



**The NEXT STAGE IN DAIRY DEVELOPMENT
FOR ETHIOPIA**

Dairy Value Chains, End Markets and Food Security

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ACRONYMNS

AGDP	Agricultural Gross Domestic Product
AGP	Agricultural Growth Program
ATVET	Agricultural Technical Vocational Education Training colleges.
AI	Artificial Inseminations
ALPPIS	Addis Livestock Production & Productivity Improvement Services, PLC
APHRD	Animal and Plant Health Regulatory Department
NAIC:	Artificial Insemination Center
BDS	Business Development Services
CBO	Community Based Organization
CAHW	Community Animal Health Workers
CSA	Central Statistics Agency
DDE	Dairy Development Enterprise
DIGA	Dairy Income Generating Activity
EDDC	Ethiopia Dairy Development Council
EDDP	Ethiopia Dairy Development Project
EMPPA	Ethiopia Milk Processors and Producer Association
NNP	Ethiopia's National Nutrition Program
FAO	Food and Agricultural Organization of the United Nations
FTC	Farmers received training at the Farmer Training Center
GOE	Government of Ethiopia
LOL	Land O' Lakes
LMP	Livestock Master Plan
MOA	Ministry of Agriculture
MoARD	Ministry of Agriculture and Rural Development
MOFED	Ministry of Finance and Economic Development
NAHIDL	The National Animal Health and Investigation and Diagnostic Laboratory
NAIC	National Artificial Insemination Center
NGO	Non Governmental organizations
NVI	The National Veterinary Institute
OIE	World Organization of Animal Health
PADETES	Participatory Demonstration and Training Extension System
PPP	public- private- partnership
RUTF	Ready to Use Therapeutic Food
SCMB	Corn-Soy-Milk blend
SDDP	Smallholder Dairy Development Project
SNV	Netherlands Development Organization
UAE:	United Arab Emirates
USAID	United States Agency for International Development
WWS	World Wide Sires

EXECUTIVE SUMMARY

A vibrant dairy sub-sector is important for the economic development of Ethiopia. Dairy offers a pathway out of poverty for a large number of households keeping livestock. USAID support for the commercialization of the dairy industry over the next five years (2011 – 2016) can increase the sales of approximately 100,000 households to US\$ 10.0 million per year by October, 2016. At the same time, the dairy industry can provide needed food products to meet the increasing food security and nutritional requirements of an expanding population. The study finds that the growth in the dairy sub-sector could also create up to 73,000 new dairy related jobs by the year 2020.

Estimates place Ethiopia far below recommended daily milk intake at 17 lt per capita, and even below the African-wide average in per capita consumption. Recent research found that on average only four percent of the average Ethiopian household's food expenditures are spent on dairy products. However, tremendous potential exists to increase production and consumption of dairy products

Though Ethiopia has the largest inventory of livestock in Africa, its productivity and commercialization remain low. This is after decades of interventions by the government and international donor agencies to improve the sub-sector. Recent research found that the Government of Ethiopia (GOE) has undervalued the contribution of ruminant livestock production to gross value of ruminant's contribution to agriculture. The dairy sub-sector contributes 63% to total value of ruminant output. By underestimating livestock's contribution, the GOE has underfunded the development of this sub-sector vis-à-vis general agriculture.

There are, however, positive signs of a take-off of the formal dairy sub-sector as the current government has chosen a market-oriented policy with liberalized markets and encouraging private sector investments in the dairy industry. However, the dairy sub-sector faces challenges to secure and sustain these initial gains for future generations, and development assistance can play a significant role in overcoming these challenges.

This potential take-off comes at a time when the demand for animal products is increasing due to growing population and urbanization, rising disposal incomes, and changes in demographic structure of the population. Our projection is for demand for milk and milk products to increase from its present level of 17 lt per capita to approximately 27 lt per capita in 2020. To fill this gap, the domestic industry will need to expand, dairy cows will have to be more productive (cross-bred cows) and better managed, and producers will have to become more market-oriented and commercialized; otherwise, dairy imports will continue to increase and will drain scarce foreign exchange. Ethiopian producers can provide milk to meet the increasing national demand. At current rates of population, urbanization, and income growth, USAID investment over the next five years can help achieve 27 lt per capita and substantially improve the food security and nutrition of approximately 13.5 million consumers by 2020.

These challenges, which are not new, create opportunities for producers and investors who are innovative and risk-takers. The GOE has a clear mandate to support the development of the dairy sub-sector with policies in the areas of land allocation and tax holidays for participants in the value chain. However, market distorting policies of the past continue to hamper progress,

and they need modification if the dairy sub-sector is going to take-off on a sustained growth path.

This study takes a value chain approach to identify the constraints, opportunities, interventions and possible impact for the dairy sub-sector from input supply to final consumption of milk and milk products. The report identifies areas where USAID/Ethiopia funds can be leveraged to gain maximum impact for the largest number of beneficiaries. These innovative solutions are recommended to have sustained impact over the next decade to meet our targets set for meeting demand projection in the year 2020. The priority areas for USAID/Ethiopia funding are:

1. Articulate and share with the GOE a vision for and strategy for a vibrant and progressive dairy sub-sector that supports the efficient and safe production, processing and marketing of milk and milk products.
2. The recommended strategy is for USAID/Ethiopia to support the GOE's market-driven approach that places priority on meeting the increasing market demand for convenient, quality (hygienic) and affordable milk and milk products in targeted geographic areas focus based on market access and conducive agro-ecological conditions for dairy, consistent with the GOE (MOA) and World Bank's Agricultural Growth Program (AGP) regions.
3. Strengthen the capacity of PDC and dairy unions to collect milk for sales and processing, and provide input services to its members
4. Focus on formal and informal milk channels with the goal of moving actors in milk and dairy value chains from the informal to the formal channels.
5. Focus on and strengthen existing small and medium-scale processing units along with expansion of SME processing into other growing urban centers
6. Building on the successful proof of concept of DIGAs involving PLHIVs, expand the support for the creation of DIGAs involving women, women's groups, youth and farmers to enhance the marketing (feed, concentrates, mineral blocks, etc.) and retailing dairy products in urban areas
7. Provide knowledge-based skill sets to SMEs (individuals, coops, and private firms) to better adopt innovative solutions to filling technological gaps and removing constraints for delivery of inputs for the producing, processing and marketing of milk and milk products
 - a. To all participants in the value chain
 - b. Providing training, technology backstopping, and business services
8. Strengthen existing producer groups and the formation of new market-oriented producer associations/cooperatives and build up the professional capacity of existing primary cooperatives and cooperative unions through business development services (BDS) to

provide services that benefit the members in the procurement of inputs, collection of bulk milk, and the sale of their milk and dairy products

- a. Technical support
 - b. Business Development Services
 - c. Access to credit
9. For inputs and input services, expand existing services and foster market incentives for new entrants that reward risk-takers who invest their time and resources in new business ventures to provide quality inputs and services to dairy producers and processors:
- a. Focus on artificial insemination (AI) and health services using business models
 - b. Contracting for services between groups of producers and input suppliers – forage seed, fodder, genetics and animal health
 - c. Development of private rural farm stores linking input suppliers and input services with farmers, coops, and producer groups
 - d. Availability of micro-credit to support SMEs
 - e. Provision of matching grants, loan guarantees, etc.
10. Expand the proven model of dairy “lead” farmers who will be the catalyst for the testing of innovative “good dairy management practices” which will lead to their contact farmers to adopt improved practices for increased productivity and expansion of dairy herds:
- a. Smallholders (one to three heads) to become medium-size producers (four to 6 heads)
 - b. Medium-size producers (4 to 6 heads) to become larger producers (7 head and over)
 - c. Large producers (7 to 10 heads) to expand their dairy herd by at least 50 percent
11. Promote leadership skills for women in all types of employment in the dairy value chain with training, business planning and facilitating the access to credit.
12. Provide targeted support to women and unemployed youths to engage in all business activities in the dairy sub-sector (even as lead farmers) , recognizing that they have primary responsibility for the majority of milk and milk products that are produced, collected, processed, and marketed, with the result to create employment in rural and urban areas

13. Support the strengthening of a public sector adaptive research program targeted to specific high potential agro-ecological areas for improved dairy production systems and link the results of the research to lead farmers and their contact farmers, as well as, to FTCs
 - a. Forage varietal trials
 - b. Dairy rations using local agricultural by-products
 - c. Pasture management and zero grazing systems
 - d. Nutrient recycling of organic materials for pasture and crop development
 - e. Production of feed grains for animal production
 - f. Optimizing cross-bred animal management systems for different agro-ecological zones

14. Roll-out an extension model involving input suppliers, rural farm stores, coops, processors in on-farm demonstrations and training of collectors and primary dairy cooperatives (PDC). This can be done with close linkage to the MOA's farmer training centers (FTC), NGOs, and rural agro-dealers
 - a. Link "lead" and "contact" farmers to the MOA's training activities at the FTCs
 - b. Provide technical packages training and manuals (e.g. forage seed production, silage making, etc.) for improved dairy production to the FTCs in high producing dairy production areas

15. Support the relocation and commercialization of urban dairies by municipal governments in set-aside agricultural zoned areas in the peri-urban areas to avoid liquidation of dairies, environmental degradation, and pollution, through creation and support of producer groups and cooperatives.

16. Support the Ethiopian Meat and Dairy Technology Institute (EMDTI) and other vocational training centers with technical support in training people for jobs in milk handling, testing, processing and merchandising of milk and milk products

17. Support the creation and functioning of the Ethiopian Dairy Council/Board to foster public-private dialogue at both the national and regional levels to create a dynamic, private sector-led dairy forum to address industry needs with government agencies so as to provide a regular supply of quality milk for the marketplace. Topics for public-private dialogue include:
 - a. Access to land for forage and dairy production
 - b. Milk quality industry standards
 - c. Enforcement of contracts for delivery of products and services
 - d. Land zoned for dairy production
 - e. Government programs on subsidized AI and animal health services
 - f. Harmonize regulations on live animal, and animal and plant genetics with international standards

1. OVERVIEW OF THE DAIRY SUB-SECTOR STUDY

1.1. The Role of the Dairy Sub-Sector in the Economy of Ethiopia

Ethiopia has one of the largest livestock inventories in Africa with a national herd estimated at 49.2 million cattle, 46.8 million sheep and goats, and 9 million pack animals. All livestock currently support and sustain livelihoods for 80% of all rural poor. Of the total population, 35 – 40 % of all livestock are located in the pastoral areas.(MoARD 2007) Female cattle constitute about 55.48% of the national herd.. Of the total female cattle population, dairy and milking cows total 16,941,361, 14.24% dairy¹ cows and 20.12% milking² cows (CSA 2008). Eighty-three percent of all milk produced in Ethiopia comes from cattle with the remainder coming from goats and camels. (MoARD 2007) Sheep's milk is not commonly collected or consumed in Ethiopia. The Central Statistics Agency (CSA, 2008) estimates 2.76 billion liters of cow milk produced by sedentary populations annually while camel milk is estimated at 16.2 million liters annually.

The Ministry of Finance and Economic Development (MOFED) estimated the gross value of ruminant livestock production in 2008/09 at Birr 32.64 billion. The estimate includes the values of: livestock off-take (Birr 9.653 billion), milk and milk products (Birr 19.471 billion) and other products, e.g. wool, dung and change in stock inventory. Very recent recalculation of values by Behnke et al. estimated the contribution to the economy at Birr 48.07 billion, an increase of 47%. (This figure does not include the value of animal traction.) Milk and milk products contributes 63 percent to gross value of ruminant livestock production. The GOE has been underestimating the contribution of livestock and especially milk to the agriculture gross domestic product (AGDP) of the country.

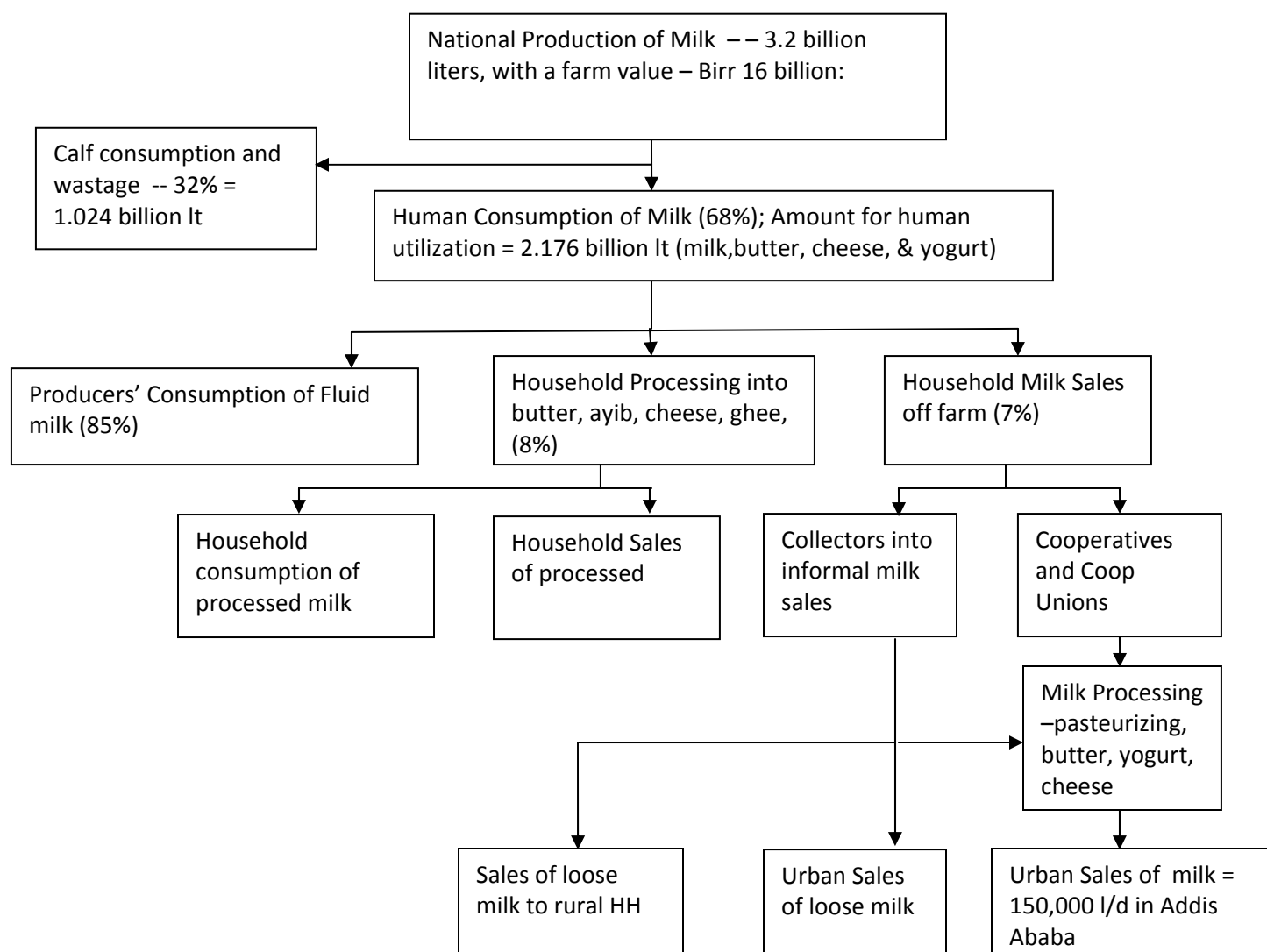
1.1.1. Milk Production and its Allocation

Ethiopia produces approximately 3.2 billion litres from 10 million milking cows – an average of 1.54 litres per cow per day over a lactation period of 180 days (CSA quoted by Tefera). (See Figure 1.1) The farm-level value of the milk is an estimated Birr 16 billion. The value of other important animal products and services include blood, traction, transport, and manure for organic fertilizers and fuel. Estimated calf consumption and wastage of milk is 32% of the milk produced (Getachew and Gashaw). Households consume approximately 85% of the milk collected, 8% of the milk is processed into products with longer shelf life, and 7% is sold (MoARD, 2007). During peak production in the wet seasons, rural farmers, not part of formal cooperatives, face challenges marketing their milk as most regions experience a surplus. More surplus milk may be processed at the home into local cheese or butter. For most subsistence farmers in all cultures in Ethiopia, the daily decision on how to allocate milk is decided by the head female in the household and is dependent upon season, number of children in the household, presence of sick family members, and daily financial needs.

¹ Cow of any breed kept primarily for milking purposes

² Cow of any breed which has been milked

Figure 1.1. Allocation of milk produced in Ethiopia



1.1.2 Livestock and Milk in the household economy

Livestock performs multiple functions in the Ethiopian household economy by providing food, input for crop production and soil fertility management, cash income as well as in promoting savings, fuel, social functions, and employments. With these multiple functions, livestock can serve as a vehicle for improving food security and better livelihood of the rural population.

As listed in Figure 1.1., a majority of the dairy households in Ethiopia directly consume most of their animals' milk production, 85%. This is compared to only 62%, 66%, and 62% of production of grains, cereals, and pulses respectively being consumed. (CSA 2010) An increase in HH income through the adoption of improved dairy technology has been found to lead to improving the household's nutrient intake which contributes to better health and nutrition. Smallholder producer will trade milk for in-kind payment for casual on-farm labor or for barter

with shops, although this is more common in the highlands. This practice may have stemmed with the high farm labor needs during peak milk production periods.

Despite the contribution of livestock to the economy and to smallholders' livelihood, most livestock production systems in Ethiopia are not adequately market oriented. Livestock in either the highlands or lowlands are not kept for commercial purposes (sales of livestock is estimated at only 10 – 12%). The primary reason for selling an animal is to generate income to meet unforeseen expenses. Milk, because of its consistent albeit season contribution, is more market oriented although 98% of all milk marketed in Ethiopia is through the informal market channels. In Addis Ababa, the informal market channel handles 90% of milk and milk products sold to consumers (personal communication with processors and Jabbar et al.).

Apart from its contribution as a source of food and income, it is the only source of traction power in traditional peasant farms. In the arid and semi-arid extensive grazing areas of the Eastern, Western and Southern lowlands, livestock are managed in migratory pastoral production system.

1.2. The Challenges

In spite of the enormous livestock resource and great potential for increased livestock production, the productivity is disproportionally lower due to a number of dynamic economic, technical, policy and institutional challenges (Tefera, et al.) Livestock producers encounter various livestock management problems, prevalence of major endemic diseases, poor feeding and high stocking rate on grazing lands.

