes 15% Value Added Tax, 10% Sur Tax and 10-30% duty and 3% WHT as non-tariff charge on imports of dairy products.. Uganda and Tanzania exempt imported dairy products from VAT. Other charges include Import Declaration Form (*IDF*) fees, Standards Bureau Fee, Dairy Authority Cess, Pre-Shipment, Suspended Duty and Excise Duty are yet not imposed on imported dairy products.

The effects of the non-tariff charges have been to negate the benefits of low intra-regional tariff on dairy products. This is an issues raised by traders in the region as being of gross concern. The main barrier created by imposing a suspended duty is the unpredictability it imposes on traders because of the haphazard manner in which it is applied. It often comes into effect immediately after imposition and therefore could greatly erode the competitiveness of commodities procured prior to its imposition. Another problem is that they tend to stay longer than necessary despite being intended for short-term

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protection of domestic producers. Generally, by reducing entry prices, increasing trade margins and protecting the regional market from the international dairy giants, the EAC Customs Union and COMESA FTA offers a real prospect for increasing dairy trade. Combined impact of high tariffs and high freight charges are detrimental to trade initiatives and it is only by expanding the FTA can COMESA countries will begin to register growth in dairy trade.

Table 6: Ethiopia Custom Tariff on Imported Dairy Products

CUSTOMS tariff No	Description of Dairy Products	Duty rate (%)	VAT (%)	WHT (%)	Sur tax (%)	special Permission
04011000	Milk and cream of =<1% fat, not concentrated or sweetened	30	0	3	10	MOH
04012000	Milk and cream of >1% but =<6% fat, not concentrated or sweetened	30	0	3	10	MOH
04013000	Milk and cream of >6% fat, not concentrated or sweetened	30	0	3	10	MOH
04021000	Milk and cream in solid forms of =<1.5% fat	20	0	3	10	MOH
04022100	Milk and cream in solid forms of >1.5% fat, unsweetened	20	0	3	10	MOH
04022900	Milk and cream in solid forms of >1.5% fat, sweetened	20	0	3	10	MOH
04022910	---When imported in bulk by food manufacturing industries	10	15	3	10	Not required
04022990	---Other	20	15	3	10	Not required
04029100	Concentrated milk and cream, unsweetened (excl. in solid form)	20	0	3	10	MOH
04029900	Sweetened milk and cream (excl. in solid form)	20	0	3	10	MOH
04031000	Yogurt	30	15	3	10	MOH
04039000	Buttermilk, curdled milk and cream, etc (excl. yogurt)	30	15	3	10	MOH
04041000	WHEY & MODIFIED WHEY, WHETHER OR NOT CONCNRTRD OR CONTNG SWEETENING MATTER	30	15	3	10	MOH
04049000	Products consisting of natural milk constituents, nes	30	15	3	10	MOH
04051000	Butter	30	15	3	10	MOH
04052000	Dairy spreads	30	15	3	10	MOH
04059000	Fats and oils derived from milk (excl. butter and dairy spreads)	30	15	3	10	MOH
04061000	Fresh (un-ripened or uncured)cheese, including whey cheese and curd	30	15	3	10	MOH
04062000	Grated or powdered cheese	30	15	3	10	MOH
04063000	Processed cheese, not grated or powdered	30	15	3	10	MOH
04064000	Blue-veined cheese	30	15	3	10	MOH
04069000	Cheese, nes	30	15	3	10	MOH

Source: Ethiopian Customs Authority, ECuA, Addis Ababa November 2007.

4 Socio-Environmental Factors for Investment in Dairy Sector

The livestock sector in general and the dairy sub-sector in particular do not make a substantial contribution to the national income, despite its large size, due to numerous socio-environmental factors. The poor performance of the dairy sub-sector can also be attributed to socio-economic, infrastructure and technical constraints, inadequate research and extension, and lack of policies relevant to the development of the dairy industry. Land tenure policies, feed availability, lack of adequate dairy services, breeds of cattle used, lack of marketing outlets, roads and transportation have their own contribution.

Because of various socio-environmental factors, still in Ethiopia today the dairy market appears even less developed than in neighbouring countries with similar agro-climate conditions, like Kenya and Uganda. Smallholders dominate dairy production in all the three countries. Similarly, all have parallel formal and informal marketing system where the proportion of milk marketed in the formal market constitutes a very small portion of the total milk produced (Muriuki and Thorpe, 2001).

The following socio-environmental factors represent underlying opportunities for increased trade that may be tapped by dairy businesses in Ethiopia and COMESA to expand trade and enhance their long term return on investment goals.

4.1 Demand Side Constraints

Population Growth: The high rate of population increase (about 3% per annum) is reckoned to influence livestock development. The demand for livestock products, particularly for dairy is directly related with the annual population growth. Notwithstanding, the rate of growth in dairy products production is not in par with the population growth rate in Ethiopia. There many reasons for this. High population growth has forced people to cultivate more and more lands, which used to be mostly grazing areas for livestock. This practice has stretched the carrying capacity of the land beyond its limits, and consequently resulted in low livestock production performance.

Seasonality of demand: The demand for milk and dairy products is very much affected by seasonal fall of demand among the Orthodox Christians (that comprise about half of Ethiopia's population) during the fasting season and the fasting days. The majority of the Orthodox Christians practice fasting more than 200 days per year, during which time they abstain from consuming animal products. When dairy enterprises process only pasteurized milk with a short shelf-life, this means that processed volumes go down during the time when people (fast) consume less. Once UHT technology has been introduced, processing of milk can be more regular leading to a stable sourcing of raw milk for processing as well.

Low per capita consumption: Dairy per capita consumption is extremely lower (16 litres per year) and the recommended amount is 200 litres/ annum / capita. Marketing should include promotion of milk consumption. Training and public education including school milking could be considered as part of a milk promotion program.

Low demand and high transaction costs: Growth of the dairy sector is constrained by low demand and low prices and/or by high transaction costs, which reduce the actual price received by producers and their incentive to generate surpluses. Milk is mainly produced for household consumption and any surplus is taken to the market provided that the price received compensates the effort (the opportunity cost) to take that surplus to the market.

4.2 Supply Side Constraints

Livestock population: One of the serious constraints to the livestock development in Ethiopia rest on the importance attached to the economic functions of the livestock found in various agro-ecological zones. Overall, livestock in Ethiopia are used as input function, asset and security function.

Farming methods in Ethiopia have remained unchanged for centuries; cultivation is carried out using oxen drawn traditional ploughs in the highlands which demand high dependency on animal power (as an input function). High population growth forces people to plough more land, which in turn demand more

ploughing capacity, and consequently the presence of a higher cattle herd. This has created pressure on grazing land and ultimately poor economies of smallholder farms in the rural areas. The other economic benefit of livestock, as a source of additional income, assets and security are also important, however due to low productivity of the indigenous stock these functions requires maintaining large herds which demand additional area of grazing land.

In the lowlands the pastoralists and agro-pastoralists derive maximum benefit from livestock through milk and meat (the output function). Similarly, in order to compensate for low livestock productivity and to offset risks due to recurring draught the pastoralists maintain large cattle stock for food as well as security functions.

Animal health: Poor animal health and management are major constraints of dairy development in Ethiopia which cause poor performance across all dairy production systems. Many of these problems result from the interaction among constraints themselves e.g. poorly fed animals develop low disease resistance, fertility problem, partly because the animal health care system relies heavily on veterinary measures. Poor grazing management systems continue to cause high mortality and morbidity (e.g., internal parasites). Many of the disease constraints which affect supply are also a consequence of the non-technical constraints e.g. insufficient money to purchase drugs or vaccines.

Because smallholder dairy development is a rather risky endeavour, good, easily accessible veterinary services are essential. Experience in many countries, such as India and Kenya, shows that private veterinary services (also supplemented by public services for the "public goods" such as vaccination) are highly desirable, and can provide the flexible, dynamic services the smallholder dairy producer requires.

Feed and nutrition: Inadequate supply of quality feed is the major factors limiting dairy productivity in Ethiopia. Improved feeding is crucial to provide satisfactory environment for animal growth and feed supplements stimulate higher milk productivity. Feed, usually based on fodder and grass, are either not available in sufficient quantities due to fluctuating weather conditions or when available are of poor nutritional quality. These constraints result in low milk yields, high mortality of young stock, longer parturition intervals, and low animal weights.

Feed supply is a major issue for smallholder dairy systems, as most systems operate under conditions of extreme land pressure, feed conservation for dry season supplementation has been a major issue, as most technologies, such as silage, haymaking, and urea treatment are not suitable for smallholder. Fodder trees and mixed tree-legume protein banks can be a solution.

Hence, improved nutrition through adoption of sown forage and better crop residue management can substantially raise livestock productivity. In highland zones, high population growth and density are causing the shortage of grazing land on which livestock production by smallholders depends. In the lowland areas, the shortage of feed and water during the dry season forces animals and livestock keepers to trek long distances in search of food. The quality of feed also deteriorates during the dry season in both the mixed farming and pastoral system. Apart from this, there is critical shortage and high cost of feed. Besides, there are only few companies that produces feed concentrates and therefore dairy processing firms depend on farmers' scanty produce.

Low Productivity and Genetics: The productivity of indigenous stock is a major constraint in dairy development. In the indigenous herds genetic potential for milk production is low. However, there is still a potential for increased production through improved management; selection of the best animals; improved reproduction; etc. Similarly, the potential for production of marketable milk is not fully exploited in the indigenous herd. The selection of efficient breeds specifically adapted to respond to those elements in the environment that are subject to man's control is the necessary step to improve the dairy sector. The choice of dairy breed has been subject to much debate. Generally, a combination of selection in local breeds and cross-breeding with exotic genetics is more appropriate, leaving it to the skill of the individual smallholders to decide on the level of exotic germ-plasm they can manage.

Quality Problem: Adulteration is the major problem in processing and marketing. Milk adulteration is usually done by farmers and brokers. Both hygienic and nutritional aspects are important in milk quality. It is important to identify where adulteration in particular occur in the marketing chain: -farmer level; -middlemen; -distribution. In some modern companies such as Sebeta Agro-Industry (Dairy Processing Enterprise), quality control is made using physical and chemical laboratories though the company doesn't have bacteriological laboratory.

Health Problem: Public health implications of the sale of raw milk/ unpasteurized milk marketing in towns and cities cause various health problems. Even though, possible hygienic/ health related problems be solved by expensive milk processing and marketing systems that will increase consumer milk price and reduce consumption/demand, it should be critical to consider necessary sanitary and hygienic related issues in all type of dairy farms.

Collection Problems: Delays in collecting milk from the farmers to the processing plants and in delivering from the processors to the distributors contribute to high incidences of spoilage. Poor customer care coupled with unreliable and unhygienic processing methods contributed to poor product quality which in turn suggests the need to strengthen management and investment in udder hygiene and cold chain technologies.

The use substandard milk collecting utensils and buckets for up lifting the milk from the supply centres, where many smallholders are doing their sells, may result in poor milk quality. Similarly, non-existence of chilling and cooling centre at potential milk producing and supply area also cause a deterioration of milk quality. Moreover, faulty processing equipment that result in leakage of the processed products and keeping milk collected from over a 100km radius for long hours without refrigeration results in milk quality decline and high incidences of spoilage.

Institutional Concern: Development of dairy co-operatives is too slow and they are too weak. Due to problems with the leadership and competence in cooperatives a lot of a dairy cooperative do not concentrate on dairy and divert the limited resources into other activities. Transparency and accountability are important issues for survival and success. Co-operatives have to be business organizations that make profit for the members. The only objective of a dairy cooperative should be to make as good a profit as possible by handling milk delivered from the members. A dairy cooperative is not a social institution.

The Ethiopia Milk and Milk Producers and Processors Association (EMPPA), established in 2006 though the support of SVN-BOAM, has technical and financial capacity limitations to assume its objectives. It is expected that the association would serve as voice for milk value chain actors in identifying policy issues and forwarding to the relevant regulatory body, facilitate market access and linkage among members, working towards improving dairy technology and techniques by sharing experiences and good practices, and developing culture of dialogue, conflict management and competitiveness.

Another area of institutional concern is that most extension staff have little experience with livestock and dairy farming. Key areas requiring additional extension training include fodder production and livestock feeding schemes, husbandry (in particular calf rising), and dairy hygiene. Health and breeding services can best be handled by specialized professional services. Extension staff must also help producers cope with social change, such as changing gender roles and issues of access and control over resources.

Lack of technical support: Milk suppliers need to have technical support on the process of production including feeding and nutrition, breeding, sanitation and milk hygiene, human and animal health, marketing and handling and transportation of milk towards collection centres. Through appropriate technical support and capacity improvement, the core problem of milk value chain (shortage of raw milk supply, access to reach the raw milk, and method and means of milk collection) could be tackled.

Lack of infrastructures: Infrastructures, especially access roads that reach the rural community has limited the supply of marketable milk to collection centres. Even if farmers have the capacity to produce more milk than they are doing today, they are not encouraged to make effort on milk production they cannot sell. On top of inconvenient infrastructures the milk collection centres are not at the level of what they should be and needs special attention at different sites.

Lack of Access to Land: perhaps the greatest institutional and socio-economic constraint that the dairy industry faces today arises out of socio-economic rather than technical problems; i.e. the lack of access to land for expansion of the dairy enterprises and feed production. The problem of inadequate feed is a result of the limited land availability for pasture establishment especially on productive highland areas where dairy cattle can flourish and where the density of the population is high.

Lack of Credit: Capital requirements for smallholder dairy producers are high and may be especially constraining for women farmers. Institutional credit schemes need to be long-term. If, for example, a pregnant three-year-old cow is the starting stock for the family dairy, credit terms should be for at least three years. Loans are ideally accompanied by an insurance system to mitigate animal loss risks.

However, experience with livestock insurance has not been very good, because of the moral hazard problems involved. Moreover, at present none of the credit institutions provide credit for the purchase of dairy heifers. Financial supports to the smallholder farmers who intend to go into commercial dairy farming are very much limited.

The credit-in-kind system, whereby animals are provided on condition that some of the offspring are passed on to other members of the community, has been effective in many programs. If the program is adequately integrated in the local community, peer pressure ensures sustainability of the passing-on mechanism.

Unreliable Seasonal Supply: the weather conditions highly determine the production levels of milk in all production systems in Ethiopia. Similar to most of African countries, Ethiopia's milk yield is estimated to fall by more than 50% during drier periods lasting up to 6 months per year. Due to limited capacity to process long life dairy products, Ethiopia experience predictable periods of scarcity, with part of the deficit filled by imported dairy products.

The principal problems of the milk collection, apart from seasonality, are small volumes of supply, dispersed and relatively low income retail markets, poorly developed transportation systems and heavy seasonal rainfall and irregular and unreliable access to market for milk and milk product.

Idle Capacity: Most dairy plants in the country are operating under capacity, i.e., less than 40%. Excess processing capacity, if where accompanied by abundant low priced milk, is one of the "low hanging fruits" for increased domestic business and cross border trade into COMESA.

5 Opportunities for Investment in Dairy

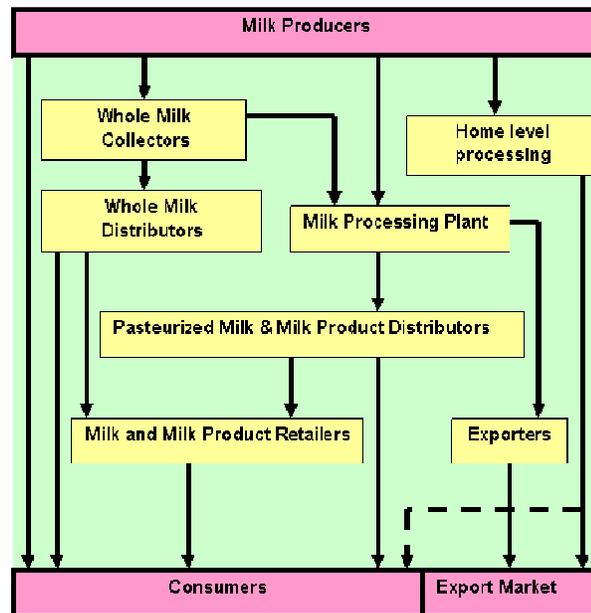
5.1 Ease of Entry into the Dairy Sector

The dairy industry is essential for rural Ethiopia and it is potentially the largest rural employer in the Ethiopian highlands and pastoral/ agro-pastoral areas. With continued urbanization, growing population size, demand for milk by the children and younger generation, it is expected that the dairy industry will become a major player in agricultural development and has further potential to contribute significantly towards increased income and employment.

The ultimate goal of the intervention in the dairy industry in general and Milk Value Chain in particular is to increase rural incomes by increasing the number of rural households deriving their livelihood from dairy business through managing high productivity enterprises, while delivering quality and affordable dairy products to the market. This study tries to identify the intervention points into Ethiopian dairy industry along the milk value chain (see Figure 3 and Figure 4).

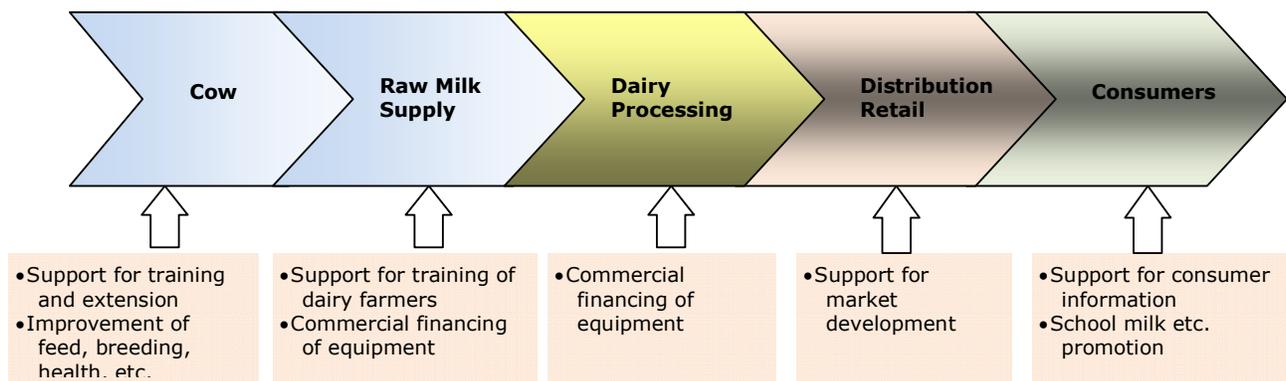
To build a successful and sustainable dairy industry, all parts of possible entry points across the milk value chain have to be identified and addressed; from cow to consumer. Different parts of the value chain need different kinds of support and intervention where the situation of course requires various case to case interventions. Several entry points could be identified across the dairy value chain with varied degree of resource requirement and level of competitions. Farmers need support and training to increase milk production in yields and quality. Dairies might need assistance in evaluating the feasibility of investments and financing for investment in equipment. The dairy industry that relies on a good milk supply and collection systems need to be put in place. Distributors and retailers to reach out to customers are also needed in sufficient number. Finally consumers need information on what the dairies offer and on the benefits of drinking good quality milk. The illustration below summarise the milk value chain from a 'cow to consumer' as a model for sustainable dairy development.

Figure 3: Market channel of milk & milk products



Source: SNV-BOAM Milk Value Chain, 2006

Figure 4: Cow to Consumer model



Differential growth across geographical areas (regions) would be expected due to differences in production environment, infrastructure and other factors that facilitate or hinder growth.

The **low level of raw milk supply** which is critical at present could be an entry point into the sector for investors. The number of investors and level of competition to get into the business of the dairy industry in the country is lacking. Quite a lot of incentive and support are available from the government at all level to ease the entry of investors into the dairy industry.

Possible interventions on the **supply side** could be strengthening of raw milk supply, improving milk collection centres, provision of feed, logistics and breed improvement. In the processing chain quality improvement, business linkages, training, and technology transfer are important activities to be considered. The following value chain diagram by (SNV-Business Ethiopia (BOAM) - Milk Value Chain) indicates the possible intervention points (see Figure 5).

This value chain diagram indicates that raw milk supply has three possible sources: the owner dairy farm, small farmers and milk collectors. The collected raw milk is transported to the processing centre and used as main raw material to end up to pasteurized milk and other dairy products through various technological processes. In this value chain four intervention points are mapped. These are:

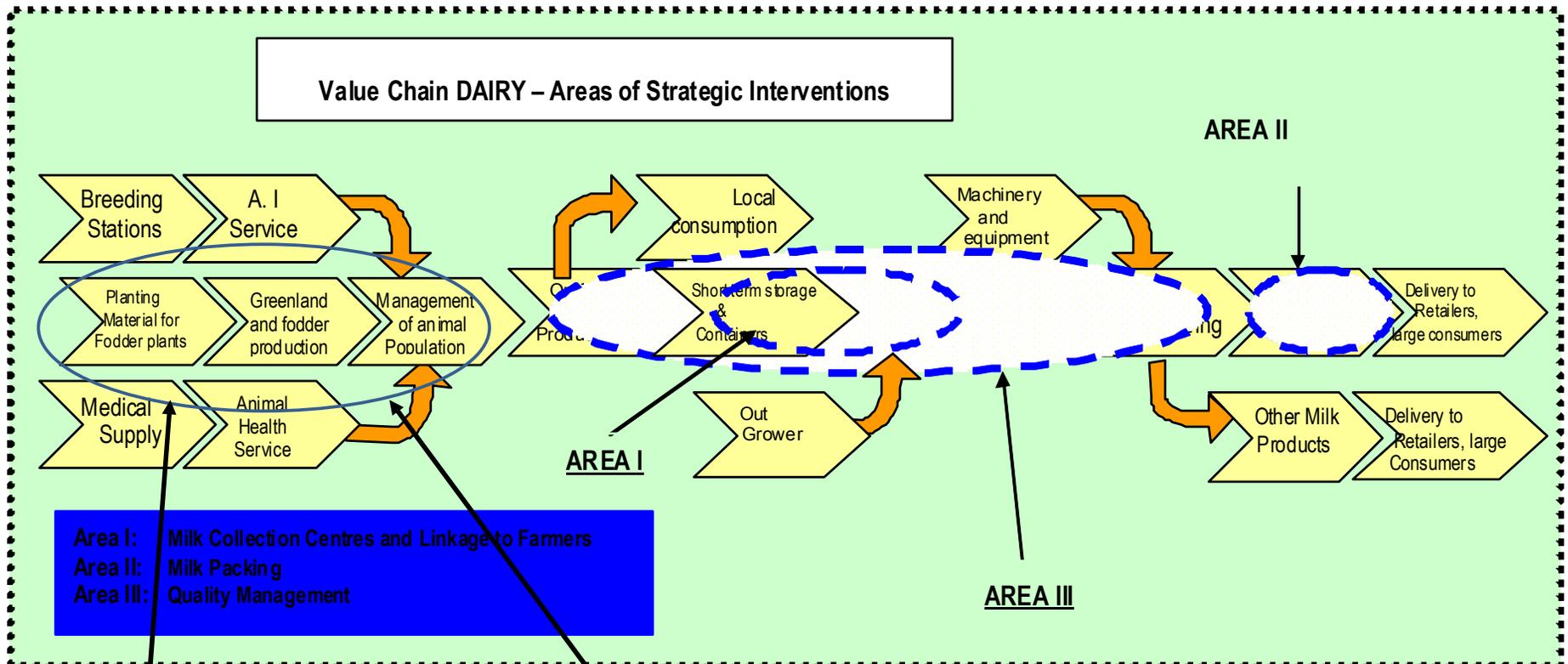
- Improving source of milk and get sustainable milk supply
- Supporting possible sources of raw milk such as small farmers
- Introduce milk collection centres with the necessary facilities that can help to increase the volume of milk supply
- Improve the packing technology and quality of finished product during processing

Currently, there is a growing concern by many stakeholders in dairy sector about the possible competition between *floriculture* sector and dairy investment on the existing scarce land resource. From an economic perspective, horticulture industry is a growing sector, which provides revenues to many workers, directly and indirectly, and foreign currencies for the balances of payment. Even though, both industries (floriculture and dairy) required relatively small land areas these sectors are competing for land especially in peri-urban and urban areas located around Addis Ababa. Besides, the special treatment and incentives on provision of land and other infrastructure that has been made by local and investment authorities for the floriculture industries compared to the dairy sector seems a little bit preferential. Apart from this, entry in to dairy business is easy compare to other business interventions in the country, as a *joint venture* or as *Wholly Foreign Owned Investments*.

On the other hand, to show the ease of entry into the dairy business the following examples from "*Potential investments*" (Haan et al. 2001) are indicated:

- Animal health and breeding services, with a focus on developing private systems. Costs would be about US\$2,000- US\$5,000 for breeding services, and US\$10,000- US\$20,000 for veterinary practices.
- Market development and infrastructure. Cooling systems vary between US\$1,000 and US\$20,000. Wood-fuelled pasteurization plants at nominal costs can be effective up to about 500 litres per day; small pasteurization plants (2,000 litres per day) cost about US\$10,000; and larger processing plant costs vary according to individual design.
- Financial services (savings and credit) need to be included in the overall microfinance systems, eventually supported by special credit in-kind schemes.

Figure 5: SNV-BOAM Milk Value Chain Model



Source: SNV-Business Ethiopia (BOAM) Milk Value Chain.

Land O'Lakes works on organising dairy cooperatives and development of market-oriented dairy services like breeding and AI, forage development, animal health services, as well as milk collection center development.

ILRI focuses on research that is relevant for development of livelihoods of people practicing dairying.

5.2 Milk potential commercialization areas in Ethiopia

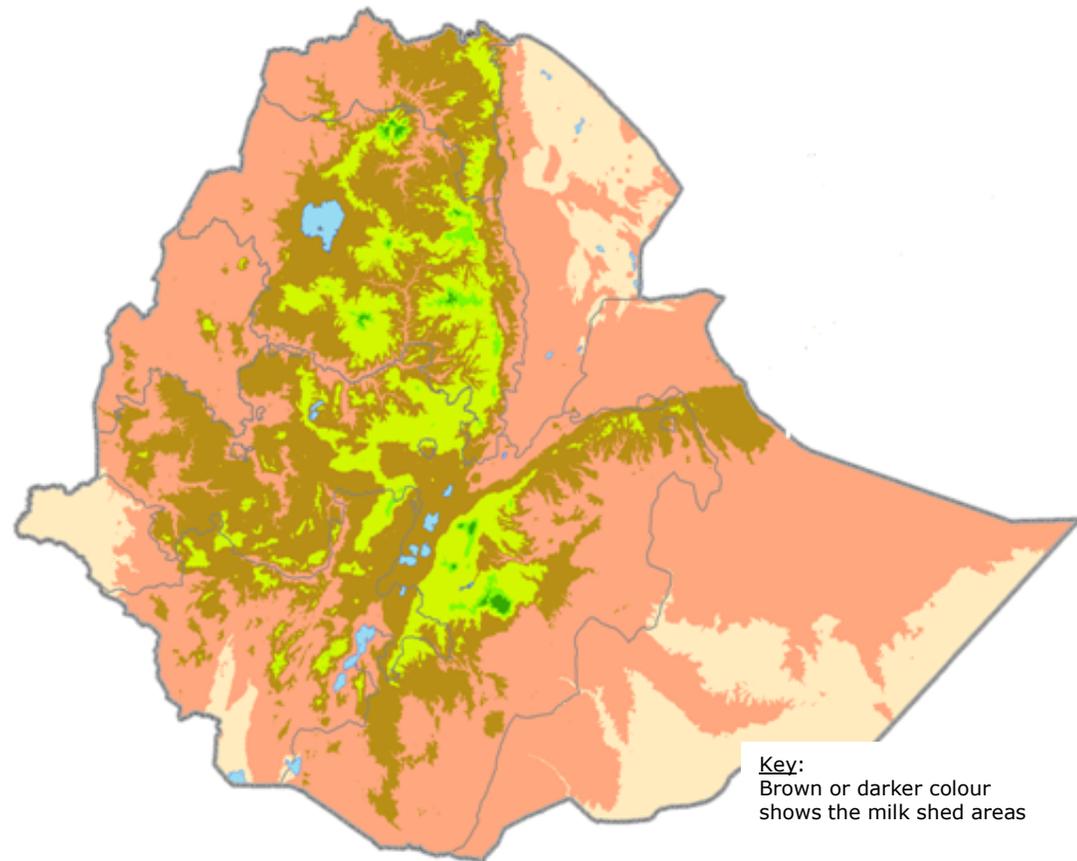
The milk shed districts in the different zones and regional states of the country suitable for market-oriented milk-production systems were identified by MoARD in 2005 (see Table 7). The major milk shed areas to a very large extent fall within the central highlands of the country, where the milk consumption is also higher due to higher population density and size compared to other ecological zones (see Table 7 and Figure 6). The majority of milk shed districts cover most of the urban and peri-urban centres and regional towns. Moreover, these districts have good telephone, electricity and road networks.