Thus, the contribution of this sector in the agricultural economy of the country remains lower. Indeed, it accounts for merely 30-35% of the national agricultural output and 40% of the agricultural export.(MOFED, 2008). Studies indicate that the livestock sector contributes about 12-16% of national Gross Domestic Product (GDP) Moreover livestock also contribute to the livelihoods of 60-70% of the population, 15% of export earnings and 30% of agricultural employment.

The smallholder farmers and pastoralists produce and supply 98% of the total milk production of the country (YONAD 2009). The economic prospects for dairy industry performance and development are rather good both at the smallholder level and on the more commercial level.

During the last decade the dependency of Ethiopia on imports of 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), primarily milk powder. Imports reached a peak of 994,657 kg in 2008. (Customs) Furthermore, the sales of imported milk powder are the highest in the Addis Ababa market.

Rapidly increasing population with a growing rate of urbanization is resulting in a shift in 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 lacking³.

Milk is important for food security impacting both income and nutrition. An increase in HH income through the adoption of improved dairy technology has been found to lead to improving the household's nutrient intake which contributes to better health and nutrition.

The dairy sub-sector faces a number of problems that have persisted for decades. Productivity of the dairy herd is low with average milk yield of 1.3 lt – 1.54 lt per day for an average lactation period of 180 – 210 days. Cross-bred cattle have a higher level of production estimated at an average of 10 lt/hd/day (EDDP). Dairy producers face high transaction costs from poor infrastructure. The cost to collect milk which is in small amounts spread over a wide area can be high which limits access to improved inputs, e.g. better cattle genetics and animal health services. Feed production and distribution is not coordinated. High mortality rates occur to poor nutrition which makes cattle vulnerable to disease. Producers in the rural areas lack access to markets which reduces their incentives to market fresh products and rather process lower value products.

There is a general lack of information on technologies because of limited access to extension services which reduces the ability of smallholder producers to be competitive. Dairy becomes a subsistence activity. This lack of access to information spills over into a lack of awareness about the market prices for their milk or the sale of their animals. Collectors can exploit this situation.

For over forty year, the GOE has played different roles in administering government services. The GOE has moved from an autocratic system, to a socialist regime, and now to a market oriented approach for the past two decades. The sub-sector lacks coherent national and regional dairy policies. Because of these factors, dairy production has not become commercialized as in other neighboring countries. However, the sub-sector seems poised for a take-off.

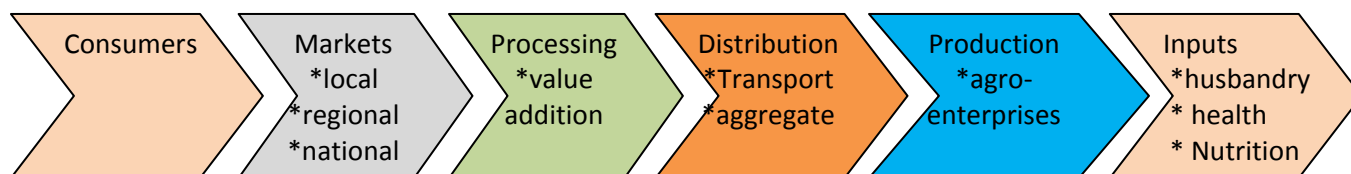
1.3. A Value Chain Approach

Our approach to understanding the dairy sub-sector is to examine the companies and individuals that interact in forming the supply of all goods and services in the value chain for the dairy sub-sector. We describe the complex interactions of firms and processes that create and deliver products to end-users (Figure 2). We start at the final consumer market recognizing that this segment in the value chain sets the conditions and the prices under which products are produced, processed and distributed. We also identify constraints in the value chain to productivity, and the opportunities to overcome these constraints.

The study segments the various activities along the value chain from inputs into production to product transformation and finally to the end-users. (See Figure 1.2.). We consider local, regional, national and international markets. Based on the best data available, we estimate the value addition to dairy products along the value chain.

³ SNV Netherlands Development Organization Study on Dairy Investment Opportunities in Ethiopia, 2008

Figure 1.2. Schematic of the Functions in the Value Chain



1.4. The Tasks and the Study Team

The GOE's MOA with assistance of the World Bank (WB) developed an Agricultural Growth Program (AGP) which targets over 84 woredas. USAID has pledged to support the AGP. Land O'Lakes conducted the value chain (VC) study at the request of USAID to provide information in the planning of new livestock initiatives in the AGP.

Land O'Lakes conducted a rapid assessment of the dairy value chain in October and November, 2010. The team was composed of experts in production, technology transfer, processing, distribution and marketing. Some of the team are current LOL staff located in various key milk markets.

The team reviewed a number of documents on the dairy sub-sector in Ethiopia and the East Africa region (see references in annex). The value chain study commissioned by SNV and conducted by TechnoServ Kenya in 2006 served as a baseline from which to examine changes in the value chain.

The LOL team developed an interview guide for the purpose of data collection from various stakeholder groups. Interviews were conducted in Addis Ababa, Bahir Dar, Mekele, Debre Birhan, Fiche/Chanchos, Jimma Hawassa, Debre Zeit, Assela, and Dire Dawa. The study team members interviewed input dealers, producers (commercial, urban and peri-urban, smallholders), market agents, processors, transporters and retailers. The team held a one day workshop to present the findings from the stakeholder interviews in the different milk sheds. Findings from the field reconnaissance were compiled into tables for ease of comparison. This information is found in a separate report. The final report with a companion PowerPoint presentation (separate document) was presented to USAID on November 8, 2010.

2. DEMAND FOR MILK AND MILK PRODUCTS

2.1. Milk Consumption

Ethiopia consumes approximately 17 kg/capita. (GOE, LMP, 2007). Approximately 83% of the total milk produced is consumed at the household level and only 7% is supplied to the formal and informal markets. The remaining balance is distributed between in-kind wages (0.43%), and used for processing local butter, yogurt, and cheese (10.06%) primarily as a means of extending the shelf life during times of surplus. Oromia region supplies more milk to the market as compared to the other three large dairy producing regions of the country.

2.1.1. Milk and Milk Product Consumption in Urban Areas

Income will be a key driver of levels of milk consumption. As individual's income rises there is a greater proportional rise in their expenditures on dairy products. The highest expenditure group, which makes up around 10% of the Addis Ababa market, consumes 38% of the milk. On the other hand, 61% of the population who are in the lowest expenditure group, consumed only 23% of the milk. Based on 2005 data, workers in the lowest income class would have to work 2.71 hours for one kg of milk, 27 hours for one kg of butter, and five hours for 1 kg of ayib (MOA, 2005). In the Addis Ababa market, 5,000 commercial producers (estimate in 2002) sold 73% of their production, 10% went to household consumption, 10% to calves, and 8% was processed (Azage, et al, 2002.) The other source of milk serving Addis Ababa is primarily dairy enterprises processing and selling milk. Addis Ababa is the dominant market with other towns like Bahir Dar, Jimma, Awassa and Dire Dawa offering opportunities for milk marketing.

The primary outlet for processed milk is Ethiopia's urban centers, namely Addis Ababa, Bahir Dar, Debre Zeit, and Awassa. However, the majority of the milk consumed by most urban and semi-urban homes is supplied through the informal sector: smallholder milk producers and traders directly supplying households, kiosks, hotels, coffee shops and the like. The impact of fasting days on milk demand is more evident in urban markets. With over 200 days of fasting, the milk processing companies will be more negatively impacted than small milk collectors. The tradition of fasting within the Ethiopian Orthodox community creates a double-induced excess supply of milk; Ethiopian Orthodox households producing milk will not keep milk for household consumption, instead seeking a market to sell all milk, while the demand for milk within rural, urban, and semi-urban communities is less as people observe the Fast. On the flip-side, demand for dairy products within Muslim communities increases during fasting periods, approximately 30 days/year. Table 2.1 displays the population of these two religions. Exact figures of the portion of people who observe their respective fasts give an indication of the real impacts the fasting period has on milk demand.

Figure 2.1. Population size by religious affiliation

Religion	Total Population	% of Total Population	Urban Population	% Urban Population	Rural Population	% Rural Population
Orthodox	32,138,126	43.5	7,070,932	59.1	25,067,194	40.5
Muslim/Islam	25,045,550	33.9	3,098,275	25.9	21,947,275	35.4

Source: CSA, 2007

2.1.2. Milk and Milk Product Consumption in Rural Areas

In the rural areas, the consumption of milk will be determined by livestock ownership and season. The demand for milk is mainly for fresh whole milk which is satisfied by own production or purchased from neighbors. Processed milk is currently not sold in rural markets. In the rural areas producers will consume fresh milk and will convert their milk to butter. It is estimated that 40% of the milk produced is converted to butter, while only 9% is converted to cheese (GOE's Livestock Master Plan - LMP, 2007) Traditional butter ferments slowly at room temperature and can be kept for a year or longer, offering rural consumers a readily storable and durable dairy product (GOE, LMP, 2007). Milk consumption in a region will depend on its herd size and the volume of milk produced.

2.1.3. Milk and Milk Product Consumption in Pastoral Areas

Pastoral communities are acutely aware of the nutritional value of milk. Women in Somali Region perceive milk from camels and goats to be the most beneficial for children's overall health, strength, and growth. In the wet season, milk consumed by pastoral children can account for 67% of the mean daily energy they require and 100 % of their protein requirements. (Sadler and Catley 2009) Lack of availability and access to milk in the dry season decreased daily consumption amounts by almost 25% with milk contributing only 16% and 50% of energy and protein requirements respectively. In drought years, children's milk consumption will drop an average of 50% in surveyed communities.

Consumption of milk within households decreases during the dry season due primarily to lack of feed and fodder resources and general decline in the nutritional health of lactating animals. Herders will often try to time cattle pregnancies and calving periods so that the natural drying off period for a lactating animal coincides with the dry season. For women and children, the shortage of dry season milk availability in pastoral communities is exacerbated because herds are moved far from settled family members as boys and men seek out water and grazing lands for their animals.

2.2. Milk Consumption Compared to Other Countries

Ethiopia has a low level of milk consumption compared to other countries in the region (Kenya = 90 lt/cap; Uganda = 50 lt/cap). Even though Ethiopia has the largest inventory of milk producing animals, (cattle, sheep, goats and camels), per capita consumption of milk is low compared to Kenya with fewer livestock and Sudan. The national per capita consumption of milk and milk products is estimated at 17 kg (Ahmed). Per capita income levels in Ethiopia place it in the range with Tanzania and Rwanda with annual per capita consumption of milk at less than 20 kg.

Average expenditures by households on milk and milk products is only four percent of the total household food budget (Staal, et al, 2008). Ethiopia is unique from other countries in the region because of the number of fasting days, over 200, and the cultural attitude that milk is mainly for children and the sick (SNV).

2.3. Milk's Role for Food Security and Household Nutrition

Livestock, milk, and milk products play an important role in the food security status in both highland and pastoral communities. In pastoralist regions, livestock are owned by a large percentage of the population. Women play a large role in decision-making regarding the processing and marketing of milk.

Highland areas of the country contain over 65 - 75% of the livestock population; cattle provide traction power for 95% of grain production and also provide food, manure, cast income as well as serve as insurance during times of drought or a household emergency. In highland areas, income earned from daily milk production is used to purchase agriculture inputs or hire labor and land, effectively increasing a household's food production potential. Although the daily income earned is marginal, especially from low milk producing local breed animals, milk sales and livestock ownership is necessary for food security. For example, farmers without access or unwilling to join a cooperative will often contract to sell their milk to a neighbour, kiosk, or a local café. The buyer pays monthly while receiving milk daily. This monthly cash/barter transaction enables farmers to save small amounts of daily income for re-investment into household livelihoods or the purchase of other livestock.

Highland farmers with local cattle will use the sale of offspring to 'upgrade' to a better producing cross-bred animal. A female head of household interviewed during this assessment discussed her plan to save all her milk money. One liter of milk would be saved for the four children while the remainder (anticipated 3 liters per day) would be saved and used to purchase an improved cow. Given the high price of cross-bred dairy cows, the likelihood she will be able to purchase such an animal will be years away. The introduction of a cow into her household (the cow was received as part of a pass-on scheme implemented by an NGO) has provided her the opportunity to plan for the additional income and her family's future.

In addition to the positive impact that dairy and livestock can have on household income, assets, and food security, the nutritional significance of dairy products has also been well documented. Dairy provides important sources of vitamins and minerals, particularly zinc, potassium, calcium, riboflavin, and B12. (Murphy and Allan, 2003, Sadler *et al*, 2009) These micronutrients, particularly important for infants and young children, are largely insufficient, absent, or poorly bio-available in plant-based diets, making dairy an important and essential source of nutrition. (Randolph et al, 2007, PAHO and WHO, n.d.) Milk is also highly energy-dense, which is important for young children or chronically ill with lack of appetite. Importantly, milk comprises all eight essential amino acids, thus constituting high quality protein. Research has demonstrated the positive nutritional impacts of dairy, including an association between increased consumption of milk and improved child growth (Zhu et al, 2004 and Hoppe et al, 2004), as well as an association between consumption of fermented milk products (including those containing probiotics) and the prevention of diarrhea (Szajewska et al, 2001). Thus, the

consumption of even small quantities of milk can markedly improve the nutritional quality and diversity of the diet.

Due to the important nutritional value of milk, increasing consumption of milk either directly or through fortified foods is often a priority of national health and nutrition programs. Ethiopia's National Nutrition Program (NNP) includes provision of Ready to Use Therapeutic Food (RUTF), Corn-Soy-Milk blend (CSMB) to health centers serving mothers and infants, children, and HIV affected Ethiopians. The NNP Implementation Guide recommends local procurement of these fortified foods, specifically citing Hilina Enriched Food Processing Center located in Addis Ababa. Currently, Hilina imports all milk products due to lack of consistent quality supply within Ethiopia.

2.4. Consumption of Imported Milk Products by Areas and Product Categories

The value of imports of milk products increased from Birr 48 billion in 2005 to over Birr 114 billion in 2010 (partial year) (See Annex Tables). The value of imports doubled during this five year period. The imports of milk products are a drain on the foreign exchange reserves which could be replaced with domestic production. The major import item is powdered milk and cream. Without improvements in domestic production and marketing of milk, the amount and value of dairy imports will continue to rise.

2.5. Milk Consumption in 2020

Population growth and urbanization are two important drivers of milk demand. Other factors are personal disposable income, taste and preference, and the price of substitute products. Based on a population at 85.2 million people for 2010, the population of urban areas would be 14.4 million people, 17% of the general population. Based solely on urban population and a conservative estimate of 17 kg per person, the annual total consumption of milk in urban areas is estimated at 244.8 million liters. Three estimates (high, medium and low) present a range in which milk consumption may reach in 2020.

2.5.1. High Estimate

Based on population growth projections, if per capita consumption of milk and milk products increases 5% per year until 2020, the national consumption of milk would be 3.2 billion liters and the urban and peri-urban consumption would be 611 million liters. Per capita consumption in 2020 would increase to over 27 liters per capita. (This level of consumption matches FAO's estimate in 2003 for average consumption in Africa.) Urban consumers would require an additional 364 million liters of milk or an increase of an increase of 148% over current consumption. This estimate is not unrealistic if the GOE and its donors continue to advertize to the younger population the importance of drinking milk. The preferences of the younger population are more malleable, especially on cultural, social and religious norms. The impact of the fasting days on the younger population milk consumption habits could be much less than at the present time.

2.5.2. Middle of the Range Estimate

Assuming that urbanization continues to grow at 4.3% per year until 2020, but per capita consumption of milk remains the same at 17 kg per capita, the consumption in peri-urban and urban areas in 2020 would be 375 million liters. Urban areas would need an additional 128 million liters or an increase of 52% over the current estimated level of urban consumption.

2.5.3. Low Estimate

For the low estimate of the range, the rate of urbanization remains the same and per capita consumption of milk and milk products remains the same as in 2010 with no income effect, no effect from relative prices of substitutes for milk and milk products, or a change in the preference for milk. Then the annual consumption of milk would be 337 million liters in peri-urban and urban area. An additional 91 million liters would be needed or an increase of 37 percent over the current estimated level of consumption.

2.6. Assessment

The projection for demand for milk and milk products to 2020 is for a steady increase based on growth in urban population, increased in disposable income and change in tastes and preferences. The question is whether producers can respond with the adoption of improved technologies and management practices to increase their supply to meet the expected rise in demand for quality milk and milk products, or if the government will have to expend scarce foreign exchange on the importation of increasing amounts of foreign exchange for dairy products.

3. DAIRY PRODUCTION

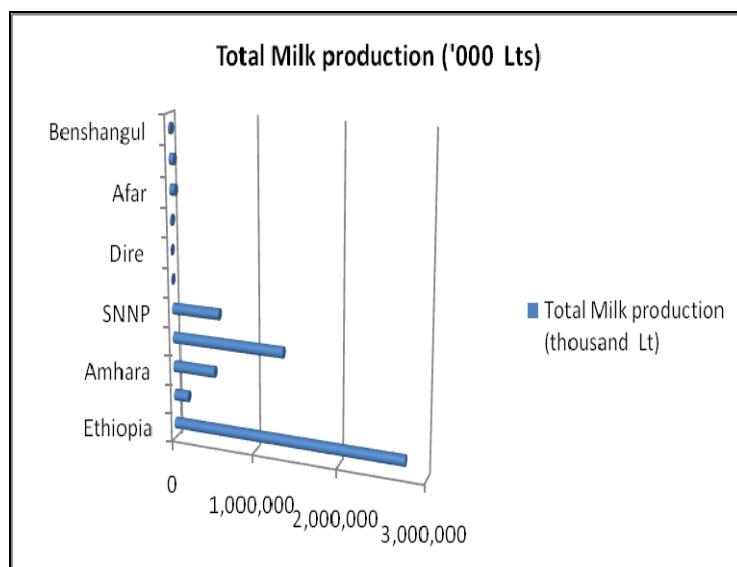
3.1. Current Situation

There are 10 million dairy cows in Ethiopia producing 3.2 billion Lt per year. The production per cow is estimated at approximately 1.54 Lt per day for an average lactation period of six months. In fact, national milk production for the period of 1966 to 2001 increased by only 1.6% per year and per capita production declined by 0.8% per year (Staal, 2008).

The Ethiopian cattle herd is mainly for milk production. Commercial offtake rates can be low, estimated at 10 – 12 percent of the national herd. The national herd is composed of mainly cows, and they are held in the herd beyond the period of maximum milk production. In the highlands of Ethiopia, cattle for draft power is important in crop production systems.

Milk production can vary by regions of Ethiopia. Figure 3.1 depicts that Oromia region produces 1.3 Billion liter per year making it the leading milk producing region. SNNP is the second largest milk producing region with an estimated total of 572 million liter and followed by Amhara region 506 million liters and Tigray with 136.7 million liters. The least milk producing region is Dire Dawa producing 3.1 million liters annually. Average milk production is below the national average in those regions with the most dairy cattle: Oromia, Amhara, Tigray and SNNPRS regions is 1.2 liter (Figure 3.2). Oromia region's average is even less at 0.6 Lt per cow per day. (CSA, 2008).

Figure 3.1. Total Milk Production and Average Daily Milk Production



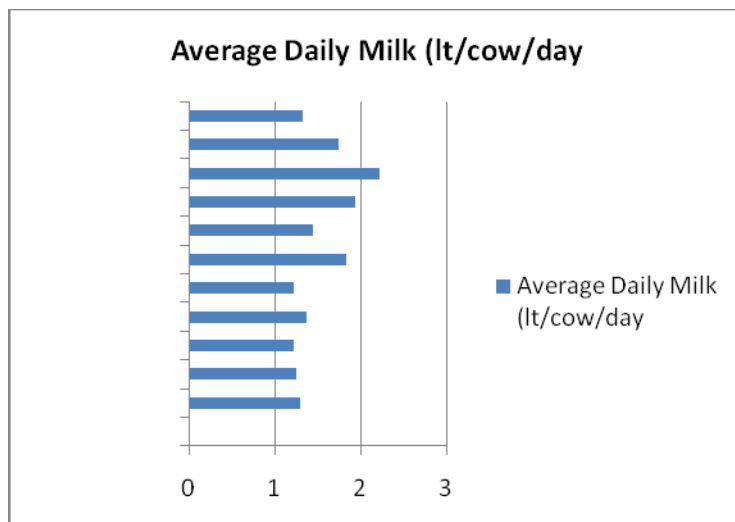


Figure 3.2. Average Daily Milk Production per Cow

According to recent studies the total milk production is increased significantly (300%) from what it has been the year 2000 (Haile). The milk per capita, based on the 2008/09 survey is 37.62 liter (CSA 2009). According to the forecast of FAO, the annual production is far below the survey made by CSA. During the period from 2001 to 2007, based on FAO forecast, cow milk production is growing at an average rate of 2.6%, which is equivalent to the Ethiopia's population growth rate but below the rate of urbanization which is over 4% (2007 census).

3.2. Milk Production Areas

Market oriented milk production is located in the highlands where rainfall, temperature, and soil types are conducive to forage production. There are three main milk producing areas in the highlands; Greater Addis, Lake Tana, and Mekele / Humera. Of the 516 million liters produced in these areas 65% comes from the Greater Addis milk shed.

3.3. Production systems and Milk Sheds

Ethiopia's dairy production systems can be broken down into four main systems: (1) commercial, (2) peri-urban and urban, (3) rural dairy smallholder, and (4) pastoral and agro-pastoral. The rural dairy small-holder system produces the largest share of total milk produced, contributing 98% of the milk supply. (See the maps of milk sheds and road networks in Annex Table 8.2).

3.3.1. Commercial Production

Ethiopia's population of improved-breed dairy cattle (pure and quality crosses) is small, 300,428 cross-bred and 52,992 pure bred animals. A majority of the pure bred animals reside on commercial or government farms, although the number of farms housing these animals was unknown at the time of this assessment. Within the Greater Addis milk shed (there are 269 commercial dairy farms with 10 or more mature cows. Producers would rely almost

exclusively on AI for good semen and would keep breeding records. These producers would be willing to pay for the more expensive imported genetics and breeding supplies (SNV).

The number of exotic dairy cattle (pure breeds) in Ethiopia is small. The output per cow can range from 1120 – 2500 lt per lactation. Producers would rely almost exclusively on AI for good semen and would keep breeding records. These producers would be willing to pay for the more expensive imported genetics and breeding supplies (SNV). In the Addis Ababa vicinity there are an estimated 5,000 dairy producers with grade and cross-bred cows producing 34 million lt per year (Azage, 2002).

3.3.2. Peri-Urban and Urban Production

Dairy farmers in the peri-urban and urban areas are specifically targeting consumer in the nearby town and city. Producers would have a better understanding of dairy management. Producers will sell to processors or direct to consumers. These producers have better genetics with greater dependence on AI services. The preferred cross-bred cow have 50 – 62.5 percent improved genetics. Some of these producers would likely keep breeding records. A quality cross-bred animals sells for approximately Birr 18,000 to Birr 25,000 per head.

Because of the scarcity of land, cattle are maintained under confined systems where feed is provided directly to cattle. Producers would rely mainly on cut and carry fodder (44%), brewers waste (35%), oilseed cakes (16%), commercial feeds (3%) and others (2%).

The value chain study conducted in 2006 by Technoserve for SNV was mostly of peri-urban producers. These field data found that feeding and animal health accounted for 51% of the cost of production. Feeding was 29% and animal health was 22% of the sales revenue. The margin (return) from the sale was 14% of the sales price.

3.3.3. Rural Smallholder Production

Approximately 75% of the livestock population are held by smallholders in the Highlands. Cattle are used for milk production and animal traction. The manure is used for fertilizer on cropland or for household fuel. The fragmentation of landholdings makes it difficult to maintain livestock in adequate condition. In the rural areas of the Highlands, producers keep mostly zebu cattle which have lower milk production. The average milk production can range from 400 to 600 lt for a two hundred day lactation period (2 – 3 lt/day/head). The zebu breed is better suited to the environment and the disease vectors of Ethiopia. Livestock graze on communal pastures although fodder production for both on-farm use and sale is becoming more common. Bulls are with the cows year round, AI use is more common by producers near NAIC centers. Producers do not practice the use of breeding records so there is the possibility of in-breeding. The government provides semen and AI services at a subsidized cost.

Small-holder producers sell their milk and milk products to urban areas (primarily through informal market) when transport is available and affordable. At some distances, the cost to transport raw milk prohibits selling to distant markets, or any market for more rural producers.

Producers convert surplus milk to butter or ergo (fermented milk) and consume in the household or sell to their neighbors. Some butter or local cheese will be supplied to urban areas.

3.3.4. Pastoral and Agro-Pastoral

Livestock and milk production in pastoral systems is primarily dependent on natural pasture located on non-arable rainfed lands. Households will hold a mixture of cattle, sheep, and goats, and camels. Seasonally, a majority of the stock is moved to follow water and pasture resources. When animals are close to home, crop residues (sorghum and maize thinnings and stover), and household waste are important feed resources for livestock. Mineral soil salt is also fed in both the wet and dry seasons (Hussen et al, 2008). Households are estimated to collect 5 liters (wet season) and 2.5 liters (dry season) of cattle milk and 13 liters (wet season) and 8 liters (dry season) under this production system. (Hussen et al, 2008) These figures are dependent on herd size and make-up. Camel milk is cited as being more important for household food security because the lactation period extends longer into the dry season with a total average lactation period of 9 months. (Sadler and Catley, 2009) However, in most pastoralist cultures, camels are not an asset commonly held by the poorer households.

In the Borana pastoral area, there are approximately 200,000 pastoral households of which 90,000 are poor (1 – 3 heads), 40,182 middle income producers, 11,000 rich farmers and 2,000 very rich. Poor households would have less than five head, while middle class would have 15 head. The rich have an average of 37 head and the very rich have 250 head of cattle (YONAD). For pastoralist whose herd sizes fall below a certain level because of drought, then household livelihood is in jeopardy, and it will be harder for household to meet minimum subsistence level. Within Ethiopia, 25% of pastoralist households are destitute. The recovery time for restocking the herd is longer, and the risk of any drought decimating the herd increases.

The cost of production varies depending on herd size. Poor household with less than five head had an estimated cost of Birr 0.79 per liter of milk. The gross margin was Birr 1.41 per liter and the gross profit margin was 64% (YONAD). Households with a medium size herd have an average herd size of 15 animals and an estimated cost of Birr 0.59/lit with a gross profit of Birr 1.41/lit and a gross margin of 73 percent. Rich households had a cost of Birr 0.61/lit and a gross profit of 1.61 per liter and a gross margin of 72 percent. Very rich households with 250 head of cattle had had cost of production of Birr .41/lit, and a gross profit of Birr 1.79/lit and a gross margin of 81 percent.

3.4. Inputs by Production System by Milk Shed

3.4.1. Feeds and Feeding

Forage production is a major constraint for improvement of the dairy sub-sector. The

- Fodder: any crop residue which is generally high in fiber and low in protein and energy.
- Forage: primarily grass species which can be of high quality if harvested in the early flower stages for dry storage

Government of Ethiopia states that “for their nutrition, most livestock of the country depend almost entirely on the herbage that grows on non-arable, natural, grazing lands” (MoARD, 2007 pg 48). Insufficient feeding of livestock

has been attributed to 40% of low productivity. Feed and feeding problems facing the dairy sector are insufficient quantity of forage produced on the farm, insufficient inputs for commercial feeds, a lack of quality feed formulation, and the absence of feed testing for analysis.

The feed sub-sector can be comprised of on-farm supply, communal grazing of government land, purchased feed/forage, and manufactured commercial feed. The feeds, fodder/forages and agro-industrial byproducts, available to small holder and commercial dairy farmers in Ethiopia can increase productivity by: increasing milk yields, lowering age of first calving, and shortening calving intervals. (See Appendix for a summary of forage and fodder nutritional values)

Common crop residues available to dairy farmers are straw made from teff, wheat, barley, mixed finger millet, rice straw, and sorghum and maize stovers. Farmers prefer wheat and barley straw which has a higher crude protein level, although teff straw is desired because of its high palatability and digestibility. Forages are the basis of dairy nutrition. Quality depends upon early harvest, proper drying and storing. Crude protein levels of 15% are possible. Improper and under-managed forage producing lands limit Ethiopia's production potential, even in commercial systems. Suluta, for example, has a reputation for productive hay land, but annual production is commonly 3,600 kg per hectare.

Cultivated forages available to producers include napier grass, alfalfa, Rhodes grass, guinea grass, desmodium, lablab, cowpeas, and vetch and oat/vetch mixtures. Forage trees are also effective forages; leucanenas, sesbania and tagasaste. Less than 1% of rural livestock producers reported on-farm production of improved forages such as Napier grass and alfalfa (Tefera). Only 60% of the smallholders use feed from own holdings. (CSA, 2008) This problem is exacerbated on the smallholders who have small land size. Fourteen percent of the smallholders use communal / government grazing and agriculture lands. Without appropriate management quality forage production, targeted to dairy, is low.

Additional nutrients are not available during all periods of the year. It is estimated that smallholders use green fodder grazing followed by crop residue (34%) and hay (13%). Producers' utilization of industrial by-products, e.g. oil cake, bran, and brewery waste is non-existent (approximately 0.8% of all dairy smallholders). Small holders and commercial farmers normally purchase some percentage of their fodder and forage needs. Competing demands for fodder and forage beyond feeding livestock include; on-farm: household use in construction of mud houses and mattresses, and off-farm: re-distribution to Ethiopian finishing farms and export to Djibouti to supply quarantine stations. Seasonally, demand is highest in November and December. Prices is heavily dependent upon the effect of weather upon supplies, but the general perception is that prices have been on the rise since 2006.

Forage production is a major constraint for improvement of the dairy sub-sector. Feeding of livestock has been identified as contributing to 40% of low productivity. The feed sub-sector can be comprised of on-farm supply, communal grazing of government land, purchases of feed/forage, and manufactured commercial feed. Fodder refers to crop residue, which is generally high in fiber and low in protein and energy. Forages are primarily grass species which can be of high quality if harvested in the early flower stages. A particular problem in pastoral areas has been the encroachment of unpalatable, invasive species, like Prosopis, reducing quality pasturelands.

The feeds, fodder/forages and agro-industrial byproducts, available to small holder and commercial dairy farmers in Ethiopia can contribute to increases in milk yield, a lower age to first calving and shorter calving intervals. (See appendix tables for a summary of nutritional values.) The problems facing the dairy sector are insufficient quantity of forage produced on the farm, insufficient inputs for commercial feeds, a lack of quality feed formulation, and the absence of feed testing for analysis.

Common crop residues available to dairy farmers are straw of teff, wheat and barley and mixed, finger millet, an rice straw, and sorghum and maize stovers. There is a preference for wheat and barley straw which has a higher crude protein level than other fodders but teff straw is also in demand as it is highly palatable and digestible. Forages are fed as dry grass hay. Forages are the basis of dairy nutrition. Quality depends upon early harvest, proper drying and storing. Crude protein levels of 15% are possible. Ethiopia has some excellent forage production lands, which are under managed. For example Suluta has a reputation for productive hay land, but annual production is commonly 3,600 kg per hectare.

Cultivated forages available to producers include napier grass, alfalfa, Rhodes grass, guinea grass, desmodium, lablab, cowpeas, and vetch and oat/vetch mixtures. Forage trees are also effective forages; leucanenas, sesbania and tagasaste.

Less than one percent of rural livestock producers reported on-farm production of improved forages such as Napier grass and alfalfa (Tefera). Even producers' utilization of industrial by-products, e.g. oil cake, bran, and brewery waste is non-existent (approximately 0.8% of all dairy smallholders). The 2008/09 CSA survey pointed out that about 60% of the smallholders use feed from own holdings. This problem is exacerbated on the smallholders who have small land size. Moreover 14% of the smallholders use the communal/ government sources. The quality of feed can be low for dairy cattle which require a minimum nutritional level for maintenance and then additional energy for calf rearing and lactation. These additional nutrients are not available during periods of the year. It is estimated that smallholders use green fodder grazing followed by crop residue (34%) and hay (13%). Dairy feed management practices, among other factors, contribute to the low level of milk productivity.

The demand for fodder and forage is high. Small holders and commercial farmers normally purchase some percentage of their fodder and forage needs (do we have an data). There are competing demands for fodder and forage beyond feeding livestock; household use in construction of mud houses and mattresses and export to Djibouti for the quarantine station. Seasonally the highest demand is in November and December. Prices is heavily dependent upon the effect of weather upon supplies, but the general perception is that prices have been on the rise since 2006. (We should have some data as hay is being harvested and sold now).

3.4.1.1. Agro-Industrial Byproducts

Small holder and commercial dairy producers also have access to agro-industrial byproducts; wheat bran and oilseed cake. Oilseed cakes include noug, linseed, sesame, cotton, and safflower. Cakes prepared from seed that is mechanically extracted has a higher nutritional value. Cakes are purchased from suppliers in 25 kg or 50 kg sacks. The current volumes of wheat bran and

oilseed cake available do not meet demand. There has been substantial growth in sales. Sales of oilseed cake in Adama increased by 500% between 2003 to 2007.

There are 15 commercial livestock feed manufacturers in Ethiopia. However, 10 of these manufacturers produce feed primarily for their own use such as feedlots and may sell to farmers when there is excess production. The five commercial manufacturers supply feed directly to livestock and poultry farmers or groups of farmers including cooperatives. They all report a shortage of ingredients for feed formulation. Common ingredients are corn, wheat screenings, wheat bran, linseed cake, noug, limestone, salt, and premixes. A profile of two of the dairy feed manufacturers follows:

Mojo Animal Mixer and Miller. This plant has a capacity of 40 quintals per hour and produces 3,000 quintals per month. It produces a ration for beef, dairy, poultry, and exports feed to Djibouti. The plant has the capacity to produce pellets.

3.4.1.2. Institutions in the Feed Sub-Sector

There are few market institutions in the dairy feed sector. The Ethiopian Animal Feed Processors Association was established in 2006 and has 15 members who pay ETB 500 per year in membership. Their activities are devoted to policy advocacy and training services provided to membership. The Lalisa Feed Traders Cooperative is a small group of traders who buy and sell teff and wheat/barley straw. Primary cooperatives, such as , purchase feed in bulk as a member service. Purchasing feed is a cash transaction, credit is not available from the seller and there is no evidence of buyers borrowing money to buy feed.

The animal feed sector is not regulated. The government does no feed quality testing or offering guaranteed analysis of mixed commercial feeds. Quality is measured by visual inspection of fodder and forages.

3.4.2. Genetics

With regard to breed type, out of the total 27.1 million cows about 99.2 % are indigenous breeds and the remaining are cross and exotic breeds that accounted for about 0.61 % and 0.11% respectively. Less than 1 percent of cattle are exotic or cross-bred. 128,745 grade cattle and pure dairy cattle. Of this amount 32,204 are with small holders. The improved breeds are distributed only in Tigray, Amhara, Oromia and SNNP regions. With regard to regional distribution improved breeds are distributed only in the four big regions of the country. Accordingly Oromia constitutes the largest share of improved breeds of cows followed by Amhara and SNNPRRS having 135.6, 38.5 and 37 thousand cows respectively. The small numbers of improved breed in the country is an indication of the low level of the usage of modern technological packages like artificial insemination and bull services.

Change in milk production in herd size explains 60% of the increase, but only 20% from technology change. This is why there needs to be increased numbers of cross-bred cows.

3.4.2.1. National Artificial Insemination Center (NAIC)

The National Artificial Insemination Center (NAIC) is the government source of improved dairy breed genetics, bull semen. The center produces 300,000 units of bull semen per year with a goal of increasing that level to 600,000 within five years. The current 1,700 AI technicians, who are employees of the regional governments, are located at the kebele level. The plan to coincide with the increase in bull semen is to increase the number of AI technician by 60 each year for the next five years. In addition to producing bull semen, NAIC serves as a training center and provider of liquid nitrogen for freezing bull semen. There are 10 liquid nitrogen centers throughout Ethiopia, these centers also serve as the distribution point of bull semen.