Table 7: Milk Shed zones in 4 regions of Ethiopia

Regions	Oromia	Amhara	Tigray	SNNP
Zones	Semen Shoa West Shoa East Wollega SW Shoa East Shoa Arsi East Hararge Bale West Hararge Jimma	Semen Shoa Eastern Zone West Gojjam Awi South Gondar North Gondar South Wolo North Wolo	Central Easter Southern Western	Sidama Welayta Hadiya Kembata Timb Gurage Gedeo Kefa Bench Maji

In the highland zones, milk production is given priority over other livestock production systems due to ecological conditions and the population-pressure that favour dairy production and the existence of neighbouring arid-areas with a comparative advantage for specialization in beef-production.

Figure 6: Milk-shed districts superimposed on agro-ecologic zones of Ethiopia



Data source: Calculated from Shuttle Radar Topography Mission elevation data, NASA.



5.3 Already existing opportunities

At production level, there are various opportunities in Ethiopian dairy sector including the need to organize farmers for better land utilization and fodder production, enhance feed access and distribution, planting perennial drought resistant fodders and promoting home-grown feeds.

The following investment opportunities along the Ethiopian dairy value chain are identified:

- At the production stage, private sector partnerships and strategic alliances offer opportunities to grow sustainable dairy enterprises. Other emerging investment opportunities at the production level include equipment supply and leasing, farm input supplies via organized check-off systems for groups of large farmers, milk testing and recording services, transport services and private extension services.
- At the farm level, investment potential lies in medium and large dairy farming but also there is potential in food processing and provision of advisory services including breeding technologies. There is opportunities to invest in dairy feed processing and feed technologies.
- Due to current low volumes, transport has not emerged as an attractive business service in the country. However as production grows, investment in milk tankers and transportation facilities will offer profitable business opportunities.
- Within the processing and packaging component, emerging opportunities include investment in modern processing equipment, supply of processing inputs and packaging, equipment supply and leasing and marketing support services.
- A number of existing small and medium scale dairy processors have limited capacity in terms of financial capital, equipment, technology and/or expertise. Some of such firms are interested in joint venture with other private investors local or foreigner to expand their operations. Similarly, some of the existing companies are also seeking for equity participation from foreign companies and individuals while others are considering outright purchase.
- With the relative fast growth registered in the dairy industry, there is a need to establish firms that provide dairy industry and related support services. Such services include artificial insemination; farm input supplies and market information, establishment of collection centres and distribution facilities, dairy breeding and farming.
- Post-harvest milk losses are high, especially during the peak seasons, when production level is high. This is due to limited access to milk collection centres. So far only the Sebeta Agro-industry and the LAME Dairy (formerly known as DDE) have limited number of milk collection centres. The other private and cooperative firms lack collection centres and facilities. In addition, substantial amounts of milk are spoiled in transit. This is due to the substandard containers and mode of transport used to collect and transport milk from up to 100km distance which lead to delays and high temperature build up in the milk. Thus, investment opportunities exist in establishing more and better managed milk collection centre as well as reliable milk distribution facilities including transport facilities and cold chains.
- Establishment of dairy breeding farms is another investment opportunity that is not yet fully exploited. Ethiopia has adequate land for dairy farming and the climatic conditions are favourable for this venture. A well-established dairy farm would produce milk and also breed in-calf heifers for sale. With the growth registered in the dairy industry, the demand for in-calf heifers is expected to increase. On the domestic market, the cost of an in-calf heifer ranges between Birr 7000 and Birr 12000. Currently most of the heifers on sale are cross breeds type reproduced with in the country. Most of them do not have records of pedigree and production. They are sold for their colour (black and white) rather than level of performance.

5.4 Opportunity in New products

The dairy industry has a number of specific features that distinguish it from the other agricultural industries. Milk is a bulky commodity, highly perishable, and produced on a daily basis. Therefore, milk requires timely management and implies high transportation and transaction costs. This makes milk a very valuable but at the same time extremely expensive raw material. All over the world the challenge of dairy manufacturers is to keep on adding value to milk, as rival products (soft drinks, fruit juices, vegetables, oil, etc.) attract consumers away. In many developing countries manufacturers have found

strong incentives to diversify and extend products' shelf-life (UHT milk is the most successful example), so as to promote consumption across all the highly variegated segments of the society, including those households that do not have fridge (Euro Monitor International, 2004).

In Ethiopia, since 1991, the private sector began to enter the dairy market as an important actor. Several private investors have now established milk-processing plants in *Addis Ababa, Dire Dawa* and *Dessie* to supply pasteurised milk and dairy products. Currently, *Lema industry, Genesis farm, Sebeta Agro-industry, Lame Dairy* and *Dessie industry* are supplying pasteurised milk and other products to urban consumers. The entries of private firms in the national milk market underpin business competition and thus manufacturing efficiency and innovation.

The dairy products currently sold in the Ethiopian market can be categorized into milk products, such as raw, pasteurized, UHT and powder milk; butter products, such as fermented and pasteurized butter; and other products, such as cottage and other type of cheese, sour milk and yogurt. Among these products powder milk are not produced in Ethiopia at the moment, and are usually imported from European and Arabic countries. Pasteurized (table/bread) butter, yogurt and various type of cheese (apart from cottage cheese) are both imported and locally produced.

Development of successful and sustainable dairy industry will be realized by strategic interventions of the investors in to all parts of possible entry points along the milk value chain especially on the innovation of new products. Accordingly, several entry points to produce new products are identified as intervention opportunity in the dairy industry value chain with varied degree of resource requirement and level of competitions.

Powdered Milk production

Ethiopia imports powdered milk that is used in the food industry and for domestic consumption. Beginning from 1978 dairy imports increased significantly to bridge the gap between supply and demand. Powder milk imports (WFP) has reached its peak of 315 thousand metric tons in 1986 during the drought period (Reda 2001). Commercial imports grew rapidly at 24.2% per year (Felleke and Geda, 2001). Further, it is estimated that imported milk powder accounts for 23% of Addis Ababa market.

Processing surplus milk into powdered milk would reduce post-harvest losses and add value to a product for both the domestic and regional market. The ideal location for the powdered milk plant is the in and around Addis Ababa, including the peri-urban areas within the radius of 100km. This location would take advantage of the milk surplus in this production area, largely reduce transport costs for the raw milk and has proximity to the regional market of COMESA, ESA and Middle East.

Flavored Yogurt and UHT Milk

Sebeta Agro-Industry and LAME Dairy (former DDE) have established the UHT dairy processing facility in 2006. The total UHT milk production in the country is currently insignificant. The production of flavoured milk has shown growth mainly due to the demand from the younger generation and urban population. Although there are no plants producing flavoured milk in the country, there remain considerable investment opportunities in this market.

Production of Butter and Ghee

Traditional, fermented butter (*kibe*), which is used mainly for cooking, is mostly made in Ethiopia. Although insignificant amount butter produced in the dairy processing, Ethiopia imports considerable amounts of butter mainly from Kenya and Europe. Farmers produce butter and ghee mainly on a small scale which is used for domestic consumption and sale. A lot of small scale dairy processors have started production of butter and ghee and its production has increased. This could be an entry point and good investment opportunities in the dairy industry.

Cheese production

Few private firms produce cheeses as their principle products. The DDE and Sebeta Agro industry produce pasteurized (table/bread) butter; yogurt and various type of cheese (apart from cottage cheese or 'ayib') apart from being imported. The country still imports cheese. Cheese production provides yet another investment opportunity.

Yoghurt and Cultured milk production

Among the dairy products consumed by Ethiopians, raw milk, yoghurt, sours (*ergo*) and pasteurised milk is mostly made in Ethiopia. The Lame Dairy, Sebeta Agro-industry, Genesis Farm are the leading yoghurt producing firms. However, other private firms produce and sell yoghurt. Cultured yoghurt or *ergo* is very popular countrywide and its demand are expected to grow. However, its production is by small-scale processors and the informal sector. Investment by the formal sector is required in order to exploit this market and develop it further.

Cream and ice cream

Some cooperatives and private dairy companies produce cream for the open market. Production of cream can be profitable because most of the ice-cream (a product made from cream) is imported to meet the demand for the local market. The number of firms producing ice cream has increased in the last few years. Although most of the ice-cream producing firms are concentrated around Addis Ababa, there is an untapped market in the main urban centres of the country.

5.5 New market regions, differentiation/ new consumer segments

This part assesses a new market regions and market segmentation of the urban dairy consumer in Ethiopia, so that dairy manufacturers and retailers can penetrate further in the Ethiopian market. Dairy is an essential component of urban diets in Ethiopia, and dairy industrial manufacturing and supermarkets retailing dairy products are growing, mainly underpinned by less-traditional and better-off urban consumers. Overall, characteristics and preference of Ethiopian urban consumers vary across dairy products and outlets.

Understanding patterns and determinants of dairy products and retail outlets choice may help targeting current as well as future consumers. In emerging and liberalising urban markets of Ethiopia competition among national processing and retailing industries is increasing rapidly. Industrial competitiveness begins by acknowledging that not all consumers are the same, and by targeting products and outlets at different groups, according to income, asset, age, gender, religion, education, culture and habits, preferences to create new market regions and consumer segments.

School milk programs and health campaigns will create large consumer segment involving enormous number of students at all level and communities across Addis Ababa and major cities in the country. This could be feasible and promising for investment in dairy industries.

Dairy consumption usually accompanied by successful product development and differentiation adapted to the specific needs of local consumers. Dairy industries have found strong incentives to diversify and extend products shelf life, so as to promote consumption across all needy segments of the society such as kids, school children, women and students, etc.

As elsewhere, in Ethiopia supermarkets are perceived as rapidly emerging phenomena. There are now some 22 supermarkets registered in Addis Ababa. Supermarket outlets are growing in other major urban areas of the country and could be considered as a new market region for dairy products. One of the driving factors behind the growth of supermarkets is growth of the urban population, increasing market liberalization and competition, urbanisation, women increasingly working outside the house, and generational change.

Contrary to the conventional image of supermarkets—the place for the rich to shop – purchasing from supermarkets has penetrated the food markets of the poor and low-income groups. Overall supermarkets are expected to penetrate further in the national urban markets and are areas of greater market penetration as a new market region for dairy industry.

In general, segmenting the urban population on the basis of their socio-economic characteristics, and their preferences regarding type, quantity, price, number of dairy products, and their choice of quality and safety attributes (hygiene, nutritional value, and freshness) type of dairy outlets (supermarket or local retailer) are all necessary parameter to assess the point of penetration into dairy industries and to innovate new market regions across the country.

5.6 New technologies

Introduction of new technologies into dairy industry create opportunities that offer attractive potential benefits to prospective investors. With the exception of powder milk, which is widely popular in the

urban areas, all industrial products (i.e. products that cannot be made using traditional technology, require mechanisation), such as standardized, homogenized, sanitized (undergone some type of heat treatment) and packed milk, butter, cheese (cottage cheese excluded) and yogurt requires new technologies and are potential entry points mainly to major urban markets.

Adoption of technology for dairy processing is one of feasible business opportunities in the Ethiopians dairy sub-sector. However, it is important to consider appropriateness of available or potentially available technologies.

The development of provincial and district towns (i.e., the rapidly growing smaller towns) provide a valuable opportunity for more widespread dairy development further away from the major urban centres by setting up village milk processing technology. Village level milk processing requires appropriate new processing technologies, facilities and equipment; suitable packaging or bulk vending technologies; and suitable transport system for collection and distribution.

The milk processing technologies range from household type, village, to medium and large scale technologies. Accordingly, the following references and technologies could be imperative for private entrepreneurs to set off dairy business for lower milk volume and small towns/ villages:

Traditional milk processing of less than < 100 litres/ day: Extension workers are urged to ensure and promote more hygienic and economic processing in the interest of the public. This implies proper sanitation, using cheap soda ash or Sodium hypochlorite; hot water must be available for cleaning.

Processing milk 100 - 500 litres/day: It is recommended to use a cheap system which enables heating of milk in water bath making it possible to heat milk in 45 litres cans up to boiling temperature. Cold water tanks must be available to enable subsequent cooling, such a system is ideally suited to manufacture of cultured milk using mesophilic lactic starter cultures. This milk has a keeping quality of 2-4 days at ambient temperature. If refrigeration facility is available its storage life can be extended to 2-3 weeks.

Availability of small hand operated separators will make it possible to obtain cream which can be converted into butter and ghee. Manual centrifuge with supplementary equipment for butterfat can also be introduced. At this scale of operation it is also recommended to avail simple milk testing equipment such as a Brick's refractometer, facilities for alcohol test.

Processing milk > 500 litres/day: Manufacturing of pasteurized milk implies the availability of refrigeration and cold storage. Consumers should be made aware of the risk of consuming raw milk without prior boiling. At this stage, availability of low pressure steam is necessary. Heating by plate heat exchangers could be applicable. Solar energy should be looked into as a possible energy source. Basic training should be given to smallholder farmers producing milk for processing.