NAIC recognizes the need to improve the current genetic base and plans to import bull semen and Holstein and Jersey heifers. However, the delivery system of getting the genetics to the cow has been a problem for years. NAIC estimates that 50% of the bull semen produced never gets to the cow. There are problems with distribution from the NAIC to the regional centers and from the regional centers to the technicians at the kebele level. Much of the distribution problem is related to inadequate or no transportation. Regional state governments have been asked to budget for a sufficient number of vehicles and fuel to overcome this problem. The Tigray regional state AI distribution system appears to serve as a good model. Rather than having the AI technicians travel to the AI center in Mekelle, the center has a vehicle that delivers bull semen and liquid nitrogen to the kebele. This system has resulted in 30 AI technicians servicing 10,000 cows with 7,000 conceptions.

The government AI system is heavily subsidized with the AI service and semen costing 4 ETB. The actual cost of the service and semen is 22 ETB.

The availability of liquid nitrogen to freeze the bull semen was a major constraint in recent years but through assistance of USAID and EDDP, the liquid nitrogen centers are functioning well. Constraints that the private AI sector face include:

- The shortage of hard currency makes the import transaction difficult. Waiting at the bank for the release of foreign currency can be lengthy.
- Lack of a protocol to import animal genetics; bull semen and embryos.
- The cost of equipment is expensive, all of which is imported, semen tanks are currently 18,000 ETB. Gloves, insemination guns, motor bikes, and hormones are all in short supply.
- AI technicians are government employees. They lack motivation and perform poorly in part due to a lack of transport to get to the farms to inseminate cows. There are very few examples of a successful private sector AI technician, one in Debre Zeyt where there is a concentration of commercial farms. The issue is that although the government salary is low, it is secure. The concept of working on a commission basis is not well accepted or understood.

3.4.2.2. Private Companies for Genetics

The advent of the private sector to dairy genetics is quite recent. World Wide Sires (WWS) was a subcontractor to the Ethiopian Dairy Development Project (EDDP) with USAID funding from 2005 - 2008. Upon the completion of the subcontract a locally owned firm, ALPPIS was registered as an importer and distributor of dairy bull semen, sourced from WWS in the US. The first bull semen imports from the US were ?. One of the obstacles encountered by WWS was that Ethiopia has no protocol for importing genetic material; bull semen and embryos. The lack of a protocol has prevented another company, American Breeders Service (ABS), from exporting bull semen from its regional headquarters in Kenya.

ALPPIS has four employees, Dr. Emiru Zewdie is the general manager. All employees work in sales and are compensated on a commission basis. They serve large dairy farms such as the NAIC farm in Holetta and Sebeta Agro Enterprise (MAMA Dairy) as well as small holder farmers. Alppis currently carries 12 US bulls with a price range of 85 to 110 ETB. The largest market for Alppis is the Amhara region because farmers in Gondar lobbied the Amhara Regional State government to permit government AI technicians to carry Alppis bull semen and inseminate cows. The Oromo Regional State government will soon institute the same measure.

Dr. Emiru states that demand is very high and the provision that government AI technicians can participate in the distribution chain will result in a rapid improvement in the genetic base. Since June 2009 Alppis has imported 10,300 units and sold 8,000 units. The demand is driven by the genetic improvement but also the US bulls have a higher conception rate, 1.2 conceptions per service. This is due in part by the evaluation of US bulls on fertility and also that the AI technician and the farmer take greater care in handling and inseminating in consideration to the value of the US bull semen, 100 ETB for US bull semen as opposed to 4 ETB for local bull semen.

3.4.3. Animal Health Services

An effective animal health system requires four components that work together; a quality education system, a laboratory system of international standards, a delivery system that provides market driven services to the farm, and the availability of quality pharmaceuticals at an affordable price.

The National Veterinary Institute (NVI) as an educational facility has long been recognized as producing quality veterinarians. In the past offered degrees and diplomas, the diploma curriculum as been dropped. There have also developed an additional 8 universities offering veterinary degrees. The general consensus is that there is a lack of confidence in the quality of education and field training compared to the NVI program. NVI is also a internationally recognized manufacturer of animal vaccines, exporting within Africa and to the Middle East. To some extent the success of NVI may be attributed to their “para-statal” status. Although a government institution, NVI is autonomous in the ability to generate income to support its state allocation.

The National Animal Health and Investigation and Diagnostic Laboratory (NAHIDL) in Sebeta is on track to reach the goal of being internationally certified for animal diseases that effect live animal and carcass export from Ethiopia by the end of 2011. This market driven development

has also presented an opportunity for the laboratory to supplement government allocations with income generation as fee for services paid by exporters. NVI is also benefitting from the exporters willingness to pay for services.

Aside from the two national laboratories, regional laboratories are weak, primarily due to the lack of funds. The budget short falls have resulted in a lack of materials for diagnostic testing, there is a high turnover of personnel, and the skill level, particularly microbiology skills are weak. There is also no clearly defined role between regional and local veterinarians and the regional laboratories and this is a major constraint in resolving issues in milk quality / udder health.

The delivery system of animal health services to dairy farmers is considered inadequate. The organizational structure of the veterinary system is unclear. There are regional veterinarians who supervise woreda veterinarians. The lack of budget at the woreda level results in lack of transportation, supplies, and low morale, resulting in high turnover. The private sector veterinarian has emerged as a competitive model in urban and peri-urban areas. Those with clinics in urban areas prosper from mixed practices of livestock and household pets.

One solution to the inadequate service delivery system is the development of community animal health workers (CAHW) or para-vets who would be localized members of the community thereby the trust factor may not be a critical component. The role of the para-vet would be to maintain vaccination programs, provide herd health services and respond to ambulatory cases in the community. Para-vets as business model or DIGA would require business skill training and likely a grant or no-interest loan for the start costs in equipment and materials such as drugs.

3.4.4. Extension Service

The GOE is responsible for transfer of technical information on commercialization of dairy smallholders, as well as, enhanced growth in the rural areas (GOE, Master Plan, 2007) . The GOE has a new extension service known as the Participatory Demonstration and Training Extension System (PADETES). The extension service provides technology packages, for example a dairy package, based on different agro-ecological conditions. The GOE is training a number of extension workers at the Agricultural Technical Vocational Education Training (ATVET) colleges. Farmers received training at the Farmer Training Center (FTC) in their kavalla. The GOE plans to open 18,000 FTCs. Each FTC will be staffed by three specialists (Development Agents – DA) in crops, livestock and natural resources. However, dairy extension services are inadequate in the milk sheds to deliver necessary on-farm advice to producers (GOE, Master Plan, 2007). GOE faces budgetary constraints to carry out extension at the farmer level. Development Agents lack the resources to visit farms

Some international donors, NGOs and CBOs engage in rural development programs that include extension activities. These projects are short term lasting only until funding ends. Private input supply companies do not provide technical education services in dairy production (e.g. feeding, genetics and animal health). Only urban and peri-urban commercial dairy producers likely engage private consultants on production issues.

3.4.5 Credit and Financial Services

Lack of access to credit, especially for small-holder farmers and pastoralist herders, has been routinely stated barrier to production (LOL, personal interviews). Lending institutions claim to be willing to lend to farmers as long as the loan application requirements are met. It was acknowledged that loans to pastoralists is not a desired endeavor primarily because of the mobile lifestyle. (LOL, personal interviews) Loan application requirements are straightforward and consistent: 1) business plan and 2) collateral of equal value of the loan amount. Although official rules require 1:1 collateral value, bank practices often require a 1:1.5 value. For small-holder farmers, title deeds to land or buildings is not always available. Livestock are not routinely accepted as collateral. Few small-holder farmers have enough recognized asset wealth to acquire a loan to purchase and improved dairy cow (quality cross-bred animals are Birr 18,000 to Birr 25,000 per head). For rural farmers, lack of market access may prevent sufficient sale of milk to pay back a loan. Private bank loans average 10%. Micro-financed institutions, typically offering short-term loans at 18%, have focused on peer lending as a way of addressing lack of small-holder collateral. Whether working through a guaranteed loan program or using peer-lending circles, overcoming the issue of insufficient collateral will directly impact female dairy farmers access to credit. Although there are no policy barriers to women accessing credit, culturally most women do not hold title deeds or own assets. With personal assets, women are required to ask their husbands, fathers or brothers to sign for their loans. Women risk losing that loan to the control of the male family member who signed. Working with financial institutions to offer no/low collateral loans (i.e. support for business plans for enterprises with earning potential) or utilizing peer-lending and guaranteed loan programs are a few ways to address this issue.

<p style="text-align: center;">“Farmer Friendly” Financial Institutions & Development Agencies</p> <ul style="list-style-type: none"> • Amhara Development Agency • Amhara Credit & Savings Institution • Awash National Bank • Oromyia National Bank

Several Ethiopian financial institutions (see text box above) have made themselves more accessible to small-holder farmers. Most of these institutions are supported by the State, NGO’s, or international donors. Training of credit staff and development of guaranteed loan programs have loosened collateral requirements.

3.4.6 Land

In the rural areas of the milk sheds in the Highlands, average land parcels are small (less than 1 ha/household), and parcels are getting smaller as a family continues to sub-divide their land among their off-spring. In peri-urban areas, demand for land is high for both residential and industrial purposes. Communal grazing areas are targets for investors to purchase these tracts reducing available grazing for livestock. Livestock are forced onto smaller and smaller areas of open space.

In the lowland areas, pastoralists face similar threats as in the Highlands. The government’s plan is to have pastoralist settle, restricting their movements both within and across the border. The government plans large-scale agricultural projects supported by irrigation schemes. The mobility of pastoralist would be restricted and encouraged to settle and become mixed crop-livestock

farmers. In addition, recurrent droughts have impact the resiliency of pastoralist to recover and rebuild herds before the on-set of another drought. A number of pastoralist become dependent on food aid.

3.4.7. Minerals, salts, etc

Vitamin and mineral mixes are items that are imported. Land O'Lakes under the PEPFAR project has funded the creation of private enterprises to manufacture molasses blocks. In certain areas, this business activity is succeeding where there is a concentration of dairy producers in urban and peri-urban areas.

3.5 Summary Assessment

The productivity of the dairy herd is low, and costs of production are high. In additional the smallholder producers are not commercialized. There is a large potential to address both of these constraints and achieve greater production of milk to meet increasing demand projections.

4. BEYOND THE FARM GATE – DISTRIBUTION, PROCESSING AND MARKETING

4.1. Formal and Informal Distribution Channels

There are two distribution channels for milk leaving the farm: the formal and the informal channel. The formal distribution channel can be defined as the flow of milk that falls within the local business regulatory net including registered business, payment of taxes, etc. The informal sector is everything outside of the formal handling of milk. The main player in the informal sector is the "milk traders" who buys directly from farmers and sell directly to an end market such as small milk bars, cafés, and milk shops. In many cases the milk trader is the dairy farmer, particularly if the farm is urban or peri-urban. The informal channel is totally under the regulatory radar. Consumer studies state that many consumers prefer the informal channel product because it is full fat, exceeding 3.5% butter fat, and there is a trusted relationship between consumer and seller, (Research International 2006)

There is no hard data relative to the percentage of milk that enters the formal versus informal distribution channels. A commonly accepted figure is less than 10% enters the formal channel. This would be consistent with Kenya where the formal channel accounts for 20% of the formal channel. An estimate for the volume of milk that each channel represents was provided by the dairy company with the largest market share; the formal market channel accounts for 150,000 liters per day. If this is 10% of the milk, then the informal market channel accounts for 1.5 Liters per day or more. Although these figures may not be precise, they can serve as a reference point.

4.2. Distribution of Raw Milk

Allocation of milk produced in Ethiopia, milk leaves the farm in three channels; collector or farmer who enters the informal channel, sale to cooperatives or collector into the formal channel, or sales within the community. With the exception of a very few commercial farms, farmers are responsible for the delivery of their milk into the distribution chain. Small holder farmers exclusively assume this transportation cost themselves and one popular model in rural areas is for children to deliver the milk on the way to school and collect the milk containers upon return home. By far the most overreaching constraint for milk, and the potential for income generation from the sale of milk, to enter the distribution channel other than the local community is access to roads. Milk sold into the formal or informal distribution channels of the highlands milk shed is collected within a distance of less than 10 kilometers from a paved road. Milk is transported from the farm in plastic "jerry" cans and in lesser cases aluminum milk cans. Commercial farmers, particularly those located in peri-urban areas, will have milk collected in bulk from the farm by a milk processor.

4.2.1. Collectors

Milk is delivered to collection points along a main road or collection centers. There are a large number of rudimentary collection centers in the highlands milk shed. These are either owned or operated by a primary cooperative, cooperative union, or a milk processing company. To date ownership of a collection center by a private investor has not attracted attention but it could be a good investment opportunity for an individual who is skilled at building relationships with buyers and sellers.

4.2.2. Primary Cooperatives and Union Cooperatives

The organization of dairy farmers into formal producer groups has been important to the development of the dairy sector. Cooperatives have struggled with producer acceptance of this business model after the socialist efforts, which forced producers into communal villages during the period of the Derg. Farmer associations and cooperatives have been of special importance to dairy smallholders who can participate in the agro-industrial sector and even the regional export market. (Holloway, et al). Dairy smallholders can face high transaction costs in selling their milk, and cooperatives can help to reduce these costs for the individual producer (Staal et al., 1997). Work done in 2006 concluded that dairy cooperatives could reduce a farmer's transaction costs by 45% (Francesconi et al 2006) There was reported to be eight dairy cooperatives in 2002 (Tsehay). In 2006, there were approximately 100 cooperatives according to the SNV study. In 2010, with the work of Land O'Lakes there are approximately 114 cooperatives with 7534 members. Most of the milk sold to the cooperatives is processed into butter and ayib and sold locally or to traders. Though the milk volume is not large compared to the total of milk sold, cooperatives are an avenue for rural smallholders to participate in the dairy value chain and sell their fluid milk (GOE, LMP, 2007).

4.2.2.1. Primary Cooperatives

Land O'Lakes provides technical assistance to cooperatives and monitors their activities. The number of cooperatives in the EDDP target areas increased from 82 at the start of the project in 2005 to 120 in 2010. (See data in Appendix Tables). Data from a select number of cooperates for the years 2008 and 2009 and for the month of October, 2010 are presented in Table XX. The average value of milk purchased in 2009 by cooperatives was highest in Addis Ababa milk and lowest in Bahir Dar milk catchment areas. The value of the milk purchased increased 8% from 2008 to 2009.

The average value of the milk sold by the cooperatives reporting information from the milk shed increased 21% from 2008 to 2009. Average revenues for 33 cooperatives reporting data indicate an increase of 77% with an average value of milk of Birr 339,000 per year per cooperative. Annual revenues exceeded expenses so that the average profit for coops reporting was Birr 92,000 with an increase of 120% over 2008 profits. The cooperatives paid annual dividends to its members totaling Birr 45,000 in 2009, which was an increase of 26% over the amount paid out in 2008.

The general financial performance of the cooperatives was positive with smallholders able to sell fluid milk at a price that exceeded the price if the milk were processed into butter or ayib. In

August, 2010, the average purchase price by cooperatives of milk from their members was Birr 3.89/lit and the average selling price by cooperatives was Birr 4.93/lit. The highest price paid for producers' milk was in Bahir Dar (Birr 5.70/lit) and the lowest was in Fitcha and Asela at Birr 4.10/lit.

4.2.2.2 Cooperative Unions

There are eight cooperative unions servicing the needs of their primary cooperative. These unions negotiate selling prices on behalf of their primary cooperatives and provide services such as training, financial audits and other business services. The number of unions has increased from 1 in 2006 to 4 in 2010. The unions and their primary cooperatives hold the best opportunity for delivery of needed services and products to their members and have the potential to have an even greater impact over the next ten years.

4.2.3. Transporters

SNV data reports that milk transporters operate under very strong margins of 51% generated from buying from farmers and selling into the formal and informal markets. It is difficult to estimate the number of people generating income from the milk transport business because although a license to transport milk is required, apparently few transporters acquire a license. One transporter interviewed collects milk up to 90 kilometers north of Addis Ababa. Currently he is collecting 6,000 liters per day for Family Milk. In 2009 he collected 15,000 liters per day and sold the milk into the formal and informal market channels in Addis Ababa. The potential to collect milk in the Debre Tsige exceeds 100,000 liters per day. The transporter felt there were another 7 transporters collecting milk in the area. Other clients buying from the collectors are Shola Dairy and the informal market channel.

As a reflection of the job multiplier effect of the dairy sector, the transporter rents a truck for 500 ETB per day, and his labor force consists of 1 driver, 1 collector, and 1 employee at each of the 10 collection sites. He negotiates price at each of the collection sites, currently he is buying from farmers at ETB 5.50 per liter (ETB 4.25 during fasting) and sells to Family Milk at ETB 6.00 per liter. The trader will make payment in kind to farmers at their request in the form of feed and veterinary medicine. In more developed economies transporting of milk, bulk milk hauling, is contracted out to transportation companies specialized in this function of the value chain. Considering the relatively low investment required and the job multiplier effect, transporting under license is very promising.

Chacha near Debre Birhane. Hirut Yohannes started her company to collect and process milk in the Addis Ababa milk shed. Processing is done at the production site in Chachah. Mainly women from 166 households sell their milk. Average herd size is less than five head. Ten people work at the collection center. The center has a milk tank with a capacity of 600 lt. An enzyme is added to the milk to release the solids which are sent by local transport to Addis to make cheese. The liquid whey is given to the members of the group.

4.3. Processors of milk and milk products

There are 18 registered milk processors in the greater Addis milk shed. The capacities range from less than 1,000 liters per day to 60,000 liters per day. (See data in Annex Tables.) Current milk processed is estimated to be 150,000 liters per day. In very few cases are the milk plants operating at full capacity. With the exception of the former state owned enterprise, Lame/Shola Dairy, and Mama Dairy, all of the other dairy processing facilities are less than 10 years in operation and many of those competing for market share in Addis Ababa are less than 5 years old. This period of 2005 – 2010 has been a time of subtle transition for the Ethiopian dairy sector. There has been an increase in processing capacity which has also been accompanied by an increase in dairy product lines. In 2000 the Ethiopian dairy product line consisted of pasteurized milk and butter. In 2010 consumers can find a wider variety of domestic dairy products including yogurt, fruit flavored yogurt, UHT milk, ice cream, cultured milk, and cheeses such as mozzarella, provolone, and gouda. MAMA Dairy offers 32 dairy products to its customers in 2010 compared to a product line of 12 products in 2006. This reflects a dairy sector that can and will adjust to consumer and market demands.