6 Market Access and Trends in Demand for Dairy Products

6.1 Access to USA, EU, COMESA, SADC and ECA markets

With a population of about 80 million, Ethiopia offers one of the largest domestic markets in Africa. The greater market potential, however, lies within the regional market. Its proximity to the Middle Eastern and European Markets provides good opportunities for investments in the production of exportable dairy products. Exports and imports with member countries enjoy preferential tariffs. As Ethiopia is a signatory of the Lomé Convention, its products to European Union Market are entitled to duty reductions or exemptions and freedom from all quota restrictions, provided that it meets the quality standards and safety regulation of the Economic blocs and each importing countries.

By reducing entry prices, increasing trade margins and protecting the country's market from the international dairy giants, Ethiopia could offer a real prospect for increased trade in dairy. Combined impact of high tariffs and high freight charges is detrimental to trade initiatives and it is only by expanding the FTA can COMESA countries in general and Ethiopia in particular will begin to register growth in dairy trade.

6.1.1 USA and EU markets

Under Generalized System of Preference (GSP), a wide range of Ethiopia's manufactured products are entitled to preferential duty treatment in the USA, Canada, Switzerland, Norway, Sweden, Austria, Japan, as well as most European Union markets.

Ethiopia as one of the least developed African countries is beneficiary from provisions of African Growth and Opportunity Act of the United States government. Even though it has been quite sometime since the Act was enacted, Ethiopia is not making the maximum out of the benefits provided by this Act to eligible African countries.

As Ethiopia is a signatory of the Lomé Convention, its products to European Union Market are entitled to duty reductions or exemptions and freedom from all quota restrictions. Under Generalized System of Preference (GSP), a wide range of Ethiopia's manufactured products are also entitled to preferential duty treatment in the Switzerland, Norway, Sweden, Denmark, Netherlands, Germany, Italy and Poland, as well as most European Union markets. However, the Ethiopian product has to meet the quality standards and safety requirements set by EU and has to enter the third country listing for that particular commodity. The agro- products to export to EU has to pass a stringent process of accreditation and registration process before it registered in the third country listing and accepted by EU countries. In this regard Ethiopia is the first country registered in the EU third country listing for honey in May 2008 though the assistance of SNV-BOAM.

6.1.2 COMESA and EAC markets

The Common Market for Eastern and Southern Africa (COMESA) is a regional economic co-operation group of 23 African countries with an estimated population of 367 million people. Agreement has been reached among member countries including Ethiopia to transform COMESA into a Free Trade Area (FTA) based on reciprocity and some countries are already implementing 100%, albeit Ethiopia has been yet not put into action.

COMESA has a mixed bag of what may be called 'milk surplus and deficit countries' resulting from years of investment and comparative advantages. With some level of marketing effort and improved access there should be visible increase in trade between the milk deficit and surplus countries. Member states have agreed upon the trade regime under which dairy products (and indeed all other commodities) should be traded, and have committed themselves to applying preferential tariffs on goods originating from the region.

In COMESA, eleven countries, which have already ratified the Free Trade Area (FTA) protocol, are levying zero duty on goods from the region. These countries include: Kenya, Malawi, Zambia, Zimbabwe, Egypt, Djibouti, Madagascar, Mauritius, Rwanda, Burundi and Sudan. Tariff reduction

commitment for Non FTA COMESA countries is as follows: Comoros, Eritrea and Uganda grant 80% reduction; DR Congo grants 70% reduction and Ethiopia grants 10% reduction.

Likewise, under the EAC trade regime, Kenya grants market access to commodities imported from Uganda and Tanzania a 90% tax reduction rate. Tanzania and Uganda on the other hand grant an 80% tariff reduction on goods originating from Kenya.

Exports of the dairy products by Ethiopia to COMESA and EAC countries have not yet taken place. Given the milk deficit situation and under developed dairy industry in Ethiopia the non existence of dairy export to the region is not surprising. However, regional market such as COMESA and EAC could be the key stimulant to get into intra-regional export of dairy products. Thus, if production of fresh milk and processed products were to be increased, there is a ready market for dairy products in the region.

Currently, over 95% of the COMESA and EAC market of dairy products is serviced by extra regional imports. Further, over 80% of extra regional imports of dairy products are sourced from Denmark, South Africa, Canada, USA, France, New Zealand, Australia, Netherlands and Poland. Using extra regional imports and intra regional exports as a proxy for the regional market size, the EAC and COMESA market for dairy products is about US\$120million per year. If market growth dynamics are taken as prospects for increased per capita income and possible increase of the per capita milk consumption the future market for dairy products in the COMESA region looks bright. This shows there is urgent need to develop the regional dairy market.

There has been an agreement in principle on establishing a Common External Tariff (CET) among EAC. At present Ethiopia has relatively the lowest customs tariff on dairy products (but not a zero tariff rate).

6.2 Long and medium term Dairy Trends

6.2.1 Global Level

The share of global milk production entering world trade is low, at 7 percent, compared with shares of other farm commodities, such as wheat, coffee, soybeans, or bananas at 30 to 40 percent. Improved refrigeration and transportation technologies have made dairy trade more practicable than in earlier years, though high costs are still a constraint. Almost every country produces milk for local consumption, but production costs vary substantially due to such factors as labour costs, animal genetics, on farm technology, and the availability of forages and water for livestock. Countries with a dairy surplus tend to be those with relatively abundant, low-cost milk inputs for milk production and comparatively small populations, such as New Zealand, the major producer of milk in the world with the lowest cost. Japan, Norway, and Switzerland are high-cost milk-producing countries largely due to their lack of land for growing dairy feeds. Poland, with an abundance of forage lands and low wages, provides the most ideal conditions for milk production among European countries. Canada and the EU lie between the two cost extremes, as does the United States, where the changing structure of the dairy industry may lead to even lower production costs (<http://www.ers.usda.gov/publications/err28/err28d.pdf>).

Dairy-exporting countries are few relative to the number of dairy-importing countries. The three dominant dairy-supplying areas of today, as in the past, are the EU, Australia, and New Zealand. Australia and New Zealand, both with low-cost milk production and industries actively involved in international marketing, are prominent suppliers to the Asian markets for cheese and dry milk powders. The EU focuses on nearby traditional markets and trans-Atlantic trade with North America, mainly for cheese.

6.2.2 COMESA level

An African cow's average milk yield is 461 kg over the year, which is only one-fifth of world average yield (FAOSTAT 2006). The top five African milk producing countries in terms of milk volume are Sudan, Egypt, Kenya, South Africa and Algeria. Meanwhile, the first four countries alone produce 52% of total African milk. Ethiopia has the largest number of cows, but average milk yield is low. On the other hand, there is huge unmet demand for milk at the moment and it is expected widen-up as the overall growth in milk production is slow.

According to the paper delivered by Dr Kipkirui Arap Lang, an Executive Director ESADA, at the Forum on 'Developing Agricultural and Agribusiness Innovations' on 13th May 2008:

- Dairy trade is an important component of intra-COMESA trade. Total intra-COMESA trade in dairy products amounted to US\$25.6 million while total extra-COMESA trade (or trade with countries outside COMESA) amounted to US\$383.2 million in 2006. Intra-COMESA trade in dairy is therefore only 6.7% of the trade that COMESA countries conduct with countries outside the region mainly with South Africa, the EU countries and Australia. Between 2001 and 2006 intra-COMESA trade in dairy has increased by 180% from US\$9.1 million to US\$25.6 million.
- This gap represents the massive opportunities open to the region in terms of exploiting the huge potential that countries of the region have to increase production and trade of dairy products amongst themselves. Global outlook for dairy is positive. The global dairy market of the future will be larger, with more demand, and more suppliers. The trend is towards more open markets.

6.2.3 Country level

Increased demand for milk, particularly for processed, i.e. pasteurized milk and other dairy products lies in urban areas. This demand for processed milk can be estimated with accuracy from the size of urban population and change in consumption behaviour. Milk consumption growth in Ethiopia presents a challenge partly due to its seasonality for the Orthodox Christians, who constitute nearly half of the population. More than 200 day are fasted by abstaining from milk and other dairy products. The traditional attitude that favours milk consumption by children and the sick is on change as the younger generation that consumes more milk is emerging. It is a common practice to observe that the milk shelves of supermarkets are empty early afternoon (observation in May/June 2008).

The projected urban-market for liquid milk in 2015 is estimated at 60 million liters. Supplying this quantity of fluid milk from domestic production in Ethiopia by 2015, would require an increase in production to over 35 million litres in order to provide the increased market requirements resulting from growth of urban population (see population size of major urban towns in Table 8) and increased consumer income.

A study conducted by the Addis Ababa Urban Agriculture Office, indicated that the aggregate annual supply in Addis Ababa is 65.5 million litres per year while the biological demand of milk exceeds five times this amount (i.e., it 321.7 million litres per year). Scarcity of pasteurized milk, particularly Mama, in many supermarkets in Addis Ababa has been observed resulting in many selling Mama on a rationed schedule

In general, Ethiopia has various advantages for the development of dairy export sector. These include the abundant and capable labour force, low wage levels, a wide-ranging weather and soil conditions, preferential access to the major world markets including Europe, USA and the COMESA.

Due to population growth and increase in per capita consumption, demand for milk is expected to increase, even more, in the future years. Increasing milk production to satisfy demand is therefore a challenge to African and Ethiopian dairy systems.

- The relief of trade barriers through reduction of import duties is a current strategy under implementation by the WTO which may affect the African dairy sector. This implies that for local dairy industries to survive, not only production but productivity also, have to increase, in order to stand competition from foreign markets.
- Some countries have been able to make enormous increases in production over recent years, showing that there is a potential for the dairy industry. Ethiopia is one of these countries.

Table 8: Population of major urban centers

Town	Male	Female	Total
Addis Ababa	1,026,900	1,084,600	2,111,500
Dire Dawa	82,249	87,339	173,588
Gondar	69,271	77,506	146,777
Nazareth	62,789	68,799	131,585
Harar	53,871	55,799	109,670
Mekele	50,314	57,357	106,711
Jimma	53,568	53,274	106,842
Dessie	50,697	56,013	106,710
Bahir Dar	48,378	54,322	102,700
Awassa	31,441	315,022	62,943
Nekemt	25,785	26,228	52,413
Arba Minch	18,899	18,529	37,428
Total	1,578,189	1,671,668	3,249,827

Source: Central Statistics office (2005)

However, sector policies, organisational structures and support services for dairy farmers need to be properly oriented to stimulate dairy development especially by strengthening the dominant informal sector and encouraging specialised small and large scale dairy production.

7 Analysis of Support Markets/ Business Service Markets

7.1 Market linkage firms

In Ethiopia, the government is the major provider of livestock marketing services. In recent years due to establishment marketing cooperatives and private dairy enterprises, the government role and share in milk marketing and processing services in urban and peri-urban areas has reduced. On the same way, the dairy marketing cooperative are playing a significant role in providing the marketing service by buying milk from members and non members, process it and sell products to traders and/or local consumers.

7.1.1 Milk and milk product Market outlets

The dairy farmers have three market-outlets for the milk left out from consumption. These are to sell to neighbours in the informal marketing channel, dealers or milk groups/ cooperatives (in some cases retailers). The availability of these market-outlets through the establishment of milk groups and cooperatives as well as the milk-collection centres have given dairy farmers a broader choice of marketing their milk instead of depending on local traders and neighbourhood buyers. This development has encouraged many traditional farmers in the rural and peri-urban areas to market their surplus milk. The increasing demand for cash has encouraged many cattle growers to sell small quantities of milk normally consumed by the farm family members or fed to calves.

The smallholder milk producers supply the large-scale processors (formal market), the small-scale processors as well as a large number of small market traders known as vendors (informal market), who sell raw milk in urban and peri-urban areas. The following features are prominent in the Ethiopian milk market linkage:

- Purchase of processed food did/does not enjoy acceptance by conventional families, who are the great majority of Ethiopians. Processing for sale is thus new, and packaging even newer. Sales are limited to slow growing local markets of surpluses if any. Products sold unpacked.
- Up to 90% of the milk marketed is through the informal channel. This imbalance between formal and informal sectors makes enforcement and regulation of standards and taxation difficult because there are no entry and exit barriers to the liberalised market system.
- The main marketing channels are dairy cooperatives societies (100 already in place), which sell milk to private processing plants Sebeta Agro-Industry (Mama) and Lame Dairy Plant (formerly known as DDE as the main processing and marketing agents in the formal sector.
- Some farmers sell milk to bars, hotels, and restaurants for relatively better prices than those for direct sales to individual households. Most of the evening milk is sold this way or consumed at home while the morning milk is sold mostly to traders and consumers.
- Milk may be collected from producers, bulked in a milk collection centre, transported to milk processing plant, processed and later on the processed milk is sold to traders and later on sold to consumers. In other words, different marketing systems are used in the marketing of milk.
- The current pricing by the processors does not motivate farmers to produce good quality milk because all raw milk is sold at the same price regardless of quality. This also gives dishonest milk vendors leeway to adulterate milk. Some processors collect milk from farmers for prolonged periods without payment and some become bankrupt and wind up without paying. Also, these same processors request farmers to deliver milk to collection centres daily but are not bound to buying it or compensating the farmer when they do not turn up.
- There is need for a policy to protect the farmer from such losses and to motivate them to produce quality milk.

In general, Smallholder dairy farmers and large-scale farmers have problems of disposing off their milk especially during rainy season due to poor infrastructure. Milk market is not organised due to improper assurance of milk market channels. Milk quality and hygiene of the producers is not well controlled. There is an unstable milk price at farm gate level due to lack of contracts between milk producers and

the milk collectors. The growth in milk production is only 1.2% while population growth is 3% per annum. This suggests a wide gap between the potential supply and demand (Ahmed et al, 2003).

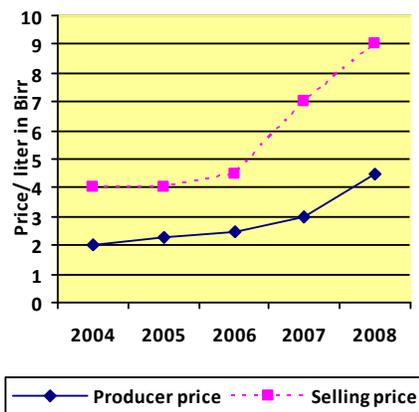
7.1.2 Farm and Retail Prices for Milk and Dairy Products

The cost of milk production under various production systems ranging from intensive smallholder to commercial-dairying is not well elucidated. There is a need for quantification of production-cost analysis of the systems and mixed farming systems and using inputs under varying conditions.

The price of milk in the rural areas during the rainy season would come down to nearly 50% of the price in the dry seasons. The price differential is a result of large amounts produced by farmers as well as expenditures on milk collection, transportation delivery to consumers, and for processors. The processors used to pay about Birr 2.00-2.50 per litre of milk at the collection centres in 2004/2005. In 2008, the farm gate price at the collection centres is in the range of Birr 4.00-4.50 a litre (see Figure7 and Figure 8).

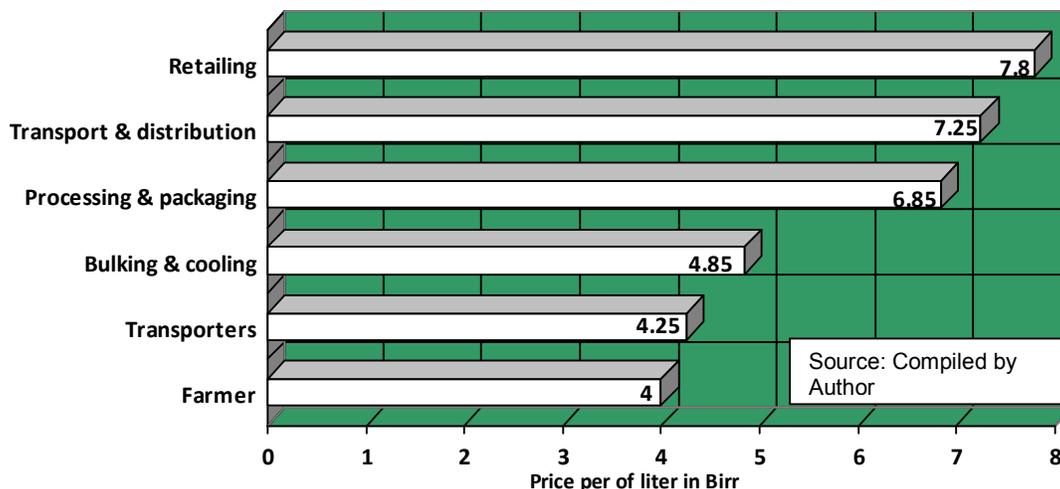
Depending on the types of tetra packed milk, the average price per litre has shot up by nearly 50% within a period of two years. Presently, in most of the big shops and supermarkets of Addis Ababa, the milk price sky rocketed to Birr 7.00-Birr 9.00

Figure7: Trend in milk price



Source: Compiled by Author

Figure 8: Price paid for milk by value chain actors from farmer to consumer in Birr



Source: Compiled by Author

a litre from Birr 5.00- 6.00 per litre in 2006/2007 due to supply shortage. This has affected a cross section of families at many levels of the social hierarchy in Addis Ababa. The producer is not getting a proper equitable share of the value of the milk that is being marketed. Farm gate prices vary widely from area to area and among different production systems. Small dairy farmers with mixed-farming units, who do not have direct access to urban markets, sell their milk to the two large processing plants (LAME or MAMA DAIRY) at fixed prices. On the other hand, the urban dairy farmers who have their own marketing arrangements and by-pass the LAME and MAMA Dairy, usually sell their milk at higher prices, depending on supply and demand.

With regard to revenue share for the price paid by consumers, producers/farmers capture up to 51% of the consumer price while Adaa processor capture 26% of the price. This shows that cost of milk

production is on the high side while the processing – margins are rather small to attract sufficient processing investments.

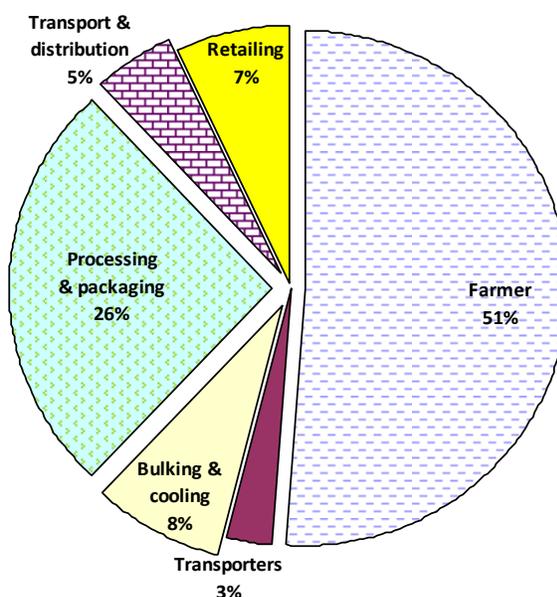
The Cooperative has a price advantage in that it has obtained its pasteurizing equipment at 50% of the usual price and has had to pay no import duty. The building is a gift. Thus the Cooperative will be in a position to offer aggressive pricing to induce customers to switch from other suppliers.

Existing market linkages among milk producers, Adaa Dairy Cooperative, and consumers: The group of farmers has attempted to increase their profits to the mutual benefit of all members. The management of the cooperative offer their members in such matters as education, supply of inputs, artificial insemination and veterinary services. The cooperative has 813 members and has grown from its inception of 34 members in 1997. The Cooperative used to collect about 8000 liters milk daily from its members. This has recently been reduced to 6500 because of aggressive purchasing by competitor dairies (LEMA, MAMA and Family Milk).

The cooperative members fall into two categories- urban and rural. Generally the rural dairy farmers have less education than their urban counterparts and the quality of milk is generally poorer. They face the same problems as their urban counterparts except that they are less likely to use good concentrate feed.

The member’s milk is delivered to 12 collection points where the milk is tested for adulteration, fat content, and acidity a pass/fail type test. About 500 litres of milk are rejected daily at the collection centres because of quality concerns. This loss is a direct loss to the members and the quality must be improved. The shipments are consolidated and roughly half of the 6500 litres is sold to LAME Dairy for pasteurization and subsequently sold through LAME’s distribution system. The remaining milk is again portioned into two i.e., 1500 litres is pasteurized by the Cooperative’s newly established processing plant. The pasteurized milk is sold to super-markets in Addis Ababa and Debre Zeit town. The remaining 1500 litres raw milk is directly distributed to its customers in Debre Zeit town. The whole trend is expected to change in the coming three months as experiences develop and penetration into market increases.

Figure 9: Revenue shared by value chain actors from milk price paid by consumers



Source: Adaa Dairy

7.2 Feed Supply

For their nutrition, most of the livestock of the country depend almost entirely on the herbage that grows on non-arable, natural lands. Other resources include grazing of fallow lands between crop fields and crop residues from cropping activities. The density and type of natural vegetation is affected by the amount and distribution of rainfall. Even though natural-pasture grazing-lands are the principal source of nutrition for livestock, most of these pastures, in the present state of management, do not provide adequate nutrition and would rarely support milk-yields of over 3 to 4 kg per cow per day. Seventy three percent of the feed is provided from natural grazing; 14% from crop residues and only 0.2% improved forages. There is still 7% deficit in the amount of dry-matter required by the livestock. This existing condition stimulates private investment in the feed resources sector to enhance the development and production of high quality feed to increase milk production per cow per day.

In smallholder dairy using improved stock (large and medium scale dairy in peri-urban and small and medium dairy in urban areas) feed is the main constraint and accounts more than 60% of the cost of production. Dairying in these areas is highly dependent on bought feeds. The available quantity and low quality affects not only productivity but also the financial returns on the investment.

In Ethiopia, following the market orientation of the dairy sector in urban and peri-urban centre, the involvement of private service centre (Kidd *et al.*, 1998) and dairy cooperatives (Azage T., 2004, Habtemariam A., 2004 and Berhanu *et al.*, 2006) to provide services such as veterinary services, AI and feed supply is found in *Debrezeit* milkshed. In Alaba district, nursery and forage seed production and marketing is being taken up by the private sector.

Moreover, the public research and extension systems has been developing partnership with regional administrations, cooperatives, cooperative unions, and private industrial concerns to promote market oriented production in high-value commodities such as pulses, legumes, oilseeds, bread wheat, and potatoes (Tsedeke Abate, 2006).

Feed, both inadequate supply and quality, is one of the major factors limiting dairy productivity in the country. Hence, factories and institutions that produce animal feed and forage play paramount important with respect to solving this problem. Rural Development Policies and Strategies (RDPS) emphasized the role that private sector can contribute in solving the problem. It further points the need to establish those factories and institutions by the government, when there is no alternative due to lack of participation of private investors. Accordingly, it is one sector that responded to liberalization policy flourishing private factories and firms in the production of concentrate feed. Niger seed cake and wheat bran market also follows the same trend following private sector investment in oil, and flour and biscuit factories, respectively. Subsequently, feed retail markets have flourished up to rural kebeles. The problem with this service is assuring quality which demands urgent need to institutionalize standard and quality system for the major feed types.

The forage and hay markets follows different trend. By its nature and due to small to nil grazing farm size, the amount required by smallholder from the market is small, which would not encouraged the involvement of private sector. Moreover, the adoption of the available technological options is limited. Hence, the forage development needs innovative research and service delivery for successful supply and/or introduction into the existing farming systems. The hay and /or crop residue market are constrained by supply problem due to the competition of hay and crop residue for export market. . Very soon a factory that produce cheap-wood from crop-residues i.e. teff straw, barley, wheat and pulse etc will be established in Ethiopia by Chinese investors to ease the problem of housing construction (personal communication- Addis Ababa-2008).

Feed quantity and quality To feed the increasing human population by continuous cereal growing, available grazing is on the decline. Feed shortages and nutrient deficiencies become more acute in the dry season in both the highlands and lowlands. Studies have indicated that there is a deficit of about 12.3million tonnes of dry matter in Ethiopia. For various reasons, crop residues and agro-industrial by-products are not adequately utilized. Cultivation of forage is not widely adopted and commercial feed production is not developed. Source: <http://countrystudies.us/ethiopia/95.htm>

In commercially-oriented mixed farming systems in rural areas and dairy farming system in urban areas would appreciate if animal feed production is commercialized and produced by interested investors to ease the feed shortage problem in the country by producing improved forage crops i.e. alfalfa, Elephant grass (Napier grass), Fodder beets etc. It is worth to mention here that alfalfa and fodder beet seeds are very expensive and are not available as required. A kg of each type of improved crop seeds costs Birr 100 (USD10)/kg. Such a strategy does not exist in Ethiopia at present and is limited to the few farmers with easy access to major urban centres through some NGOs eg IPMS, Land O' Lakes. The majority of dairy and fattening operations are in such situations. With available water resource for irrigation and opportunity to access land from the government, there is a golden opportunity for individuals interested to invest in production of improved forage crop seeds for animal feed. Fodder varieties, which ensure year round fodder availability, are in high demand. These varieties may initially be imported but later on local seed production of such fodder varieties makes a good investment sense.

Concentrates feeds Concentrate feed-ingredients are mainly used by dairy for supplementing roughages and for balancing the dairy-ration formula which comprise only a third of the total feed offered to the dairy cows. Dairy farmers use agr-industrial by-products such as brewery residues, wheat bran and middling, oilseed cakes (niger seed, cotton and sesame), and mineral mixtures and molasses to supplement their cows that are on milk production.

Commercially-prepared, balanced, dairy cattle concentrate-feeds of good quality are sold by number of feed mills. They are all very expensive and are rarely used by small-scale peri-urban dairy farmers. This

may be the primary reason that milk prices are very high in Ethiopia. Business service providers or partners are encouraged to invest in the sector to ease the gap between milk producers, processors and consumers.

7.3 Artificial insemination and extension

7.3.1 Cross breeding service

In Ethiopia, crossbreeding service is provided through two major means: Artificial Insemination (AI) and distribution of improved breeds from cattle improvement and multiplication centre. It is a service monopolized by the public sector and both means are known for their inefficiency and ineffectiveness in the country (Ababu *et al.*, 2004; Azage *et al.*, 2006; Ababu *et al.*, 2006; Workineh and Ababu, 2006 and Kefena Effa, 2006). In addition, crossbreeding using improved bulls are also major source of crossbred cows in the urban and peri urban areas. Currently, some progress is made to start *in vitro* production of crossbred embryo at EIAR-Holleta biotechnology laboratory and training of staff was underway by expatriate staff from Cuba (Personal Communication-DZARC, 2007). According to Workineh and Ababu (2006), it is an area for the public sector to support and promote, leaving the more routine management of crossbreeding ranches for the private sector.

It has been generally accepted that the first- generation cross is well adapted to the environment, performs satisfactorily and is accepted by farmers. In some farms where the management levels and feeding systems are high enough and acceptable, the levels of exotic blood in dairy cows are as high as 87.5 to 93.75%. Records analysed from over 21 years of work on three large dairy farms, namely, Holleta, Stella, and Selale, on a total of 1,112 individual animals born to 109 sires, showed that an overall average performance of 3,208kg of lactation yield and 2886 kg of first lactation milk yield. The effect of season on total lactation-yield and calf-weight at birth was not significant. The overall mean weight of calves at birth was 38kg (Tadesse, et al 2005).

7.3.2 AI Service

According to Azage *et al.* (2006), problem with efficiency and effectiveness of AI technician and monopolized public delivery of the service are some of the major problems in the country AI system. AI service provided by the public sector for the last 60 years could able to cover only 2% of breed able animals. On top of this, the field AI system is loosely linked with the National AI Centre responsible to produce semen nationally. Moreover, the AI technicians are not getting the required refreshment training, poor monitoring and evaluation and recording system to the point difficult to trace the success rate, lack of transport and operational costs for field service, and AI technicians' involvement in corruption and unethical service delivery are some of the factors that made the AI field inefficient and ineffective field. In addition, absence of mechanism of using the revenue accrued from the cost recovery to expand the service is also a problem.