The dairy processors are quite competitive in their purchasing practices of raw milk. Prices generally range from ETB 4.50 to 5.00 per liter. The further the farm or collection center is located from the point of processing, the price decreases to account for additional transportation costs. Fasting periods are a challenge as processors report a decline in processing capacity of 25% during the August and March/April fasting periods. However, some processors are managing around fasting periods by building inventories of UHT milk and cheese, although this can create cash flow problems.

One of the interesting characteristics of Ethiopian dairy processing is that the operations tend to be quite vertically integrated. Some processors have their own dairy farms, collection centers, transport, and retail shops as well as out sourcing these services. The key expenses for the dairy processors are purchase of milk, labor, and transport. One processor of 33,000 liters per day and fully integrated from farm to retail has a total work force of 380 people. In detailed surveys of six milk processors, five processors held their work force fixed regardless of the amount of milk being processed. During periods of milk shortages and fasting periods, this increases the price per liter rather dramatically when milk supplies decrease by 25%. All firms do some portion of milk collection and transport along with out sourcing collection and distribution to “specialized” firms. There has been no detailed analysis by any of the surveyed firms into the cost effectiveness of collection and distribution systems.

As the buyer and seller of milk the dairy processor is the key relationship link in the dairy value chain. The relationships with sellers (farmers and cooperatives) and buyers (retailers and consumers) require trust. In order to build trust each party needs to know what is demanded of them and there has to be a transparent flow of information along the value chain; the processor needs quality raw milk and the retailer needs an adequate supply. The relationships also require that each party has some level of power in price negotiation and volumes of milk collected reflected in contracts. Finally the relationships require that everyone has benefit in terms of getting paid on time with incentives to increase price. Currently there is no industry forum or association within which the processors can collectively discuss common interests, seek training, and conduct market or business assessments.

4.4. Domestic market

4.4.1. Household Purchase

The primary shopper of dairy products is the 30 year old female and the shopping list includes milk on a daily basis and butter. These shoppers tend to shop in the formal market for milk, cheese, and table butter and the informal market for traditional butter.

Consumer research conducted in 2006 by EDDP and tested against qualitative opinions of food retailers recently indicated that the primary barriers to increasing consumption are availability, price, and a lack of trust in quality. The optimum price point for milk as reported by consumers is in the range of ETB 2.50 – 3.00, about 50% of current retail prices. The principle age of consumers who consume milk and milk products is 25 – 34. There is little or no difference in gender or religion. There are significant opportunities to introduce new, convenient packaging and new products to the youth category of consumers. Driving this increased consumption is positioning dairy products as nutritious, “home grown” and fashionable.

4.4.2. Retail

The survey team collected market prices for milk and dairy products to compare price differences across the various milk sheds. (See data in Annex Tables). Raw milk price was the highest in Humera because of the income from cash crops, e.g. sesame, etc. UHT is imported and the average price was Birr 52 per lt. Mama Dairy produces UHT, and the product sells for an average price of Birr 20 per lt. Powdered milk is available in all markets, and the average price for 900 g is Birr 180. Only ghee is available in Humera because of the high temperature and people do not use butter. (See Annex Tables). The price for local cheese (ayib) in Dire Dawa is the highest of all the reported areas.

Fluid milk is not widely consumed by the general population on a regular basis. Most people use the majority of milk in tea/coffee, feeding infants, or the elderly and/or infirmed (GOE, LMP, 2007). Dairy products are more widely consumed such as butter, ayib and fermented milk. Only 15.43% of the milk produced is sold in the market (CSA, 2005).

In July 2006 EDDP surveyed 25 food retailers in Addis Ababa to identify activity that could drive dairy product sales. Respondents referred to their primary issue as lack of supply, indicating in some cases that sales could increase by 300% if the supply was available. October 2010 interviews conducted with a sample of the 2006 retailers confirm that supply continues to be the major problem in dairy sales. The dairy case is a valuable part of the retail shop and sales are increasing as a result of greater product selection. Fluid milk continues to lead the dairy case in sales, followed surprisingly by flavored yogurt, a relatively new product to Addis Ababa consumers. Retailers identified growth categories as cheese, flavored yogurt and table butter. A portion of the demand for cheese and flavored yogurt is currently being met by imports but expanded production presents a strong opportunity for Ethiopian dairy processors. The margins on fluid milk are 10-15% and on cheese and yogurt the range is 25-35%. The retail price for a half liter of fluid milk ranges from ETB 4.90 to ETB 5.50. Milk powder has apparently lost market share, as some retailers no longer stock it as they did in 2006. The perception is that milk powder is for infants. Consumers still voice quality concerns at the retail

level and continue to boil fluid milk prior to consumption. Relative to competing with imports, retailers feel that Ethiopian products need to improve quality and improve packaging.

Clearly Fasting periods of the Ethiopian Orthodox Church have a significant impact. However, there is evidence that the impact is not as large as perceived 10 years ago. Processors of milk report that the decline in consumer demand is seen most predominantly during the 15 day fasting period in August, accounting for a 25-27% decrease, followed by the 55 day Great Lent period in March/April with a 25% decrease. The fasting period preceding Christmas in December accounts for less than a 15% decrease. Processor report that during fasting periods they are more likely to produce cheese and butter which can be inventoried until the end of the fasting period or ship these products, which have a longer shelf life than fluid milk, the regions of Ethiopia where fasting is less of a factor. In the Addis Ababa market there were approximately 25 locally processed branded products sold by different manufacturers in 2006 (SNV).

4.4.3. Hotel, Restaurant and Institutional (HRI)

HRI is an important market segment for milk. Both milk traders and the processors are supplying this end-use market. There are clear opportunities to develop a marketing plan to increase the share of pasteurized milk and dairy products to these customers. Data are lacking on the size of the segment and what are the needs of the customers.

4.5. Milk and Dairy Product Exports

Farm gate prices for fluid milk in neighboring countries are reported in the following table.

Country	Wet Season Price (national avg)	Dry Season Price (national avg)	Currency	Exchange Rate	US\$ Values
Kenya	14	35	KSh	Kshs 77 = US\$1	0.18 – 0.45
Uganda	250	500	UShs	USh 2,250 = US\$1	0.11 – 0.22
Rwanda	150	200	RFr	RFr 580 = US\$1	0.26 – 0.34
Ethiopia	3.50	4.50	ETB	ETB 16 = US \$1	0.22 – 0.28

Ethiopia is not the lowest cost producer of milk. During the surplus (flush season) period, Ethiopia's price to producers is higher than in the other countries. Only for a few niche markets will Ethiopia's milk be competitive in neighboring countries. It is estimated that Ethiopia exported less than US\$100,000 in dairy products to Somalia and Djibouti (Wouters).

4.6. Employment Creation in Value Chain from Increased Dairy Production.

According to FAO, every 5,000 lt of additional new milk produced and marketed will create one new job in the value chain. Based on our estimates for demand for milk in 2020, we project an increase in employment of up to 73,000 new jobs in the dairy sub-sectors.

5. DAIRY VALUE CHAIN

5.1. Overview

This section of the paper describes the value chain actors involved in each of these segments of the formal and informal chain and their interrelationships with other players and the constraints and opportunities they face. This analysis will enable to pinpoint the leverage points where an intervention is needed at each dairy chain functions.

If this is addressed well, it will create an opportunity for a smooth flow of information and products along the chains and ultimately enhances the competitiveness of the overall chain actors in general and the smallholder milk producers in particular. To this end, the formal and informal dairy chain will be analyzed. Each of the segments of the activities in both channel will be discussed separately and gets into the analysis of the actors, the process through which the chain functions are embarked on, and finalizing with a presentation of constraints, opportunities the overall Ethiopian dairy sector (formal and informal) faces, leverage points and interventions required to upgrade the dairy value chains.

5.2. Formal Dairy value Chain

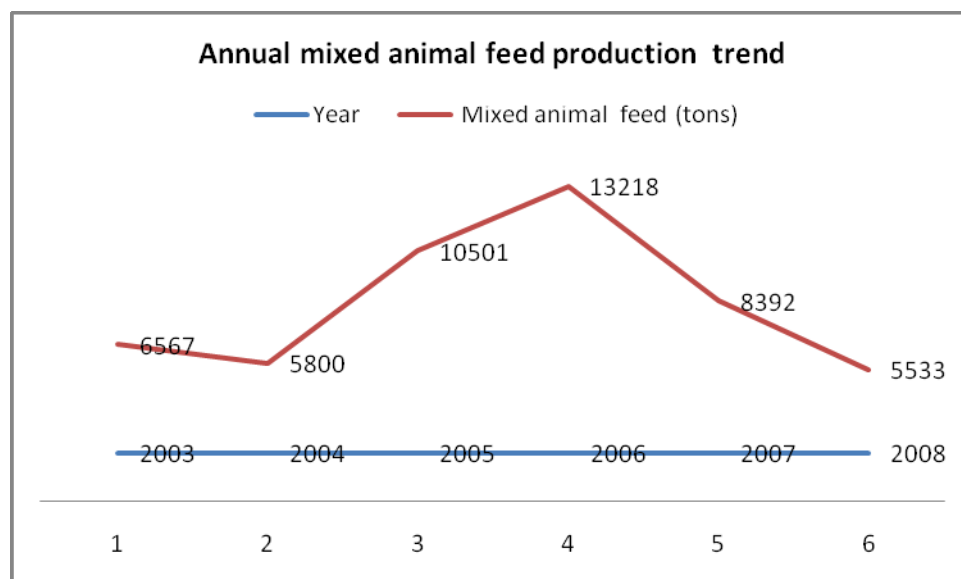
The formal dairy chain involves seven distinct value adding activities from production of the milk through reaching to the final consumer in the market. These activities include input supply, milk production; Raw milk transportation, bulking and cooling, processing and packing, transporting processed milk and milk products and retailing gathering (bulking); processing; transportation; and retail trading .

5.2.1. Input supply

This category of segment includes the supply of all inputs that are required by smallholder milk producers and dairy commercial farms. Different dairy value chain actors are engaged in supplying feed, artificial insemination, veterinary services, equipments and machinery, and packaging materials.

5.2.1.1. Feed suppliers

The Ethiopian Animal Feed Industry Association (EAFIA) has got 46 members (14 in Addis Ababa , 21 in Oromya, 4 in SNNP, 3 in Amhara region and 4 in Tgray region 4) (EAFIA, 2010). Besides, there are about 40 feed retailing private businesses in the urban and pre-urban milk shade areas of the country. Along with the feed supplied from these companies milk producers also use crop residues, hay and other by products from wheat flour and brewery factories. From the year 2003 to 2008 the feed processors at national level supplied an annual average of 8,335 tons of mixed feed to the users. However the supply in the given years shows a declining trend (See Table 5.1). In 2005 the industry supplied a total of 13,218 tons and steadily decrease to 5533 tons in the year 2008(see figure below)

Figure 5.1. Annual mixed animal feed supply

Source: EAFIA, 2010

According to the Association the price of different feed ration has substantially increased in the past seven year (2004-09). For example the dairy ratio price per quintal was Birr 79 in 2004 and in 2008 it reached 302 increased by (382%) and in 2009 was Birr 230 (increased by 291%). The main cause for the price increment was shortages of ingredients. The following table 5.2 shows the price per quintal for different rations.

Table 5.2. Price for different formulated feed mix

Type	Birr per quintal					
	2004	2005	2006	2007	2008	2009
Dairy ratio	79	86	108	128	302	230
Calves ratio	87	94	107	136	312	340
Sheep ratio	76	84	105	125	301	240
Bull ratio	78	88	106	127	301	310
Heifer ratio	85	92	114	134	308	320

Source : EAFIA,2010

5.2.1.2. AI service providers

There are seven AI service providers in the country and out of which one is owned by the government and the rest six are run by private businesses. The National Artificial Insemination Center (NAIC) is owned by the government and has seven⁴ branches in different parts of the country that distribute semen and liquid nitrogen to the milk producers. Out of the private sector actors Addis Livestock Production and Productivity Improvement services (ALPPIS) is the main supplier of genetic material. Among others it import and distribute genetic material and AI equipments to the private AI service providers in one hand and give the service directly to the milk producers. ALPPIS is operating in most of the urban and pre-urban milk shades of the country. The other five AI service providers are located in different small-town and provide the service directly to the producers on a demand basis.

5.2.1.3. Veterinary services

There are five veterinary medicine importing companies and about 39 actors that provide veterinary services in urban and pre-urban milk shade areas. In addition to these private service providers the government's agricultural extension system based at wereda level also providing vet services to the smallholder milk producers.

5.2.1.4. Machinery Equipment and packaging

There are three big machinery and equipment (milk processing and cool chain) importing companies in the country from all parts of the world and supply to potential investors who want to invest in dairy sector. These are Packo Ethiopia, Ture Import and Pladot Ethiopia. But there are also two small-scale equipment (churner, like aluminum jars, churner, acid tester and lacto meter etc) supplying companies (selam vocational training center and Nile star), that supply directly to the milk producing smallholders and small-scale commercial dairy farms. The packing material (plastic pouch) is also imported from UAE, Kenya and Israel.

5.2.1.5. Financial institutions

The service of the financial institution for the development of dairy sector in Ethiopia is of paramount importance. However the different business operators in the value chain are complaining on the commercial banks particularly in terms of flexibility and speedy decision.. For any loan, all types of banks are demanding marketable collaterals to secure the loan. Based on the interviewed made with some dairy sector managers, some banks do not consider machinery and livestock as collateral for the dairy processors.

For urban and pre-urban milk producing smallholders, microfinance institutions are the most suitable source of finance. Because of size and single borrower limit issues, the amount of loan to be granted to a single borrower is often too small for further investment at small scale level. Value chain specific financing and developing new financial products which addresses a specific need is often the MFI are lacking. Most of them lend based on conventional way of doing business. There is also gap from the smallholders' side. They are lacking business and financial management skills to utilize the borrowed money efficiently and effectively such in a way it

⁴ Nekempt, assela, Bahirdar, Dessie, wolaita, wolkite, Mekele and Harari

brings a positive change on their livelihood.. among others Amhara Credit and Saving institute which is operating in Amhara region, Dedit Credit and saving Sh co, operating in Tigray region, Oromia Credit and saving share company operating in Oromia and Omo micro finance is operating in SNNP. These four MFIs are government affiliated and there also NGO affiliated MFIs like wisdom (World Vision Ethiopia, PEACE Mf (Agriservice Ethiopia) that also provide financial services to smallholder milk producers.

5.2.2. Milk production

In formal dairy chain the main milk producers are commercial dairy farmers and smallholders located on urban and pre urban areas of the milk sheds. The smallholder milk producers and the commercial dairy farmers are distributed in Addis Ababa, Oromia, Amhara and Tigray regions, 11 zones, 48 woredas, three main milk sheds (the greater Addis, Lake Tana and Mekele and Humera), and in 20 sites. There are currently 33,500 smallholding milk producers out of which 80% of them own 1-3 Dairy cows, 15% 4-6 and the remaining balance own 7-10 dairy cows. In urban and pre-urban milk shed production systems. Out of the total producers about 7,535 smallholders (household heads) are organized in 114 primary dairy cooperatives and 8 dairy unions (the list of milk sheds, PDC and union are annexed) and the remaining balance are non cooperative members. Out of the total PDC members about 23 % are female smallholders. Besides these smallholders, there are also a total of 269 commercial dairy farmers that own more than 10 dairy cows each. The total milk produce in the three main sheds is estimated at 515,994,660 liters, out of which 65.2% comes from the greater Addis Milk shed, 21.9% from Lake Tana and 12.9% from the Mekele and Humera milk sheds. (do not have of the milk production disaggregated by production system.

5.2.3. Raw milk transporters

Two milk processors, one dairy union are engaged in this function. They transport the raw milk from the milk producers to their bulking /chilling centers. There are also Individuals who engaged in milk business collect milk from the producers, transport to their bulking sites and finally supply to the processors.

5.2.4. Bulking and chilling centers

Five actors established a total of seven milk bulking and chilling centers in the milk shed. It is only the three centers which are owned by milk processors are the one which giving chilling services. This means they collect milk from the producers and put in the chilling facilities until they transport it to their processing unit. The other four which are owned by the Addaa primary cooperatives and Selale dairy union do not have chilling facilities but only aluminum and plastic buckets used for collect milk from the producers

5.2.5. Commercial milk processors

This category of actors are those adopting modern technology with a majority of their output is pasteurized packed milk with the size of 500ml. except mama also producers UHT milk. Currently there are about seven main (Lame, Sebeta, MB Plc, Adaa, Genesis, Lema and Bora. These companies have a daily processing capacity of 107,500 liters per day but they only attained only about their 60% capacity i.e. 64,000 liters per day. In the year 2008, the first three

big processing companies produced about 14 million liters of milk, 120,000 Kg of butter and 20,000 kg of cheese and 90,000kg of soft cheese (UNIDO 2009). Besides these big companies there are also about ten small scale milk processing companies that produce about 25-30 thousand liters per day. The processed dairy products are distributed to the different outlets through the milk transporting trucks and vans owned by the processors themselves (see annex table for processor survey results.)

5.2.6. Retailers

5.2.6.1. Supermarkets

Ethiopia's supermarket revolution began in the late 1990s, especially in bigger cities such as Addis Ababa, Bahir Dar, Mekele and Hawassa although the pace remains slow in comparison with other African countries (e.g. Kenya). The growth in supermarkets has been triggered by the urban population increase, income growth of relatively wealthier Ethiopians and by the increase in expatriates in Addis Ababa who prefer to shop in supermarkets. Currently in Addis Ababa there are 25 bigger supermarkets owned by 15 companies and out of which 12 are owned by Ethiopian and the other 3 by foreigners. Moreover other supermarkets also exist in major towns of the country which distribute milk and milk products processed by milk processing companies based in Addis.

5.2.6.2. Dairy Income Generating Activities (DIGA) Kiosks

DIGA groups are established with the support of Land O lakes' dairy development program. Currently, they are given technical and business development services. There are a total of 32 DIGA groups engaged in selling milk through their milk kiosks in Debrezeit (3), Debrebirhan (1), Addis Ababa (22), Hawassa (3) and Mekele (3). These groups have a total numbers of 617 beneficiaries

5.2.7. Consumers

5.2.7.1 Household and Institutional buyers

In almost all urban households buy raw unpasteurized milk on a daily basis from collectors or urban small holders mainly for their kids. It is common to substitute mother breast feed with cow milk when the breast dried up and mothers are back to work. Because of price, sustainable supply and the perception that pasteurized milk is something that certain fats are extracted, most household buyers are inclined to unpasteurized raw milk.