The fact that the current performance of the public AI service delivery is poor and effective demand for AI services are largely made by the private dairy cow owners suggest that private sector involvement in AI service delivery in urban and accessible peri-urban settings are justified. The government should focus on areas where the private providers are not interested due to absence of effective demand for AI and institutionalize appropriate enabling environment. Workineh and Ababu (2006) recommended the public sector support in import and testing of improved genotypes, supply of liquid nitrogen, quality assurance and regulatory services for promoting private AI service delivery. With acute shortage of bulls for natural breeding, the scope of artificial insemination is going to increase. This clearly shows that artificial insemination service in private sector has great scope.

7.4 Improved Bull Service

Improved bull service is one means of getting dairy crosses through private service providers. It is the service that currently gives relief to AI problems, though it is also constrained by different problems such as lack of information on the genotype of the bull, shortage and non-replacement of exotic bulls and disease transmission. Similarly, like other private services, bull service is also not monitored and evaluated for its performance by the Livestock Department of MoA (particularly the AI Centre) though

the performances of the bull (disease, pedigree and physical appearance) have paramount influence on the crossbreeding service. Hence, this study strongly suggests the institutionalizing monitoring and evaluation, quality assurance and support system to the private bull service delivery based on its importance in the breeding service especially to rural areas.

The genotype of Ethiopian livestock has evolved largely through natural selection influenced by environmental factors. This has made the stock better able to withstand feed and water shortages, disease challenges and harsh climates; but the capacity for high levels of production has remained limited. The non-market oriented subsistence animal production is incompatible with the farming system of most agro-ecological zones. Crossbreeding and breed substitutions have been done for a more rapid increase in milk production in high potential areas. However, their applicability in the low potential areas, where the ability to survive is the major concern, needs more detailed studies. There are some important indigenous breeds of livestock with a remarkable features; the lowland breed of cattle (e.g. Boran) are often regarded as superior in terms of size, durability, and productivity and/or consumer preferences. However there are few detailed studies on these and other indigenous breeds.

Again with zeal interest of investors, this sector could easily be exploited by starting heifer production business which is missing in the country and always in high demand. Investors must seek innovative ways of boosting livestock production, and recognize that the ultimate beneficiary of the investment is the investor and the farmer through the links between livestock and crop production.

7.5 Milk Testing and Quality control

“Quality is like a hammer, you can use it to build a window or to kill your neighbour.” Prof. Pedro Villaseca, International adviser on standardisation and quality IFPRI conference, May 2005, Addis Ababa.

There is a need to devise means and ways of involving/ promoting the development of dairy industry that is responsive to market demand and public health concerns by putting minimum conditions for delivery of safe and hygienic milk. These could be done, but not limited to, by:

- prescribing the need to use milk vessels that are easy to clean and suitable for carrying.
- providing specified outlets that may be more easily inspected and equipped with inspectors with all necessary equipment for quality control check.
- encouraging formation of stakeholders organisation specifically for milk vendors that could be assisted in setting of their own “code of conduct” which meet minimum hygienic and safety standards including members imposed penalties for adulterating milk.
- encourage local authorities to set up milk marketing orders with involvement of all relevant stakeholders (vendors, processors and consumers).
- maintaining strict milk standard which result in higher costs and thereby free most marketed milk into formal channels improving the average standard of milk in the market.

Given the increasing human population in the Ethiopia and the rate of urbanization, there will be a substantial need to improve the quality of milk and milk products served in the cafeteria, restaurants, snack bars, supermarket, etc. Thus, the need for testing foods, agro products and water in quality and safety control and the need for accredited testing laboratories in Ethiopia is crucially important to support the National Need Assessment for testing services, quality parameters, residues and contaminants.

Table 9: Quality Standards for Unprocessed Whole Milk in Ethiopia

Principal Requirements	Result
Chemical	
Milk fat	Not less than 3.5%
Milk solids non-fat	
Total Solids	Not less than 12.8%
Added water, preservatives, or other added substances	
Natural Constituents	
Protein	Not less than 3.20%
Density/Specific Gravity	1.026-1.032g/ml (at 15.6°C)
Freezing point depression of milk	0.525-0.545
Titrateable acidity	
Bacteriological grades	Not available

Source: Compiled by Author

In summary, the ever-increasing number of residents of the cities, travellers, week-enders mainly from Addis Ababa, etc. need to be better served in order to attract better economic activity in the country. This is therefore designed to fill in this gap and contribute to the social and economical services available in the country by establishing dairy laboratories focusing on control and quality assurance at all stages along the milk and milk products value chain.

One of the most obvious problems is the lack of analytical quality assurance and independently verified analyses in the milk sector. The establishment of an independent laboratory (Accredited) for milk and milk product quality control (chemical and microbiological) enables to perform range of tests at milk production, collection and processing centres (see Table 9: Quality Standards for Unprocessed Whole Milk in Ethiopia).

The milk processors in and around Addis Ababa paid the milk producers on the basis of milk quality as determined by the processors. This was a potential source of disagreement and open to abuse. The establishment of independent laboratory will have an important role in arbitration between producer and processor. A second major role for the independent laboratory is that it will assist in reducing the incidence of poor quality milk being supplied to the processor, thereby improving the quality of milk and milk products available to the consumer. This would also reduce the frequency of disputes between farm and dairy plant.

Due to the decline in quality milk production, processing plants operate far below capacity resulting in "quality compromise" in the purchase of raw milk supplies, milk that has been adulterated and/or has high bacteria counts, high acidity, etc., continues to be accepted by processors, who lack experience and expertise in establishing relations with dairy farmers, processing technology, business management, and marketing requirements.

The present system in Ethiopia for testing of raw milk and dairy products (with the exception of some research testing laboratories like ILRI) does not stimulate the production of good quality, biologically pure milk with high technological quality that meets the national/ international standards. In order to increase the customer requirements towards the quality characteristics, which are the bases of the prices of raw milk, the implementation of a new analytical laboratory system is required for testing of the milk quality, which produces test results accepted by both the producers and the customers.

As stated above, there is no good laboratory practice. No equipment and instruments for the control laboratories. No necessary complex and reliable analysis, these created difficulties in analyzing the samples with sufficient quality and speed. Currently there are no proper means for collecting and processing of information concerning the milk and milk products quality for marketing.

The current situation of laboratory services in Ethiopia is mainly for diagnostic purpose. To improve the quality of milk and milk products, strict accredited laboratory service and assurance is crucial. Thus, investment in this sector is of the prime importance in product and market development.

Today's consumers are demanding quality in the food products they purchase. Milk, cheese and other dairy products must have a strong reputation for quality and value. Thus, the dedicated efforts of dairy producers, manufacturers, and marketers must be professionally supported in their endeavour. Nevertheless, the quest for improved quality continues with manufacturers and producers to enhance and assure the quality of dairy products at every link in the marketing chain – from farms all the way to the consumer's table.

The production of safe wholesome dairy products begins with the production of quality milk at dairy farms. Dairy producers work with many resources and experts to help them maintain the health of their dairy cows and the quality of the milk they produce. A combination of on-farm "Best Management Practices" (BMP), stringent regulatory requirements and regular on-farm quality assurance inspections help ensure that all dairy products begin with quality raw milk.

Milk testing and quality control is an essential component of any milk processing industry whether small, medium or large scale. Milk being made up of 87% water is prone to adulteration by unscrupulous middlemen and unfaithful farm workers. Moreover, its high nutritive value makes it an ideal medium for the rapid multiplication of bacteria, particularly under unhygienic production and storage at ambient temperatures. For any processor, to make good dairy products, good quality raw materials are essential. A milk processor or handler will only be assured of the quality of raw milk if certain basic quality tests

are carried out at various stages of transportation of milk from the producer to the processor and finally to the consumer.

Trade of milk and payment of farmers demand accurate and reliable results from approved laboratories like in some neighbouring countries i.e., Chemiphar (U)Ltd in Uganda and AnaLabs in Kenya. Chemiphar Ltd has shown an interest to set up an accredited food testing laboratory in Ethiopia. In this regard, SNV has organised an international conference on the need for an accredited food testing laboratories in Ethiopia where AnaLab of Kenya and Chemiphar of Uganda have shared their experiences with the the Ethiopian counterparts and stakeholders in June 2008.

No scheme has been set up to pay farmers according to the quality of the milk they produce. Thus, the establishment of milk-testing laboratories, which performs the analysis of samples from single cow to bulk milk from different herds, is imperative. Profitability of dairy production and end product quality is closely related to the hygienic and chemical properties of the incoming raw materials. Implementation of milk payment schemes, which favours farmers who supply milk with the desired properties, is a very effective tool for gradual improvement of the raw milk quality in the country.

Laboratories which offer a complete range of milk and milk product analysis, which determine the hygienic, chemical and microbiological quality of raw milk and dairy products all along the value chain remain the major requirement and concern for the development of dairy sector in the country. Such laboratories are commendable in order to meet the set requirements for both internal and external markets. The planning and establishment of quality control laboratory for milk and milk processing plant will include the following:

- Organization and staffing of the quality control activity within the dairy plant. Training the quality control personnel.
- Definition of quality standards taking into account also the legal requirements for raw materials, ingredients, packaging materials, processing line and equipment, end products, storage, handling during distribution, etc.
- Laboratory and methods for testing and analyzing for the quality parameters including organoleptic, physical, chemical and microbiological methods - sampling methods and schedules.
- Alarm limits (maximum/minimum) for quality parameters - Recording and reporting systems.

It is expected that interested private investors in this discipline along with existing dairy associations are encouraged to give attention to shifting this untapped business area in Ethiopia.

7.6 Veterinary and pharmaceutical service

The livestock disease and parasite situations in the country are well understood, and control and treatment-methods are sufficiently known and established throughout the country. The livestock diseases that are commonly encountered and are of economically importance to dairy production are Foot and Mouth, CBPP, Anaplasmosis, Enterotoxaemia, Lumpy-skin disease, and Haemorrhagic septicaemia. Other diseases, such as Blackleg and Anthrax, also occur sporadically. Rinderpest is one disease that has seemingly been effectively controlled. Intestinal worm-infections causing great production losses from morbidity (e.g. Tape worm) as well as mortality are also important problems. Ticks are the main livestock health hazards as they are very common in the highlands and the major vectors of many of the epidemic diseases (FAO-Livestock Sector Brief, 2003).

Provision of veterinary service is the major and the day to day activity and encompasses basic animal health education; treatment and vaccination; laboratory diagnosis and sample collection for regional laboratory. In addition to clinical based service, technicians involve in mobile clinical service on call basis and vaccination campaigns.

There are six organized Faculty of Veterinary Medicines and one National Veterinary Laboratory in Ethiopia. This faculty produces yearly skilled human resources to meet the demand of the producers while the National veterinary Institute produce over 14 different bacterial and viral vaccines against various infectious animal diseases. The faculty is also another source of part-time animal health professionals that serve the dairy producers and accounts for 18% of clinical service and 4.7% of drug provision during treatment.

The vet service providers are very much preferred as by producers for their timeliness and availability for home services. In the meantime, producers complain on the effectiveness of the private vet personnel's for use of expired drugs.

Development of responsive services requires that policies create an enabling environment for pluralistic development of service supply, and that the public sector is committed to making clear the different roles of the public and the private sectors in delivery of services. In this regard, enabling environment for development of private sector in service delivery is almost lacking and far limited to dairy market and animal feed services. The other lacked enabling environment is lack of equal play field in the market and lack of incentive and backstopping institutions in the private sector development. The public sector is expected to strengthen its efforts in developing capacity of producers in formulating the demand for services, developing favourable conditions for the private service providers (capacity building, incentives), coordinating the various service providers by creating platforms, monitoring and evaluation and quality assurance and taking care of public interests and long-term interventions (infrastructure), which are unlikely to attract private sector investment instead of participating in the free supply of inefficient and ineffective services that can be delivered through well functioning private sector.

Currently, these favourable environments are lacking to occur. The incentive to private sector development is far from expectation. Spielman *et al.* (2006) pointed that despite the growth of private sector in service delivery, some of the key market, organizational, and policy incentives have yet to fall into place in Ethiopia to stimulate private investment in agricultural service delivery.

Furthermore, the recent World Bank measures of ease of doing and starting business in Ethiopia place the country at 102 and 106 out of 178 countries in 2008, respectively and a rank of 58 in dealing with license. The difficulties in starting a business and enforcing contracts in Ethiopia are well documented, and reflect many cumbersome procedures, strict regulations, barriers to accessing credit, and minimum capital requirements (World Bank, 2007b).

Diseases of different origin are frustrating livestock industry in Ethiopia. Livestock contributes 33% the agricultural GDP and 15% of the export earnings and the economic of livestock losses due to direct mortality is estimated to be 9% in cattle and 15% in small ruminants and in economic terms, the production losses from diseases are generally estimated to amount more than Birr 900 million (about US\$ 150million) per annum (Debu University). With a very large livestock population and progressing dairy industry, the demand for veterinary pharmaceuticals is very much there.

Ethiopia has great potential for increased livestock production, both for local use and for export. However, expansion was constrained by inadequate nutrition, disease, a lack of support services such as extension services, insufficient data with which to plan improved services, and inadequate information on how to improve animal breeding, marketing, and processing. The high concentration of animals in the highlands, together with the fact that cattle are often kept for status, reduces the economic potential of Ethiopian livestock.

Animal health and improved management is also one of the major constraints of dairy development in Ethiopia which cause poor performance across the productive system. Many of the problems result from the interaction among the technical and non-technical constraints themselves e.g. poorly fed animals develop low disease resistance, fertility problem, partly because the animal health care system relies heavily on veterinary measures, poor grazing management systems continue to cause high mortality and morbidity (e.g internal parasites), many of the disease constraints which affect supply are also a consequence of the non-technical constraints e.g. Lack of private veterinary services and lack of the right medicines for their sick animals. This situation invites dedicated investors to improve the socio-problem of the livestock farmers to improve the dairy industry of the country.

Pests and Diseases: Animal disease is a major constraint limiting the production of indigenous stock, by restricting the introduction of more productive animals, new technology and constraining the country from entering the high priced export market. There are epidemics of infectious diseases with high rates of mortality, which could be controlled by vaccination; there are also parasitic, and vector born diseases. Trypanosomiasis and internal parasites are very severe, for which effective, easily administered inexpensive control or treatments have not yet been developed Thus, livestock diseases on their own and interacting with nutritional and productivity problems cause high mortality, morbidity and restrict production in potentially productive areas. These two economically very important and potentially attractive sectors need to be prioritized as investment opportunity for potential investors.