Institutional buyers are big institutions like universities, training centers, hospitals etc found in major cities and towns in the country. Café and restaurants of big enterprises are also categorized under institutional buyers. The majority of these institutions are sourcing from collectors, retailing shops and processors.

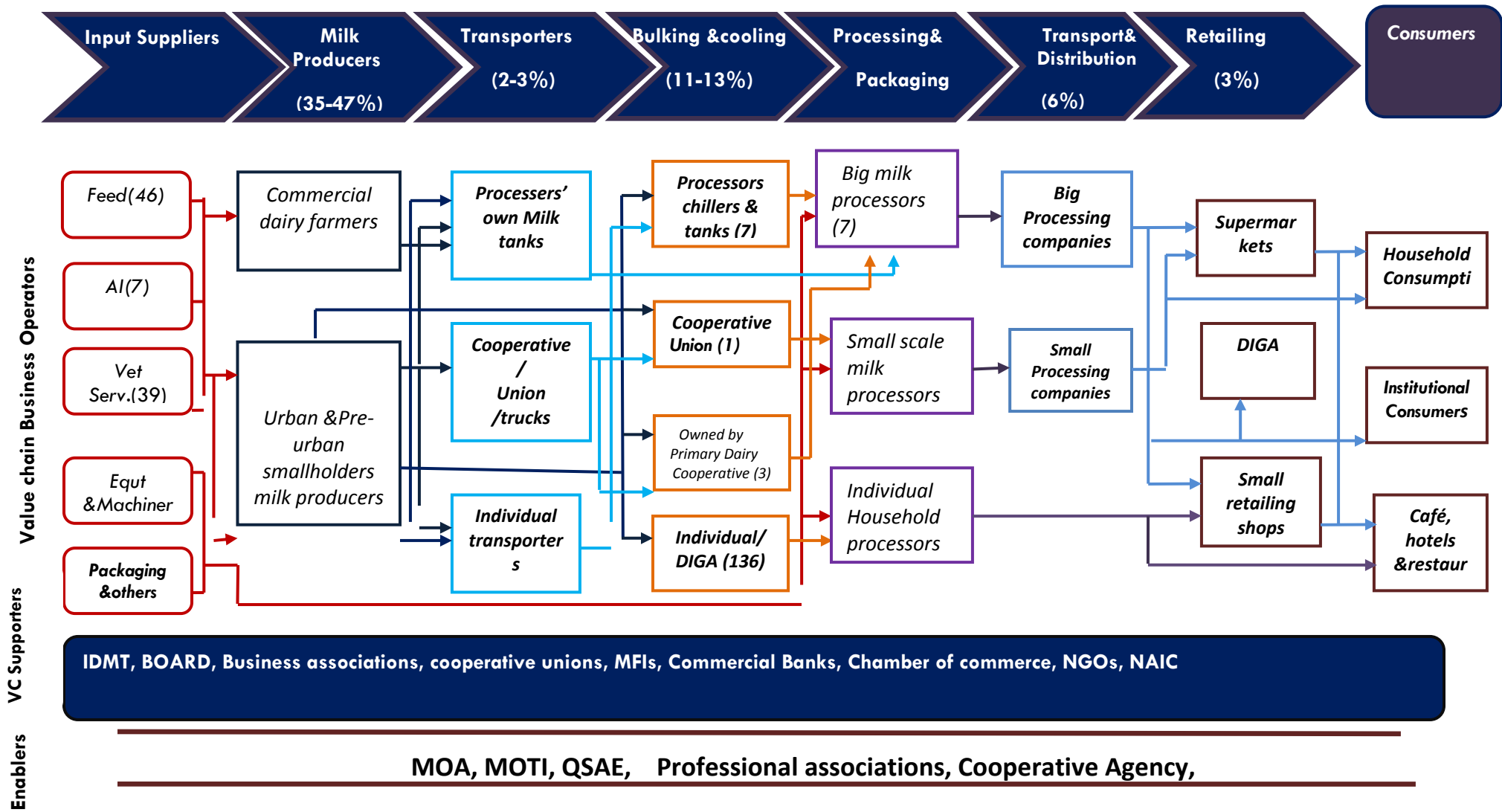
5.2.7.2. Cafes , Restaurants and shops

There are large number of cafe's, kiosks and restaurants in all towns. Hot milk and macchiato (mix of coffee and milk) are the famous drinks which triggers the demand for milk by cafes and restaurants. Kiosks and retailing shops are selling packed milks to household buyers. Butter,

cheese and yoghurts are solely sold at supermarkets. During eve of holidays *Ayib* are often sold at shops. Some cafes and restaurants are using powder milk for hot milk and macchiato, which are not often chosen by consumers.

5.3. Development Organizations

Like Land O'Lakes, SNV-Ethiopia, ILRI and others are currently providing technical and business development support to the dairy sub-sector at all level in the value chain. They are strengthening the organizational and technical capacity of producer groups, business associations. They work on developing the market and improving the quality of the milk and milk products.



5.3. The Informal Dairy Value Chain

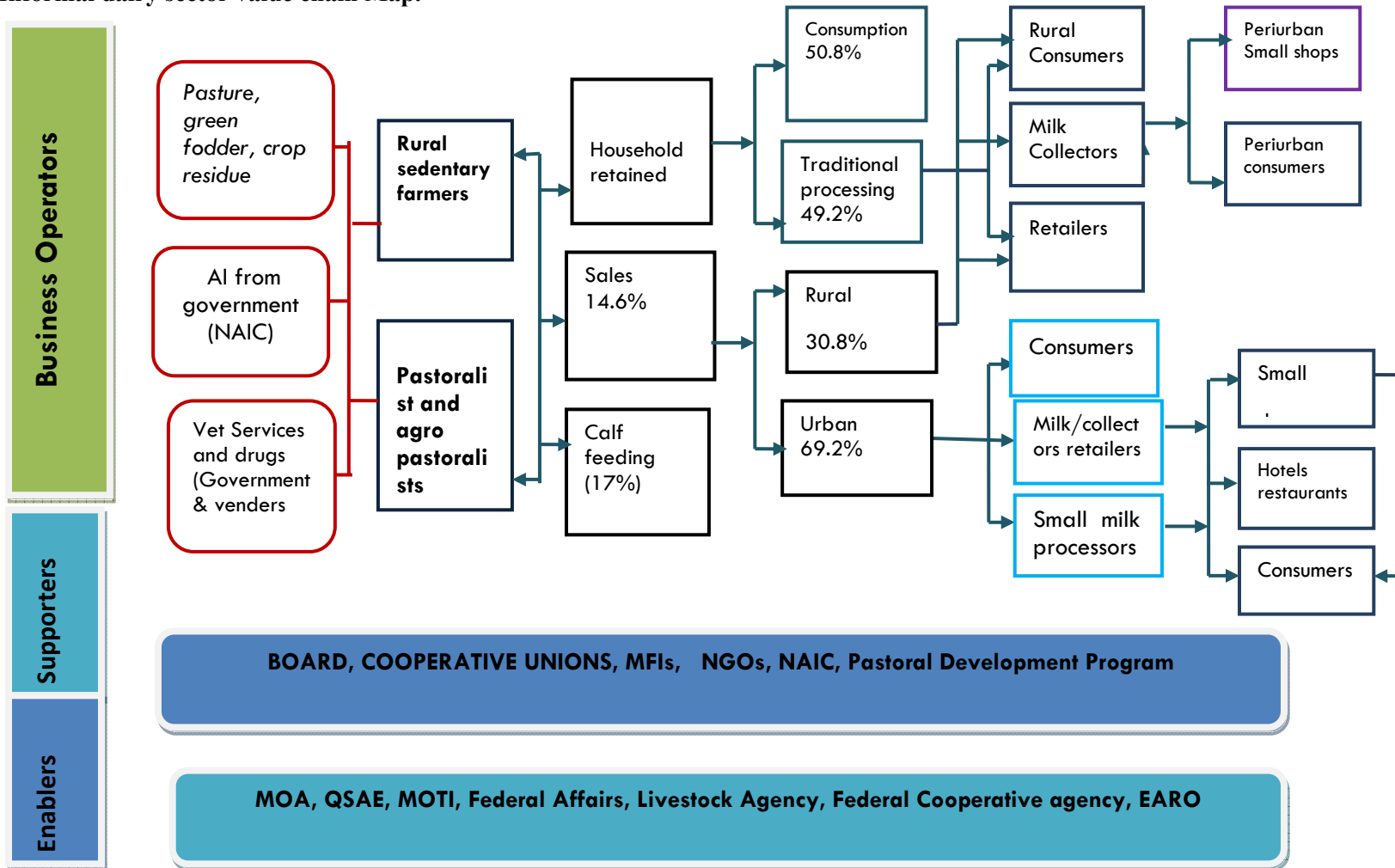
The informal market involves direct delivery of fresh milk by producers to consumer in the immediate neighborhood and sale to itinerant traders or individuals in nearby towns. In the informal market, milk may pass from producers to consumers directly or it may pass through two or more market agents to local consumers and neighboring countries (Somaliland and Kenya) consumers. 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. The informal (traditional) milk channel has remained dominant in Ethiopia. Moreover this channel provides substantial amounts of milk which goes into traditional dairy processing and then traded, especially traditional soured butter. The main milk producers in this channel are sedentary rural smallholders and pastoralists.

The main feed sources for these milk producers are pasture land, green fodder from their own land and crop residues. Besides this, in some rural areas local brewery residue and hay also used. In pastoral areas particularly in dry season feed multi-nutrients block, hay and concentrates are supplied with the support of different development organizations and some pastoralists purchase supplies from Nazareth area. The government extension system takes assumes most of the responsibility for supplying AI, veterinary services and drugs. However there are individuals' drug ventures in some areas of the pastoralists and sedentary rural areas.

Milk and milk products in sedentary rural Ethiopia are often used for household consumption and/or sold to finance the purchase of basic household commodities such as coffee, salt, cooking oil, sugar, etc. The products are also sometimes used as payments and gifts to others. According to UNIDO 2009, out of the total milk produced about 68.4% is retained at household level, about 14.6 % is sold, 17% utilized by calves. The smallholders use the milk retained at household level for consumption (50.8%) and traditional processing two purposes (49.2%). More over the total milk supplied to the market is geographically goes to the urban (69.2%) and the rural neighborhood (30.8%) market. Through these structure reaches to different market out lets and consumers.(see the map below)

However, in pastoral areas there is an export channel that cow milk is exported to Kenya on a daily basis in this channel a daily average of 3025 liters in wet season and 1500 liters in dry season is entering to the export market (YONAD 2009).

Informal dairy sector value chain Map.



6. THE POLICY ENVIRONMENT

Government policies are important if the dairy sub-sector is going to advance to meet the targets projected for 2020. Policies are necessary to create an environment conducive for innovation and risk taking on the part of investors. Four policy pillars for commercialization of smallholder dairying were identified by Delgado: (1) remove market distortions; (2) building participatory institutions of collective actions by small producers to facilitate their vertical integration; (3) increasing investment to improve productivity; and (4) promoting effective regulatory institutions to deal with public health and environmental concerns of livestock intensification.

6.1. Market Distortion Policies

The GOE has chosen a path of market liberalization (Wouters et al). Input and market prices are free to move with market forces. There are no published price controls on milk and milk products. The GOE privatized the large milk processor, Shola Dairy, which was a positive development for the industry. New investors are free to invest in the dairy industry.

There are still areas where government policies distort the dairy sub-sector. The GOE has a restrictive foreign exchange policy which can make it a difficult process for firms to obtain foreign currency for the purchase of equipment.

The GOE and the regional government authorities have a lengthy process for obtaining land for dairy farming. The access to land is a difficult process. Investors in commercial dairy farms have also been unable to get access to land for forage production.

The current genetic improvement and health policies are to provide subsidized services in artificial insemination (AI) and animal health services. Both services are underperforming and hampering dairy productivity, though the GOE is investing in new veterinary schools and capital equipment. One positive step is that the Amhara Regional State allows government AI technicians to provide insemination services using private sector bull semen. This could be coupled with allowing government AI technicians to charge a commission fee for bull semen sales. The Trade Practices Commission allows exemptions to enterprises that have “significant impact upon development and are designed by the Government to fasten growth and facilitate development”. If the government AI system is producing 300,000 units of bull semen but only 100,000 units reach cows, it is questionably facilitating development currently. Furthermore by fostering the private sector with increased imports, costs will be driven downward and efficiencies in the system will develop. The government policy in Kenya, Uganda and Tanzania is to move many animal health services to the private sector.

The value added tax (VAT) can add to the cost of dairy products. Fluid milk is exempt from VAT while other dairy products are not. The country is deficit in milk production and VAT adds to the lack of competitiveness in meeting consumer demand.

6.2. Participatory Institutions for Collective Action

6.2.1. Cooperatives

Cooperatives are a vehicle for improving the market power of dairy smallholders. The GOE policy on cooperatives is mixed. The GOE policy is to encourage the formation of cooperatives, yet the government can inject politics into these organizations. The cooperative law needs to be reviewed. In the case of a cooperative union, the GOE appoints the manager rather than a professional manager being hired by the board of directors. More work is needed to strengthen the management of existing and new cooperatives as they are created.

6.2.2. Other Business Models

There are other business models besides cooperative that could be considered for the dairy sub-sector. Farmer group/organization and limited liability share company would allow dairy producers or private individuals to start businesses and apply for loans without starting a cooperative. The GOE could examine these alternative simplified business models.

6.2.3. Ethiopia Dairy Development Council (EDDC)

Stakeholders in the dairy sub-sector plan to establish the EDDC. A steering committee has been formed to address issues facing the industry and to engage all direct stakeholders and allied industries supporting the dairy sub-sector. The EDDC is a worthwhile organization to create a forum for addressing constraints to market liberalization with the GOE, and to reconcile differences between members such as coops and processors. It will be important that the private sector to take the lead role in the formation and operation of the EDDC.

6.3. Investments to Increase Productivity

6.3.1. Farmer Training Centers (FTC)

The MOA is planning to expand its network of FTCs to deliver extension information to smallholders. A FTC will be in every kebele. The USAID/Ethiopia dairy initiative can link to the MOA's FTCs working at the national, regional, woreda and kebele level to share knowledge and where feasible link lead and contact farmers to the FTC for training.

The Bill and Melinda Gates Foundation (BMGF) plans to support dairy development in Ethiopia in its second phase of its East Africa regional program. USAID/Ethiopia will want to carefully examine how its investment in the dairy sub-sector can be leveraged with the BMGF funds.

6.3.2. Credit

Farmer access to sufficient credit is required for milk production to keep pace with demand. The primary issue identified is secured transactions with collateral. Collateral is part of a well structured lending system. Ethiopia's lending system has gaps that limit its effectiveness in agricultural development, particularly dairy supply expansion. The use of collateral presently requires that the property being pledged as collateral be registered to a third party to avoid fraud

and misunderstanding. There is no central location in Ethiopia to register collateral. Vehicles can be used as collateral since they are registered with the Motor Vehicles Office, equipment is used as collateral as it is registered with the Ministry of Trade and Industry, and a business itself could be used as collateral with its registration within the Company Registry. Under Civil Code 2820 livestock, future crops, warehouse receipts, and accounts receivable are eligible to be used as collateral, but there have been no cases where a lending institution has secured a loan with any of these chattel or claims. Finally financial institutions, banks and micro-lending institutions have a tendency to over-collateralize to 150% to 200%. Acceptance of agricultural assets as collateral by lending institutions needs to be clarified and supported by the Ethiopian government.

Micro-finance institutions have adopted “peer pressure” methods such as group lending or securing repayment of a loan by a group. The repayment rates on “peer pressure” lending is very good, exceeding 90%. Ethiopian finance law allows leasing of equipment, machinery, and some vehicles, ideal for agriculture, but to date no financial institution has developed a leasing product. Outside of financial institutions there is no lending between buyers and sellers. In other words, if a dairy processor needed more milk, it would be in the processor’s interest to finance new technology or more cows or assist a farmer to secure credit. This has not been the case in Ethiopia so far, but needs to be pursued to make these accepted practices or dairy development will be slow to take off.

6.3.3. Foreign Direct Investment

Relative to the dairy sector Ethiopia has very attractive foreign direct investment policy. Investors are exempt from tariffs and duties on all capital equipment and up to 15% on spare parts. Exemption from export taxes are also provided. Tax holidays range from 1 to 5 years and investors can carry initial operating losses forward and use any depreciation method. Investments are protected against nationalization and expropriation. It is a sound and non-discriminatory policy. However, the landholding rights issue clouds the investment opportunities for commercial dairy farming and for dairy processing since potential processing investors have expressed an interest in also having a dairy herd to assure milk supply and quality. Opportunities do exist in milk collection and assembly and transportation.

6.4. Regulatory Institutions for Markets, Public Health and the Environmental

USAID/Ethiopia supported the development of the Animal and Plant Health Regulatory Department (APHRD) to improve the regulatory functions of the GOE and to be in compliance with international standards. This agency is a positive step for recognition by OIE and other international bodies, but its functional effectiveness needs to be improved dramatically.

Livestock presents public health and environmental issues which require attention by the public sector. Food safety is a key function of the GOE and the sales of raw milk to consumers could be an issue of concern though most consumers know to boil their raw milk after purchase. The processors in the formal sector have to comply with certain regulations which adds costs to their products. These disparities will need to be addressed through public-private forums.

If the current Ethiopian dairy market is demand driven and the production levels do not keep pace with demand, then it is logical that dairy farmers, smallholders and commercial firm alike,

will seek to expand their production. In order to expand production, farmers will need to increase their land holdings to produce more feed whether it is cultivated forages or pasture land. Although the Federal Proclamation (1/1995), State Ownership with Private Landholding Rights prohibits private land ownership, the Rural Land Administration and Use Law (456/2005) provides for rural land holding rights free of charge to farmers already on the land, for the issuance to them of a title certificate, identifying the concerned plot and for survey and cadastral registration of the title. For a farmer “farming for a living” this right has no time limit and a farmer’s holding size should be a minimum size to provide for the family’s food security. The holding may be transferred by inheritance to members of the family also engaged in farming, but it may not be freely sold. Fortunately for farmers the decisions on land acquisition are made at the kebele and woreda levels and there is much anecdotal evidence of farm expansion through renting of additional holdings of 2 to 4 hecatares, albeit not contiguous with current holdings. If a commercial dairy farm model is 15 to 20 hectare to support 80 cows is accepted, then the land issue becomes more problematic and it is doubtful that the land acquisition would be available in the high land milk sheds.