7.7 Dairy Logistics

Transport

Ethiopia's transport system is one of the least developed in the world and is inadequate to support an efficient agricultural-production and distribution system. Road density is the lowest in the world, with only 20% of its land- area being within 10km of an all-weather road, and 70% of its farms being more than a half day's walk from an all-weather road.

The relatively high marketing- costs for liquid milk and the risk attached to marketing perishable products play a central role in dairy production and marketing. Lack of cooling facilities, inadequate means of transport, and poor communication considerably aggravate the difficulties of collecting and preserving locally produced milk. The action of pooling, especially pooling of milk collection and transportation activities, have the potential to mitigate costs. Milk production is widespread throughout Ethiopia and improvements in the production, collection, processing and distribution of milk will lead to added income throughout the rural sector.

As a landlocked state, Ethiopia relies on its airports and close links with its neighbours for access to the outside world. The government is determined to improve infrastructure links in all areas, to further open up the economy to international trade and investment. On the ground, there are moves to develop internal transportation systems, both on the roads. This could lead to private sector operators to take the advantage to select any regional state of their preference and invest their business as facilities of transportations are well organized throughout the country.

Milk Collection Centres

In total there are about 10 dairy processing companies operating in Ethiopia. Located in various parts of the country, these dairies have a total processing capacity of 72,000 litres of milk per day. This processing capacity could easily be increased to a double-capacity a day with minor upgrades to existing equipment. The capacity ranges 5000 litres per day in the smallest dairies, 30 ton per day in the largest. They supply a very limited range of dairy products to the domestic market. Presently, imported dairy products have a significant share of the domestic market. In response to increased competition from imports, local dairy processors are attempting to develop new products of their own. These new products require higher quality raw milk and better milk handling, manufacturing, and distribution practices.

In 2005, milk collection reached 19.3 million litres from 7,300 farmers from 48 milk collection centres (MCCs). A large number of MCCs and dairy plants are managed by young inexperienced workers or by farmers with insufficient knowledge of GMP. This is the main factor leading to unsafe products and limited shelf-life of products which directly correlates to the economic balance of dairy plants. The main problems which lead to such conditions are: low product quality, non standardization of products, unsafe products and low competition potential.

The dairy processors' demands for better quality milk are putting increased pressures on MCCs to supply higher quality milk. Presently in Ethiopia there is no MCC operating with Good Milk Handling (GMH) standards. There is also a general lack of GMP (Good Manufacturing Practices) being standardized and followed in the milk value chain. This inconsistency throughout the dairy food chain results in products of variable quality and inconsistent taste.

The milk value chain in dairy system is deficient in the control of milk collection, transportation, and processing due to lack of knowhow among the actors. Thus, private sector with sound skill in the system is encouraged to focus into this part of production system and invest in equipment for milk collection centres, for milk processing plants, for laboratory facilities, for food grade packaging materials, and for cleaning solutions to make a difference in the Ethiopian dairy industry.

Adaa Dairy Cooperative case: The Cooperative has 12 milk collection centres strategically located in different parts of Debre Zeit town. The producers use the centres to deliver their milk and for others to purchase milk and milk products during the day. The centres are not limited only in sells of pasteurized milk but also engaged in raw milk sells which will stop as of the first week of August 2008. This is because the cooperative wants aggressively to go into market and compete with its competitors (LEMA, MAMA, and Family milk). The cooperative also wants the MCCs to be the centre education, centre of information sharing, and the centre for recreation for its members and the communities at large.

7.8 Finance Services

Though the credit market is responsive for the liberalized economy in the country, it is not serving the dairy sector due to reason discussed below. Some 10 new private commercial banks and one cooperative bank were established, their involvement in dairy sector credit is limited to large investors which are not interested to invest in the dairy sector. This is due mainly to long reproduction cycles of the species that result in long gestation period for the investment. These commercial banks have involved in credit service through government incentives for special programs and NGOs support. Effort is being made by Land O'Lakes to collaborate with three private commercial banks (Bank of Abyssinia, Awash International, and Dashen) that are Development Credit Authority (DCA) partners with USAID. Land O' Lakes provided training to the banks' lending officers to improve their understanding of the dairy sector, particularly dairy processing; its investment requirements, cash flow expectations, and potential returns on investment and covered 50% collateral for those interested borrowers and constrained by lack of collateral. But, these banks are constrained by shortage of capital and loan able fund (Personal Communication – Land O' Lakes, 2008).

SNV has also provides access to three kind of funds: research and study, leverage and financial intermediation to finance those intervention areas in the selected four agricultural and agro processing value chains, of which milk and milk value chain is one. The objective of leverage fund is entrepreneurs/ producers and their organisations to buy business development services and business development services providers to sell relevant services to producers. The objective of the financial intermediation fund is to provide grants that enable entrepreneurs/producers and their organisations to access financial services from financial institutions and enable financial institutions to offer appropriate financial services to economic operators.

The other major source of dairy credit service is from Micro Finances Institutions (MFI) flourished after the issuance of Proclamation 40/1996, which provides the establishment, licensing and supervision of microfinance institutions. Up to 2005, there were 23 licensed MFIs reaching about 905 thousand credit clients and some saving clients in the country (Getahun G., 2005). Though most of the MFI are addressing the dairy sector, it is constrained by unfavourable loan size and period for sector, far to rural dairy producers and long loan procedure for smallholder dairy producer. According to the recent MFI, the maximum loan size is Birr 5,000.00 which is not enough to start a single dairy cow farm with 3 years loan that is not feasible for dairy. The interest rate is high (up to 20%) when compared to the bank interest rate (7.5 %) and the ceiling interest rate is still open to be decided by the board of directors, according to the new Directive No MFI/13/2002 (Ibid). On top of this, the MFI are loosely linked to other actors in the service delivery system including government actors. This is because MFI are working independently once

Table 10: List of dairy hardware & ingredients

Value chain links	List of equipment and ingredients
Milk collection centres	<ul style="list-style-type: none"> • Collection utensils • Stainless milk containers • Different equipment
Milk Transportation	<ul style="list-style-type: none"> • Isolated inox tank for milk transportation • Field equipment for milk measurement and acidity testing - alcohol probe or Ph meter • Milk transfer pump • Equipment for milk measurement
Laboratory	<ul style="list-style-type: none"> • Acidity testing equipment -Ph meter and titrated • Inhibitors and antibiotics testing equipment • Thermometers • Lactometers
Refrigeration unit for milk samples storage	<ul style="list-style-type: none"> • Containers for tacking milk samples • Milk receiving and storage • Milk pump with filter • Plate heat exchanger • Ice water
Isolated milk storage tanks	<ul style="list-style-type: none"> • Milk pasteurization unit • Temperature control • Continue temperature chart recorder • Divert valve • Holding tube • Homogenizer • Separator
Yogurt fermentation tanks	<ul style="list-style-type: none"> • Temperature probe • Isolation • Pasteurized milk tank • Isolation
Packing line for: Yogurt, set yogurt and pasteurized milk	<ul style="list-style-type: none"> • Cooling chambers • Isolated and easy clean • Data logger for temperatures recording • Track for distribution • Isolated • Temperature control • Data logger for temperature control
Cleaning in place (CIP) system*	<ul style="list-style-type: none"> • Acid (Nitric acid) • Caustic (Sodium chloride)
Dairy products production ingredients	<ul style="list-style-type: none"> • Starter culture for yoghurt making • Starter culture for butter making • Starter culture for cheese making • Rennet powder

* for cleaning -Transport tanks and separator for dairy plants
Source: Compiled by Author

they got certificate from National Bank. Wolday A. (2002) pointed National Bank of Ethiopia have limited capacity to supervise MFIs and there is absence of a government department or other institutions to supervise and support this MFI.

These MFI such as OSCSC and ACSI have insurance service associated with death of borrower. This service can be developed to incorporate livestock insurance services, as Azage *et al.* (2006) indicated the importance of livestock insurance system in Ethiopia, due to the high risk associated with the sector. Dairy associations at all level should advocate for responsive credit system for the sector.

7.9 Hardware supplies

The availability of necessary hardware for milk collection, transport and processing and storage in required quantity and quality are decisive for the development of the dairy industry. The main equipment and ingredients are listed in Table 10. No dairy product can be produced both in quality and quantity in the absence of these equipment and ingredients.

None of the items listed are available or even sold in Ethiopia. The dairy sector is in a critical problem to fly in the items and ingredients from abroad in a timely manner to facilitate the day to day activity of milk processing, product diversification, and milk quality control duties. Thus, private sector is encouraged to play a big role and benefit from this exciting and inviting business opportunity.

7.10 Refrigeration

With improved education and income of the people, the demand for hygienically produced and processed milk and dairy products is expected to improve. With increased refrigeration facilities at the retail outlets, the storage of chilled milk and frozen dairy products becomes easier.

Milk is traditionally collected by un-chilled in the villages and brought to the collection centres of dairy plants, establishment of milk collection centres in the milk pockets with chillers offer a good investment as the quality and quantity of milk procured will be improved.

7.11 Milk Processing

Milk processing is now in the hand of the private sector but is struggling against unfair competition from the informal sector and imported similar dairy commodities.

Quality assurance system is weak and competition from imports is mainly on the basis of quality difference rather than price. Improvements in processing and quality assurance and efficiency are necessary for the survival in increasingly liberalised, regional and global market. This will require self regulation rather than control from the government. This implies the industry will have to organise itself to better face challenges of economic order of the region and global as whole.

This is particularly true considering that raw and pasteurised milk are dominant milk products in and around Addis Ababa markets, powder milk is the third most consumed milk products, and UHT milk has been introduced recently. The trend of processed dairy products (butter, ayib, and some cheese varieties) is increasing and there are only four milk processing units. Keeping in the view the recent trend, the investment in processing units of milk make a good investment sense.

At present, the major sources of milk to Addis Ababa are the private farms around it, and the smallholder urban dairies within the city, using grade and cross-bred cows. The total milk production from these 5,170 dairy farms amounts to 34.95 million litres per annum. Out of this 73% is sold, 10% is left for consumption at home, 9.4% goes to calves, and 7.6% is processed mainly into butter and ayib (Azage *et al.*, 2002). The other sources of milk to Addis Ababa are DDE Sholla (now LAME Dairy), Sebeta Agro Industry (Mama), LEMA, Family Milk enterprises, Genesis Farm and recently Adaa Dairy Cooperative that collect milk from farmers as far away as 150 km radius

Table 11: Status of diversified dairy products production in Ethiopia

Products	Status
Milk Powder	imported
UHT Milk	imported
Pasteurized Milk	produced
Cheese	produced
Butter	produced
Yoghurt	produced
Ghee	produced
Cream	produced
Ice Cream	produced
Milk Ice	imported
Ice Confection	imported
Flavoured Milk	imported
Chocolate Milk	imported
Fermented Skim Milk	imported
Sterilized Milk	imported

Source: Compiled by Author

around Addis Ababa and provide standardized and pasteurized milk in plastic sachets.

In general, in Ethiopia only 2.5 to 3.0% of milk is processed and channelled into the formal market. This very low compared to the milk produced in the country and the demand on the other side. The obstacles in this regard are the collection of good quality milk as well as storage and delivery

If attention is paid to this sector and effort is made, the country will hopefully be able to tap into the export potential of this commodity and go a long way in improving rural poverty.

Agricultural development is the top priority of the Government and the country has witnessed this with increasing commercialisation of the sector. There are growing demands for inputs of agricultural products by manufacturing industries and for the provision of all-round support services such as the maintenance of laboratory equipments, milk processing equipments, tractors, harvesters and other agricultural equipment such as grain silos, cold storage, incubators and transport. The Agricultural-Development-Led Industrialization (ADLI) strategy adopted by the government facilitates the incentive structure needed to promote foreign investment in agri-business. These are some of the areas which investors have to think boldly to grasp the opportunities before time is lost in vain.

The past public effort to encourage pluralistic service providers were limited, instead, donor supported public projects were responsible in substituting services where supply was missing. Currently, limited attempt is being tried to promote community based organisations/ Dairy cooperatives and private sectors in service delivery by international organisations like SNV, ACDI/VOCA and Land O' Lakes, and projects (IPMS and RCBP of the World Bank). The efforts of these organisations have significant impact in the development of the dairy industry.

SNV- Netherlands Development Organisation: SNV aims at capacity development, mainly through advisory services of local organizations (local governments, private sector, civil society) for poverty reduction and good governance. The core of SNV's approach is bringing all the value chain actors and the stakeholders together in so called Coordination Groups. By doing so it supports the creation and strengthening of branch and business associations in the selected value chains. Concretely, SNV has realised the establishment of the Ethiopian Milk Producers and Processors Associations (EMPPA) and the Ethiopian Honey and Beeswax Producers and Exporters Association (EHBPEA). As a result of this approach, the SNV advisors contributed to establishing agricultural processing businesses and linking them to rural producers for their supply and to domestic and foreign markets.

ACDI/VOCA: A private, non-profit organization that promotes broad-based economic growth and the development of civil society in emerging democracies.

Land O' Lakes: Since 1981, Land O'Lakes International Development has applied an integrated approach to international economic development that capitalizes a leading farm-to-market agribusiness. Use practical experience and in-depth knowledge to facilitate market-driven business systems that generate economic growth, improve health and nutrition, and alleviate poverty.

Improving Productivity and Market Success of Ethiopian Farmers (IPMS): A major component of the project is to develop a learning and advisory structure which "links" the different private and public institutions for the development of the agricultural sector.

Rural Capacity Building Project (RCBP) of the World Bank: The development objectives of the proposed RCBP is to assist the Ethiopian Government to strengthen the agricultural technology system, make it more responsive to clients' needs, and enhance the capacity of producers to select economically viable technologies and practices. This would be achieved through: (i) modernized TVET colleges which are more responsive to the changing needs of a demand-driven and market-driven agricultural sector; (ii) piloting new initiatives in the agricultural advisory service system to introduce demand-driven and participatory mechanisms; (iii) a strengthened agricultural research system with improved institutional and human capacity to generate and disseminate client-demanded and market-oriented technologies.