To safeguard against private and public impediments to free competition the Ethiopian Parliament passed the Trade Practices Proclamation (329/2003) for “regulating anti-competitive practices”. In the dairy sector the Ethiopian government has done a laudable job in privatizing the Dairy Development Enterprise, Shola Dairy, state farms, the Kaliti Animal Feed Mixer and Poultry Feed and most recently providing permission, although informal, to allow Alppis to import bull semen from the US. Still more can be done.

7. CONCLUSIONS, RECOMMENDATIONS AND INTERVENTIONS

7.1. Conclusion

This rapid assessment of the dairy sub-sector for USAID/Ethiopia revealed some significant findings. These can be summed up in the following points.

- The consumption of milk is low in Ethiopia compared to neighboring countries and below recommended dietary intake levels;
- The demand for milk and milk products will continue to rise due to population, urbanization and rising incomes in spite of the large number of religious fasting days, and imports will have to increase to meet the domestic shortfalls (requiring scarce foreign exchange);
- Large quantities of milk does not reach the consumer as fluid milk, and the formal sector handles a small fraction of the fluid milk market in urban areas;
- Increase the supply and quality of milk and milk products;
- A very high percent is sold as raw milk which poses problems of adulteration and hygienic concerns;
- The cost of milk production is high because of low productivity and transaction costs to bulk and transport fluid milk from a large number of smallholders
- Notwithstanding these constraints the dairy sub-sector is at a stage of take-off because of the emergence of dairy cooperatives, private sector processors, and consumer awareness about the importance of consuming milk.

7.2. A Vision

The GOE and the industries in the dairy sub-sector realize that an opportunity is present to move the whole sub-sector forward. A vision is required that all stakeholders can support. The vision put forward to USAID/Ethiopia is: “Domestic production of quality Ethiopian milk and milk products that improves the livelihood of a large number of dairy households, creates additional jobs, and protects the natural resources of the country”

7.3. A Strategy

The proposed strategy for USAID/Ethiopia is to support and strengthen the private sector (small, medium and large firms) to engage in a progressive and liberalized market for dairy and dairy products. The priority needs to be on the transfer of entrepreneurial skills. USAID/Ethiopia will want to collaborate closely with the various GOE agencies in the areas of banking, investment, regulatory and government services. The private sector in partnership with the public sector sets its target for meeting demand projections set forth for the year 2020.

7.4. Key Constraints, Interventions, Actors and Expected Outputs - Impacts

CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<p>1. Feed: Supply shortage of feeds, Knowledge of feed formulation, Poor forage management</p> <p>2. Land: Land Shortage for ingredient & fodder production, access to land, parcel sizes decreasing; decisions between food, forage and grazing land</p> <p>3. Breeding Services / Improve genetic stock; shortage of Poor Quality semen; few business operators</p> <p>4. Veterinary Services / Drugs: Subsidized and inefficient ; Lack of quality drugs / presence of contraband in markets; Shortage / inconsistent supply; Lack of veterinarians with dairy technical focus; Lack of diagnostic services</p> <p>5. High cost of production: VAT + raw materials costs; equipment / Machines / Materials: High cost / devaluation; Lack of local supplies; electricity shortages</p> <p>6. Business Services: Few business actors (Commercial); Lack of innovative / entrepreneurial skills; Lack of marketing capacity</p> <p>7. Subsidized government system undermining private sector</p> <ul style="list-style-type: none"> • Un-harmonized government policies to international standards • Inadequate extension 	<p>1. Private sector input suppliers work with groups of dairy farmers to conduct on-farm demonstrations for their products, seeds, fertilizers, genetics.</p> <p>2. Institute contracts between feed manufacturers and maize and oilseed producers for delivery to the factory at negotiated prices and quantities</p> <p>3. Support SMEs on forage seed production, e.g. Rhodes grass</p> <p>4. Project set-up demonstration sites for silage pits</p> <p>5. Contracts between groups of farmers and a veterinarian and the CAHW for preventive care and treatment of dairy cows</p> <p>6. Contract between groups and an AI inseminator</p> <p>7. Contracts between feed manufacturers and groups of dairy farmers for delivery of feed rations</p> <p>7. Ag input dealers and MOA researchers have field days on selected forage plots</p>	<p>Producers</p> <p>Feed mgf</p> <p>Feed dealers</p> <p>AI inseminators</p> <p>MoA researchers</p> <p>MoA extensionists</p> <p>MFIs and banking institutions</p>	<p>1. Quantity of feed grains and oilseed cakes purchased on contracts</p> <p>2. Contract signed for AI insemination of quality semen</p> <p>3. Number of private firms providing imported semen increases</p> <p>4. Improved quality of forages produced for dairy cattle</p> <p>5. Number of kg of improved forage seed sold by SMEs</p> <p>6. Milk production in project herds increases by 25% by the second year of project</p> <p>7. Introduce rural farm stores near to farmers in the milk sheds</p> <p>7. Field research trials on new forage seeds established in three locations</p> <p>8. Farmer field days conducted</p>

Table 7.1.b Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector - Production			
CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<u>Pastoral System.</u> Low milk production Lack of market access	<u>Pastoral System.</u> 1. Sale of camel milk 2. Small scale processing of butter 3. Milk marketing to Somalia and Northern Kenya of fluid milk	<u>Pastoral System.</u> SMEs Pastoral assoc. NGOs CAHW MFI	<u>Pastoral Systems.</u> Quantity of products sold in domestic and export markets - Improve food security
<u>Rural Smallholder (Crop-Livestock)</u> -Low productivity -High cost of milk production - Low management knowledge - Distance from market place - Poor quality (Management, handling etc...) from milking to selling - Inadequate knowledge transfer system - Poor value chain/ vertical/ linkages (low trust among the actors) - Lack of i - Low level of integrated dairy management practice and knowledge	<u>Rural Smallholder</u> 1. Road access 2. Increase market access 3. New farm organizations to access fluid markets	<u>Rural Smallholder</u> FTC Farm groups Milk collectors Processors	<u>Rural Smallholders</u> Formation of groups Increase sales of fluid milk
<u>Urban and Peri-Urban</u> 80% of producers have 1 – 3 head Lack of chilling centers High cost to produce milk Lack of feed and land Lack of chilling centers Low trust Poor vertical linkages Pressure to move out of urban	<u>Urban and Peri-Urban</u> 1. Strengthen coops 2. Create new coops 3. Contracts with input deliver providers 4. Processors	<u>Urban and Peri-Urban</u> Cooperatives SME Lead Farmers FTC	<u>Urban and Peri-Urban</u> - Expand number of cross-bred cows - Profitable coops - Fluid milk purchased by formal sector
<u>Commercial Producers</u> Cost of feed Availability of land	<u>Commercial Producers</u> - pilot tests on production of feed rations - feed supply contracts - land use on relocation of commercial dairies	<u>Commercial Producers</u> - producers - govt. agencies - processors	<u>Commercial Producers</u> - expand herds - contracts signed with feed mgf. - feed exchange - marketing contracts with processors

Table 7.1.c. Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector – Bulkers and Transporters -- Cooperatives, Collectors and Transporters			
CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<p><u>Cooperatives:</u></p> <ul style="list-style-type: none"> - high cost of operations (cooling) - weak management - lack of working capital - governance weak - auditing of operations - lack of transparency <p><u>Collectors – Milk Hawkers:</u></p> <ul style="list-style-type: none"> - lack of knowledge on proper care of milk – lack of skills - lack of access to credit to invest in handling equipment - poor rural roads - low level of integration (up and downstream) <p><u>Transporters:</u></p> <ul style="list-style-type: none"> - poor rural roads - High cost of transportation - Availability of trucks on regular basis. - not milk tankers in use 	<p><u>Cooperatives:</u></p> <ul style="list-style-type: none"> - training in business skills - education on governance - training on testing of milk - use of contracts <p><u>Collectors – Milk Hawkers:</u></p> <ul style="list-style-type: none"> - training in milk handling - organization of milk collectors -testing of milk -Implement a pricing scheme based on quality <p><u>Transporters:</u></p> <ul style="list-style-type: none"> - Assessment of supply of transport available during times of the year - Detailed costs on transportation 	<p><u>Cooperatives:</u></p> <ul style="list-style-type: none"> - business trainers - laboratories - processors - lending organizations <p><u>Collectors – Milk Hawkers:</u></p> <ul style="list-style-type: none"> - business trainers - MFI -Labs <p><u>Transporters:</u></p> <ul style="list-style-type: none"> - Transporters - MFI 	<p><u>Cooperatives:</u></p> <ul style="list-style-type: none"> - publication of financial statements - financial ratios improve - cost of collecting and selling milk decreases <p><u>Collectors – Milk Hawkers:</u></p> <ul style="list-style-type: none"> - reduction in adulterated milk - more milk collected from villages not on the collection route <p><u>Transporters:</u></p> <ul style="list-style-type: none"> - Reduction in collection costs for milk sold by cooperatives - reduction in costs by processors collecting milk

Table 7.1.d. Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector - Processors			
CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<p><u>Processors:</u></p> <ul style="list-style-type: none"> - Shortage of milk supply and milk quality problem - Technical skills to process value added products such as cheese - Low level of market linkage with producers and collectors - Marketing skills (Labeling, branding, distribution...) - High cost of packaging 	<p><u>Processors:</u></p> <ul style="list-style-type: none"> - STTA (Short term technical assistance) for business skill, marketing, quality improvement for processors - Promotion investment, identify processing opportunities for SMEs in regional centers - Support new product development - encourage industry to set and adhere to milk standards - contract facilitation between PDCs and processors and promote quality-based payment strategie - grant or guaranteed loans for start-up processing facilities 	<p><u>Processors:</u></p> <ul style="list-style-type: none"> - Small, medium and large processors in Addis Ababa and the regional urban centers - business development providers - Ethiopian Meat and Dairy Technology Institute 	<p><u>Processors:</u></p> <ul style="list-style-type: none"> - increased volume of milk and milk products sold in urban area by processors (formal sector) - establishment of new processing facilities, especially in regional urban centers

Table 7.1.e. Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector – Retailing: Supermarkets, Grocery Stores and Milk Kiosks			
CONSTRAINTS:	INTERVENTIONS:	ACTORS:	OUTPUTS – IMPACTS:
<u>Retailing:</u> - Unhygienic milk - Shortage of shelf stable milk - Timeliness - Short shelf life - Limited product categories - Improper milk handling	<u>Retailing:</u> - Use of BDS services to improve the merchandising of milk and milk products - Retailers involved with in-store demonstrations of milk and milk products - Use of coffin cases and other types of display cases in stores to sell milk products - access to loans to update display cases in retail outlets	<u>Retailing:</u> -Supermarket chains -Grocery stores - Technical training by specialist in retailing	<u>Retailing:</u> - Increase the volume of milk sold through outlets - Consumers perceptions improve about consuming milk

Table 7.1.f. Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector – Hotel, Restaurant, and Institutional (HRI)			
CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<ul style="list-style-type: none"> - Inadequate packaging and sizes - Low level of quantities required on regular basis - inventory control and chilling of products 	<ul style="list-style-type: none"> - Business service providers for training on retailing - New bulk package designs for institutional buyers - Promotion of the use of milk products in menu planning 	<ul style="list-style-type: none"> - Business service providers for training - Package design for institutional buyers - College food nutritionists on meal planning to use dairy products 	<ul style="list-style-type: none"> - Increase purchases of milk products by schools and other institutions with cafeterias - changes in menus to increase the usage of dairy products

Table 7.1.g. Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector – Ethiopian Consumers			
CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<ul style="list-style-type: none"> • More fasting days • Adults consume less milk • 4% of the expenditure goes to dairy products • Lack of knowledge on milk quality (Pasteurized vs. raw milk) • From raw to pasteurized??? 	<p>Consumer-targeted awareness campaigns</p> <p>- Use recognizable public figures to speak on importance of milk consumption</p>	<p>- Ethiopian Dairy Development Council</p> <p>-Market research firm</p>	<p>-Targeted promotions to key demographic groups</p> <p>-Increase milk consumption</p>

Table 7.1.h. Constraints, Interventions, Actors and Impact for the Dairy Sub-Sector – Export Markets			
CONSTRAINTS:	INTERVENTIONS	ACTORS	OUTPUT-IMPACT
<ul style="list-style-type: none"> • Low level of export quality for milk and milk products • Inadequate or no law enforcement on keeping milk quality standards • Lack of market information on export, both formal and informal. (They elaborated on informal... Somaliland-camel, Kenya- cow) • Suit case marketing (support to) 	<ul style="list-style-type: none"> • Market research (Regional markets) • Identify niche markets (Diaspora) • Support on product development • IESC/ VEGA+ project... Link with diasporas investment 	<ul style="list-style-type: none"> - SMEs - Processors - Women groups 	<ul style="list-style-type: none"> - Increase the number and volume of milk and milk products exported to neighboring countries - Increase in foreign exchange -Increase income for households processing milk

8. ANNEX

8.1. Bibliography

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8.2. Maps of Milk Sheds (Insert Map 1.)

8.2. Insert map #2.

8.3. Tables of data

Annex Table 8.3.1. ZERO GRAZE DAIRY (15 cow herd)

		ETB/herd	USD/herd
		Model	Model
MILK PRODUCTION			
	Average litres per animal per day	12	12
	Lactation period (days per year)	305	305
	Total milk produced (litres per year)	43,920	43,920
	Milk sold for cash (litres per year)	37,586	37,586
	Average price per litre	4.5	0.36
	Gross milk revenue (per year)	169,136	13,531
ADDITIONAL REVENUE			
	Calf and heifer sales (annual equiv)	37,336	2,987
	Manure sales	13,688	1,095
	Total gross revenue (all sources)	220,159	17,613
PRODUCTION COSTS (per herd)			
	Total variable costs	112,407	8,993
	Depreciation	35,011	2,801
	Total production costs	147,418	11,793
	Total cost per litre produced	3.4	0.27
	Total cost per litre sold	3.9	0.31
FARMER PROFIT (per herd)			
	Gross profit	107,752	8,620
	Gross profit per litre produced	2.5	0.20
	Gross profit per litre sold	2.9	0.23
	Net profit	110,077	8,806
	Net profit per litre produced	2.5	0.20
	Net profit per litre sold		

		2.9	0.23
RATES OF RETURN			
	Return to variable costs	0.96	0.96
	Return to total costs	0.75	0.75
LABOUR			
	Hired labour (days/ha)	3	3
	Family labour (days/ha)	-	-
	Total labour (days/ha)	3	3
	Gr. return per Year total labour	35,917	2,873.39

Annex Table 8.3.2 Nutrient value of common feeds available to small holder and commercial dairy farmers in the respective milk sheds.

Forage

Feed type	Dry Matter %	Crude Protein (CP)	Energy (ME)
Native grass hay	92.3	6.4	1.98
Rhodes grass hay	92.3	8.3	2.0
Oat hay	96.0	8.8	1.91
Alfalfa hay	88.0	19.2	2.37
Vetch hay	89.3	20.8	2.46
Lablab hay	91.1	18.2	2.26
Cow pea hay	92.0	14.4	2.38

Fodder

Feed type	Dry Matter %	Crude Protein (CP)	Energy (ME)
Barley straw	91.4	4.4	1.82
Wheat straw	91.8	3.1	1.74
Tef straw	92.2	4.8	1.97
Oat straw	92.2	5.7	2.12
Finger millet straw	91.2	3.3	1.97
Maize stover	91.0	4.0	2.10
Sorghum stover	91.3	5.6	2.02
Lentil straw	92.4	7.7	2.0

Concentrates – Protein sources

Feed type	Dry Matter %	Crude Protein (CP)	Energy (ME)
Noug cake	92.3	31.7	2.14
Cottonseed cake	92.1	38.5	2.52
Linseed cake	92.5	29.3	2.56
Sesame cake	93.1	30.7	2.55
Sunflower cake	93.1	25.5	2.18
Brewer's grain	92.2	24.4	

Concentrates – Energy sources

Feed type	Dry Matter %	Crude Protein (CP)	Energy (ME)
Wheat bran	89.7	16.8	2.11
Wheat middling	92.7	17.8	2.82
Maize grain	90.3	9.9	3.21
Oat grain	93.3	8.7	2.60
Barley grain	91.4	9.9	2.60
Sorghum grain	89.6	10.2	2.50

Annex Table 8.3.3 EDDP/LOL Milk shed, Region, Site and woredas

#	Milk Shed	#	Site	#	Woreda	#	Zone	#	Region
<u>1</u>	<u>Greater Addis</u>	1	Addis Ababa	1	Akaki Kaliti	1	Akaki Kaliti	1	Addis Ababa
				2	Kolfe	2	Kolfe		
				3	Yekka	3	Yekka		
				4	Bole	4	Bole		
				5	Wolmera	5	West Shewa	2	Oromia
				6	Ejere				
				7	Alem Gena				
				8	Dandi				
				9	Jeldu				
		2	Debre Zeit						
				10	Akaki	6	East Shewa		
				11	Ada'a Liben				
				12	Lume				
				13	Adama				
		3	Assela						
				14	Tiyo	7	Arsi		
				15	Digalu & Tijo				
				16	Lemu & Bilbilo				
				17	Assela Town				
				18	Lode Hetosa				
				19	Dixis				
				20	Robe				
		4	Chancho						
				21	Wuchale	8	North Shewa		
				22	Sululta				

				23	Mulo				
				24	Debre Libanos				
		5	Fiche						
				25	Girar Jarso				
				26	Degem				
				27	Kuyu				
				28	Wara Jarso				
				29	Yaya Gulale				
				30	Fiche Town				
			Addis Ababa	31	Bereh				
				32	Aleltu				
		6	Debre Birhan						
				33	Abichu Nge'a				
				34	Kimbibit				
				35	Angolola Tera	9	North Shewa	3	Amhara
				36	Basona Worena				
				37	Debre Birhan Town				
				38	Ensaro and Wayo				
2	Lake Tana	8	Bahir Dar						
				39	Bahir Dar Town	10	West Gojam		
				40	Bahir Dar Zuria				
				41	Dera				
				42	Fogera				
				43	Mecha				