7.12 SWOT Analysis: summary

The SWOT analysis is done from the perspective of investors in the dairy sub-sector to highlight key issues only. It is not exhaustive. Therefore, detailed analysis is not given here. It is based on the aforementioned chapters and given here as a summary.

Strengths:

- Ethiopia has large cattle population. Dairying is practiced by the majority of the rural population.
- There are both the 'good and not good' experiences in the country with regard to dairy business and dairy industry. Any dairy investment can build on the existing experiences. There is no need to reinvest the wheel.
- Suitable ecological condition for dairying..
- Growing milk demand in urban centres, particularly among the younger generation due to urbanizations, education, increase in income and change in life style.
- The major highland areas and districts are marked as milk shed areas for dairy development. The milk shed areas overlap with high population density, urban centre concentration, good road and communication network and access to electric power grids.

Weaknesses:

- Insufficient raw milk supply for milk processing plants. This has forced the milk processing plants to operate with only 40% capacity and limited the production of pasteurized milk and other dairy products.
- Inadequate know-how with regard to good hygiene practices in processing of milk and milk products. This results in higher wastage of milk and public health hazards.
- Cultural indifferences to milk consumption (traditional attitude that milk is for children, cats and the sick people).
- Strong preference for local products, especially butter and ayib, which compete with selling the milk.
- There is insufficient or/ lack of private sector inputs, such as artificial insemination technicians, community animal health workers, business development service providers, animal feed suppliers, etc. for milk value chain actors.
- Poorly developed dairy market infrastructure for collection and distribution of milk. This has limited accessibility (physical) to market/collection points.
- The milk value chain players are not actively working together.
- Milk collecting utensils and buckets used for up lifting the whole milk from the supply centres, where many smallholders are doing their sells, are not enough to collect and keep the quality of milk arriving to the collection centres of the processing plants.
- The milk collection centres are few in number, now well equipped, and limited in function to collection only rather than serving as center for dairy education, services and innovation.
- Insufficient baseline data of the actors involved in processing.
- The smallholder dairy farms barely employ appropriate and state-of-the-art production technology to produce quality milk in demanded by processors and consumers.

Opportunities:

- There is an increase in milk demand and to some extent consumption.
- Possibilities/capacities for improvement are available.
- New product development to increase customer selection (lifestyle products, pro-biotic yogurt, cottage cheese).
- Distribution into multiple market channels to reach more consumers.
- Institutional market segments (schools, hospitals).
- Improve packaging (e.g. out of home usage).
- There is political stability and conducive investment climate, government policy reforms, market orientation that are favourable for dairy investment.
- The cost of production for livestock products is generally low in the country. For milk production cost, Ethiopia is ranked among the countries with lowest cost of production in the world. The cost of labour is also low as compared to all the developed and many developing countries.(personal communication).

Threats

- Natural disaster (drought, flooding).
- Expectations on pulling factors of increased access to markets. Both large and small processors who are attempting to adapt to the changing competitive environment but who are in need of expertise and technical assistance to better compete at the high end.
- Insufficient insights in economic and social consequences of stronger incorporation of farmers in commercial dairy production.
- Insufficient insights of the dairy farmers/ farms on the effect of increased milk off take on the farming system and family consumption.
- Dairy farmers are resistant against improved breeds⁷.
- There are more than 200 days that the believers of Orthodox Christians abstain from eating and drinking any animal products whether processed or raw. This has its own effects on milk producers and processors as the demand for milk and other dairy products reduces during this fasting seasons. The Orthodox believes constitute nearly half of the population of Ethiopia, and hence, fall in demand has significant impact milk marketing.
- Weak finance base of the rural and small urban/ per-urban dairy farmers to invest on improvement and expansion their dairy enterprises.
- Competition for milk from informal/local market systems.
- Absence of regulation which prevents sales of raw milk and thus pasteurized milk has to suffer until rules are set in place.
- Pasteurized milk consumption is not accustomed in local markets and people prefer boiled whole milk.
- Dairy producer and marketing cooperatives/ organizations, though at an infant stage, have potential for efficiently organize smallholder member milk producers and apply best business management practices in providing services to members, including milk collection and cooling, market management, training, technical assistance, and representation and advocacy

⁷ For example, farmers around Holleta (45km west of Addis) keep and prefer indigenous breed of cows. They think that their local breed is superior to exotic breed. Local breed produce milk with high fat%, (5%-7%), animals are resistant to diseases, they are small in size, and they consume less feed. Whereas, the cross-breed are sensitive to diseases and consume more feed, produce milk with very low fat% (3.8%-4%) which takes more volume of milk to produce a kg of butter (23-24 liters) local breed (17-18 liters)

8 Way forwards for enhancing Dairy Investment of Ethiopia

Akin to other sectors of the economy, the dairy sector in Ethiopia has passed through three distinctive phases or turning points, following the economic and political policy in the country. In the most recent phase, characterized by the transition towards market-oriented economy, the dairy sector appears to be moving towards a takeoff stage. Liberalized markets and private sector investment and promotion of smallholder dairy are the main features of this phase.

Milk production during the 1990s expanded at an annual rate of 3.0 percent compared to 1.6% during the preceding three decades. However, most of the growth in milk production (60 percent) was due to the increase in herd size. Only one-quarter was due to productivity per animal resulting from technological change. This is not surprising since dairy production in the country is principally dependent on indigenous zebu breeds with average lactation yield of 524 litres for 239 days. Therefore, integration of crossbred dairy cattle to the sector is imperative for dairy development in the country. This can be achieved in two ways: (1) through promotion of large private investment, which at the end will introduce new technology in the sector such as improved genotypes, feed and processing, and (2) as smallholders will likely continue dominating the sector, government should also promote integration of crossbred cattle into the smallholder sector through improving their access to improved cattle breeds, AI service, veterinary service, and credit. Similarly, government should also take the lead in building infrastructure and providing technical service to smallholders. Severe shortages, low quality and seasonal unavailability of feed likewise remain as major constraints to livestock production in Ethiopia. These constraints need to be addressed and technological change be promoted to increase milk production.

Due to poor infrastructure, concentration of milk producers in rural areas, seasonal fluctuation of demand for fresh milk exacerbated by long fasting period, collection problems and perishability of milk, development and promotion of small-scale processing technologies is critical to increasing smallholder producers' participation in the dairy market. This is particularly important for Ethiopia where the demand for dairy products is ever increasing though it is dominated by butter rather than liquid milk. In addition, enhancing the ability of poor smallholder farmers to reach markets, and actively engage in them, is one of the most pressing development challenges.

Dairy co-operatives and Milk groups have facilitated the participation of smallholder in fluid milk markets in the Ethiopian highlands. Milk groups are a simple example of an agro-industrial innovation, but they are only a necessary first step in the process of developing more sophisticated co-operative organizations and well-functioning dairy markets. The survival of the milk groups that supply inputs and process and market dairy products will depend on their continued ability to capture value-added dairy processing and return that value-added to their members. Evidence from Kenya emphasizes the importance of milk collection organizations in improving access to market and expanding productive bases. On the other hand, there is a need to stimulate consumption of dairy products in the country through various mechanisms, including school milk programmes as more consumption increase demand for dairy produce and can potentially encourage production in the long run.

Review of the development of dairy sector in Ethiopia indicates that there is a need to have focused interventions more coherently. Development interventions should be aimed at addressing both technological gaps and marketing problems. If the appropriate producer price incentives are in place and input markets are allowed to operate freely, dairy production may respond positively. This has been demonstrated in the Kenyan dairy development that has to some extent similar agro-ecology and production systems.

In general, the challenge is to organize the collection of safe good quality milk and provide a constant supply of good quality milk and milk products to meet market demands. At the same time, the market demand for value added products for a range of income levels should be met.

The following are major recommendations for enhancing dairy investment opportunities in Ethiopia.

- A clear understanding of potential market trends and opportunities is needed for policy and planning in the dairy sub-sector. Because demand is highly conditioned by local perceptions and traditions regarding dairy consumption, this understanding should be pragmatic and based on local realities, not on assumed replication of trends observed elsewhere.

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- Genetic improvement has obviously had dramatic impact on development and growth. The use of exotic and cross bred cattle genetics is a rapid and potentially sustainable path to higher productivity, even among small-scale and resource-poor farmers. At the same time, the failures caused by importing high-grade animals should be noted and avoided.
- National (AI) and local breeding strategies need to address the realities of climate and disease risk. Given appropriate breeding strategies and disease control measures, however, it is possible to develop and sustain cross-bred dairy production systems; such systems have often played a key role in dairy development. The production and distribution of crossbreed heifers, provision and distribution of dairy stocks, provision and strengthening of AI services, and/or bull service were major components of the dairy development projects in the past. So far, AI service is provided only by a government institution, the National Artificial Insemination Centre (NAIC). The service, though not sufficient is available in urban, peri-urban and rural areas.
- Although it is difficult to capture the role of fodder or feed technology it is possible to demonstrate that planted fodder technology played a key role in growth in dairy productivity. Research has shown that the 'appropriateness' of intensive fodder production is much more likely to depend on availability of cheap labour, scarcity of land and good access to milk markets. Where land and labour is scarce intensive fodder cultivation and feeding of crop residues to cattle should be practiced.
- Traditional/ informal milk markets have played a key role in dairy development in Ethiopia. Informal, small-scale markets control over 90% of marketed milk; there is no evidence that this basic structure will change significantly in the next few decades. These facts, which are often overlooked because traditional markets are generally not reflected in national dairy industry statistics, pose several important implications for dairy policy and development. Traditional informal markets have clearly provided an effective, functional link between farmers and consumers which responds to consumer demand: Moreover, such markets are generally those most often serving the needs of small-scale farmers and resource-poor consumers. Therefore, public policy-makers should engage constructively with traditional markets to link them with formal modern industry.
- Dairy co-operative have played a significant role in fostering dairy development, primarily by providing a stable market environment and delivering services to farmers. Even though, they are not effective than other market channels in their business due to various administrative problems they played key role in linking poor farmers to input and output markets. Therefore, to make investment in dairy co-operative development effective and pro-poor - it should be well managed, placed outside strong political forces and linked to strong demand.
- There must be a link between agricultural research and growth in dairy development. Investment in dairy development through provision of appropriate credit and research technologies to smallholder producers will bring growth and shift producers towards greater commercial orientation, increasing their demand for improved technologies and innovations.
- Imports and exports, as well as macro policy and level of openness of the economy, can play a consistent role in the pace of dairy sector development. Import controls/ restrictions which is not for purposes of enforcing Sanitary Requirements and Food Safety Standards should be reduced or abolished. By so doing the role of domestic market protection will be relegated to ratification of dairy products.
- Ethiopia dairy industry currently lacks some categories of products in terms of variety, quality and quantity. These include; cheeses, butter, milk powder, whey, yoghurts and ice cream. The processors can seek ways to increase capacity, and invest aggressively in product development.
- The performance of the few milk producing co-operatives operating so far has shown that the quantity of locally produced milk currently available to processors and consumers could be increased significantly if effective collection (quality control- platform, chemical and microbiological) tests, transportation, cooling and marketing systems are put in place.
- Milk producers organizations should provide 'support services' to increase clean milk production.. An effective and well trained animal health service should be available at any time to look after the health of animals, arrangements should be made for regular vaccination and checking against contagious diseases by the qualified veterinarians.
- Formation of Dairy Board at national level and regional level are important for the development of the dairy industry. Introduction of programs that will increase milk consumption (e.g. introduction of

school milk program) price differentiation (i.e. premium price for high quality milk) are important for increasing milk production and consumption.

- Introduction of measuring facilities at milk collection centres (MCC) at national and regional level to agree on minimum standards for similar products, e.g. standard packaging for pasteurised milk, level of bacterial counts, etc.
- Introduction of packaging regulations which encourage use of hygienically safe milk collection and transportation utensils (metal instead of plastic containers) among informal traders for milk destined for the market through informal channels.
- Addressing milk quality concerns and transforming the informal milk markets based on the concept of business development services (BDS), and be supervised by national regulatory authorities
- To avoid spoilage, milk collection centres should be set up at locations where producers can easily access.
- As in many African countries, knowledge of hygiene is often not sufficient. Thus, the most important support services regarding clean milk production is "Extension –Education".
- Scaling up of processing technology and sizes of firms may gradually evolve with general economic development of the country.

Ethiopia has the untapped but time requiring market i.e., its population. Local consumption needs to be improved and supplied at affordable price. With consumers' education, stimulating consumption and offering of milk and by products at an affordable price, the market is tremendous and overwhelming in the years ahead.

Opportunities for entrepreneurship and investment are wide. Production of value added dairy products (product diversification and development), improved animal feed supply, animal health services, animal breeding/heifer production, artificial insemination services, organizing milk collection services, and manufacturing of improved packaging materials are all among the top list to promote Ethiopian dairy industry.

The value added dairy initiative addresses specific challenges facing Ethiopian dairy industry. This initiative retains and grows farm business, dairy plants and creates good jobs for rural areas. Ethiopian dairy producers and processors already have the passion to reinvest in their operations and develop new, innovative products for the neighbouring countries and to the rest of the world at large to enjoy. These initiatives supported by interested private investors provide assistance to compete successfully and build upon the state's strong market recognition and identity.

The private sector must become a key player by providing simple, sustainable technologies that will enable communities to create jobs, raise incomes and reduce poverty; by seeking ways of working together with the national partners pooling their resources (raw materials and human resources) and channelling their energies to achieve shared objectives; by actively involved in creating business that benefits both parties.

Overall, the way forward is building a competitive Ethiopian dairy industry on private investment that generates employment and income for smallholder families and provides affordable, high quality, nutritious dairy products for Ethiopian consumers. Private investment in the dairy sector requires a reliable source of high volumes of quality milk as raw material, available in concentrated geographic regions. Ethiopian milk and milk products must not only be of the highest quality, but also available at prices competitive with imports.

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