				44	Achefer				
		9	Debre Markos						
				45	Gozamen	11	East Gojam		
				46	Awabel				
				47	Dejen				
				48	Mechekel				
	2		9		48		11		3
1	<u>Mekele</u>	1	Ganta Afeshum						Tigrai
		2	Tseisi Tsamba						
		3	Enderta						
		4	Mekele area						
		5	Adegrat						
2	<u>Humera</u>	1	Maikadra						
		2	Adobay						
		3	Berker						
		4	Berhet						
		5	Rawiyan						
		6	Setit Humera						
		11							

Annex Table 8.3.4. List of primary dairy cooperatives and Unions

Lists of PDC, Unions, Processors

I. Primary Dairy Cooperatives

1. Bahir Dar Site

#	Cooperative Name
1	Tis Abay
2	Alemba
3	Adis Alem
4	Adis Alem
5	M & Zemana
6	Yalemgenet
7	Tadele Dibabo
8	Edget
9	Meseret
10	Bachima
11	Dhansit

2. Fiche Site

12	Hawene
13	Lalistu
14	Abdi Loonii
15	Dubar
16	Goro Haro
17	Chefa Kersa
18	Echo Kidus
19	Bikiltu
20	Chancho
21	Edoro
22	Edigat
23	Kasim
24	Torban Ashe
25	Kare Kura
26	Anaso Sago
27	Jate
28	Sale
29	Abdi Waka
30	Ano Kare
31	Dega Borso
32	Muka Turi

3. Assela

33	Gora Fana
34	Limu Dima
35	Limu Bubisa
36	Abdi Waka
37	Asela
38	Waji Bilalo
39	Watera
40	Dosha
41	Dhankaka
42	Lemu Mikael
43	Lemu Araya
44	Bokoji Akababi
45	Gonde Makaro
46	Huruta
47	Robe
48	Meraro
49	Meditu Danisa
50	Goba Lencho

4. Addis Ababa

51	Gelgel
52	Birhu Tesfa
53	Biiftu Bekaka
54	Telila Berga
55	Kusaye
56	Abdi Gudina
57	Jitu
58	Dandi Gudina
59	Hibirat
60	Meta Abo
61	Sebeta Enat

5. Debre Zeit

62	Lume
63	Melka Jitu
64	Gogecha
65	Hortu Gudina

6. Debre Markos

66	Yetnora
67	Gion
68	Lemlem
69	Enbie
70	Bogena
71	Zeba
72	Wonka
73	Findika
74	Yewula
75	Amanuel
76	Embule
77	Wojel
78	Adare Mandida
79	Sokoru
80	Kayit
81	Angolola
82	Keble 02
83	Kebele 06
84	Jisa
85	Aba Moti
86	Kokeb
87	Boran
88	Chafana
89	Chaki
90	Adare Mendida
91	Medida Moye
92	Kogne
93	Abaya
94	Shano
95	Addis Birhan
96	Gebez Amba
97	Genet
98	Biruh Tesfa
99	Edget Behbret
100	Fito

7. Mekele and Humera

101	Kidus Yohanis
102	Miwttae Warki
103	Selam
104	Adimesekel
105	Ferawn
106	Zelalem
107	Adigudem
108	Hiwet
109	Azemera
110	Shewit
111	Frekals
112	Tiebe
112	Mekele and around

II. Unions/Associations

#	Name	Project site	No. of Coop
1	Selale Dairy Union	Fitche	19
2	Assela Dairy Union	Asela	7
3	Hiwot Dairy Union	Debre Berhan	5
4	Biftu Berga Dairy Union	Addis	13
5	Zemen Dairy Union	Mekele	12
6	Humera Dairy Union	Humera	5
			61

III. Processors

	Company Name
1	Adaa Cooperative
2	Aywa Agro Industry (Safi Milk)
3	Berta
4	D.Markos Dairy
5	Enat Milk
6	Genesis Farm
7	Hirut
8	Holland Dairy
9	Icecream Producers
10	Lame Dairy (Shola Milk)
11	Lema Milk
12	Life Milk
13	MB Plc (Family Milk)
14	Simret Agriculture and Industry
15	Fikadu Silasie Taddesse
16	Jantekel Dairy Union (Fassil Milk)
17	Nardelli Dairy farm
18	Prime Milk(Sululta)
19	Sebeta Agro Industry (Mama Dairy)
20	Sheno Agro Industry (Beral)
21	Yadeni Dairy Farm (Bora Milk)

Annex Table 8.3.5. Characteristics of Selected Processing Plants in Addis Ababa, Nov, 2010

	Gebre Life Milk <u>Plant 1</u>	Hirut Yohannes <u>Plant 2</u>	Berta & Family <u>Plant 3</u>	Family Dairy <u>Plant 4</u>	Mama Sabeta <u>Plant 5</u>	Lame Shola <u>Plant 6</u>
Year plant built	2008	2005	1998	2007	1995	1947
Plant Built Capacity			7000	20000	50,000	60,000
Utilization (l/d)	2000	3300	7000	11000	33,000	31,000
% Utilization			100%	55%	66%	52%
Labor - total	20	18	30	69	380	239
Labor - permanent	20	18	20	65		9
labor - contract - temp			10	4		182
Men			9	51		66
Women			21	14		
Milk purchase increasing					20%/yr	
Source of milk						
own farm	230l/d		350 kg			3
individual farmers		74 + 166		3		2218
cooperative						1
union			1 w. 6 k - 7k	1		1
Collection Centers	15					
traders		4		13		11
Price paid at farm	Birr 4.50	Birr 6.00 B 4.50 - 5.00		B4.5- B5/l		B 4.25 - 4.75
Price paid at dock		Birr 8.00	B 6.50/l			B. 6.00/l
Chilling Center					Yes	
Trained any farmers		yes	no	yes		no
How many trained		4 collector 74 farmers	0	120		0
Proc. Cost per lt				B 2.60		
Product Line - 2006	NA		2		12	6
Product line - 2010	5	6	12		32	7
UHT			No	No	Yes	No
Price for Past. Milk (B/L)	Birr 9.00					
Outlets						
own shops	1		1		1	(4)-7000 lt
supermarket			yes - DNK	80		(54)-1615 lt

Hotels		yes - DNK	10	(26)-1235 lt (79) - 3791 lt
Institutions		yes - DNK		
Restaurants		yes		(36) 866 lt (249) - 16493
Kiosks and wholesale	5	yes - DNK	700	feed
Challenges for Industry?		Machinery	Production	good cows vet drugs manpower
		finances		
		maintenance		
		management		
		Marketign		
Challenges for plant?	testing	AI	equipment	quality milk
	equipment	feed for		electricity
	products	cows		machinery
	more cows			
Needed improvements for industry?		Land for dairy	Expansion more milk	good milk commercial

Source: Land O'Lakes survey of selected dairy plants in Addis Ababa, November, 2010

Annex Table 8.3.6. Milk production and productivity by regions

Geographic area	Number of dairy cows	Number of Milking Cows	Total number of cows	Percentage Share of cows	Average Daily Milk Production	Average Lactation Period (Months)	Total Milk Production (Lt)	Percentage share of milk production
Ethiopia	7,022,004	9,919,360	16,941,364	100	1.301	6	2,764,797,144	100
Tigray	150,483	602,977	753,460	4	1.247	6	169,956,074	6
Amhara	464,088	2,128,570	2,592,658	15	1.227	6	506,006,904	18
Oromia	3,366,601	4,560,153	7,926,754	47	1.365	7	1,346,825,590	49
SNNPRS	2,749,522	2,194,332	4,943,854	29	1.221	6	572,015,306	21
Harari(Hundene)	6,658	11,695	18,353	0.11	1.832	6	4,259,369	0.15
Dire dawa	10,250	12,446	22,696	0.13	1.437	5	3,170,535	0.11
Gambella	30,774	32,815	63,589	0.38	1.932	7	16,944,336	0.61
Afar	90,993	125,046	216,039	1.28	2.229	6	63,600,980	2.30
Somale	110,924	164,216	275,140	1.62	1.741	6	55,209,717	2.00
Benshangul Gumuz Ethiopian Dairy Value Chain	41,711	87,110	128,821	0.76	1.329	7	26,808,333	0.97

Total	7,022,004	9,919,360	16,941,364	100			2,764,797,144	100
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Annex Table 8.3.7. Cattle Inventories in Ethiopia

Region	Indigenous		Cross		Exotic		National Improved Breed Female Population (%)
	Male	Female	Male	Female	Male	Female	
Tigray	1,462,000	1,629,000	4,168	6,425	1	1,934	4
Afar	96,093	377,023	0	1	0	0	0
Amhara	6,501,000	6,178,000	26,365	38,573	1	1	18
Oromia	9,973,000	12,263,000	65,279	112,590	*	23,094	62
Somaliland	199,932	420,651	0	0	0	0	0
Benshangul-Gumuz	181,058	230,866	1	0	1	0	0
SNNP	3,333,165	5,878,000	13,952	31,794	1,011	5,261	17
Gambela	37,062	92,413	0	0	0	0	0
Harari	15,481	27,358	326	1	1	1	0
Dire Dawa	17,402	31,411	0	0	0	0	0
Total	21,816,193	27,127,722	110,091	189,384	1,015	30,291	100

Annex Table 8.3.8. Performance of Primary Cooperatives in Milk Sheds in Ethiopia, 2008 and 2009												
Milk Shed	Average Cost of all milk bought by coops		Average Value of Milk Sold by coops		Average Revenue per coop		Average Expenses per coop		Average profit per coop		Average dividend per coop	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Coops (#)	42	42	12	13	32	33	31	32	32	32	21	22
Fitche (Birr) - GA	1294001	1550613	460549	540339	524706	778479	482321	405786	31967	54248	72831	116911
Debre Birhan (B) - GA	521511	367562	555171	643083	186922	572896	72492	423591	25697	41067	25491	39905
Bahir Dar (Birr)- LT	110999	174489	NA	NA	57627	181557	6571	31022	16369	48174	11500	33641
Debre Markos - LT	155285	204154	NA	NA	133197	178579	109174	104263	24024	34112	9815	12040
Asella (Birr) - GA	139063	194781	74961	138198	236697	273242	251436	253103	45079	284680	27231	18497
Addis Ababa (B) - GA	1593252	1618090	NA	NA	9214	50511	6422	12025	76152	92619	66446	47757
Average (Birr)	635685	684948	181780	220270	191394	339210	154736	204965	36548	92483	35552	44792
Avg % chg Yr '08-09		8%		21%		77%		32%		153%		26%

Note: NA = data was not available. Data is for cooperatives in two milk sheds – Greater Addis milk shed (GA) and the Lake Tana milk shed (LT)

Annex Table 8.3.9. Value of Imported Dairy Products by Ethiopia, (Birr)

Product	Years					
	2005	2006	2007	2008	2009	2010
Cheese	1,717,567	2,015,762	2,806,279	3,345,196	2088.0	2562465
Butter	101,677	302,830	503,183	819,724	193,716	1427421
Yoghurt and other butter milk	308,643	4,432,118	1,016,963	1,512,661	303,559	226,742
Milk and cream	46,823,409	63,035,855	48,546,567	77,191,210	99,852,788	114,343,334
Total	48,951,297	69,786,566	52,872,991	82,868,790	100,352,151	118,559,962

Source Ethiopian customs authority

Annex Table 8.3.10. Market Prices for Dairy Products from Field Survey, October 2010

Items	Volume	Addis	Assela	Hawassa	B/Dar	D.Birhan	D.Markos	D.Dawa	Fitche	Gondar	Humera	Mekelle
Products in informal Market												
Raw milk	1 liter	8.00	5.30	7.00	7.00	5.00	6.00	8.50	5.31	6.74	12.00	7.00
Traditional Yogurt	1 Liter	8.50	8.00	10.00	7.65	8.70	9.09	12.00	10.00	9.79	25.00	20.91
Cooking Butter	1kg	85.00	70.00	75.00	60.00	75.00	70.00	90.00	75.00	65.00	-	100.00
Ghee	1 liter	-	-	-	-	-	-	-	-	75.00	120.00	110.00
Cottage Cheese (Ayib)	1 kg	20.75	11.00	12.00	16.33	15.00	13.86	30.00	9.50	15.00	-	15.00
Products in formal Market												
Pasteurized milk	1 liter	11.30	-	11.00	-	-	-	-	-	8.66	-	11.00
Plain yogurt (Pasteurized)	500ml	12.00	-	9.00	12.00	-	-	-	-	3.25	-	-
Flavored Yogurt , 250ml	250ml	12.00	-	-	-	-	-	-	-	-	-	-
Drinking Yogurt, 390ml	390ml	9.50	-	-	-	-	-	-	-	-	-	-
Cottage Cheese (Pasteurized Ayib)	1 kg	37.00	-	36.00	-	-	-	-	-	-	-	-
Imported Cream Cheese	120gm	34.00	-	-	-	-	-	-	-	-	-	-
Table Butter (local)	200gm	25.00	-	25.00	25.00	-	15.00	-	-	14.00	-	25.00
Table Butter (Imported)	200gm	99.40	-	-	-	-	-	-	-	-	-	-
Provolone Cheese	1 kg	100.00	-	95.00	95.00	-	-	-	-	100.00	-	100.00
Gouda Cheese	1 kg	135	-	-	-	-	-	-	-	-	-	-
Cream	1 liter	62.00	-	-	-	-	-	-	-	-	-	-
Local UHT Milk (MAMA Safari)	1 liter	17.20	-	-	20.00	-	-	24.00	-	-	18.00	22.00
Imported UHT Milk (in cartoon or bottle)	1 liter	52.00	-	-	40.00	-	-	35.00	-	-	-	35.00
Powdered Milk, 2500gm (Nido)	2,500gm	390.00	-	399.00	320.00	-	390.00	-	-	-	-	-
Powdered Milk, 900gm (Nido)	900gm	180.00	180.00	185.00	160.00	170.00	185.00	175.00	-	180.00	152.50	160.00
Powdered Milk, 400gm (Nido)	400gm	85.00	70.00	-	80.00	60.00	80.00	-	80.00	80.00	75.00	-

* The raw milk price was the lowest in Debre Birhan and Fitche and the highest in Humera

* Butter price is the highest price in Mekelle

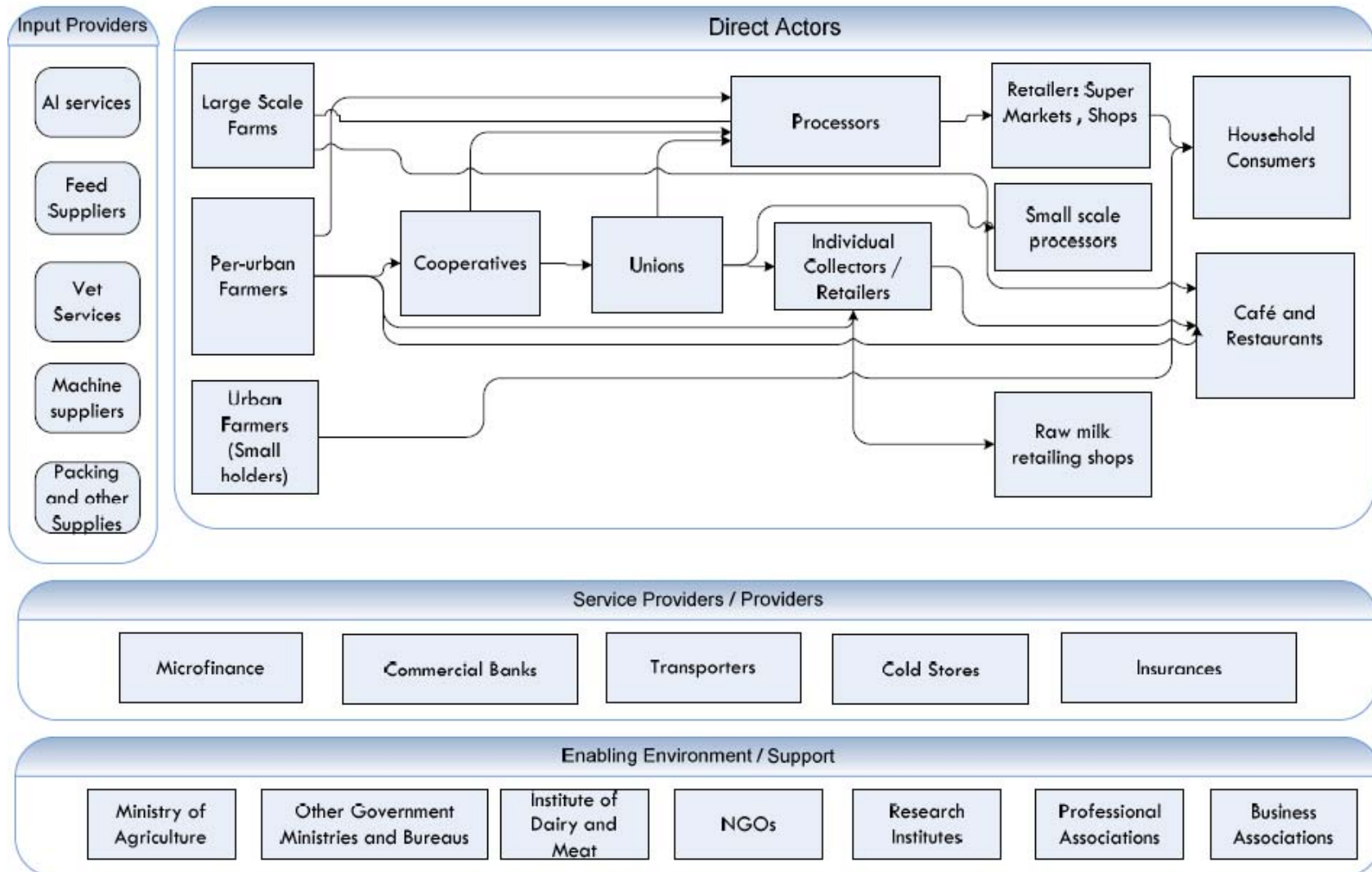
* Traditional cottage cheese (Ayib) has the highest price in Dire Dawa

* Pasteurized milk is only available in Addis Ababa, Gondar and Mekelle

* Imported powdered milk is widely available in the country

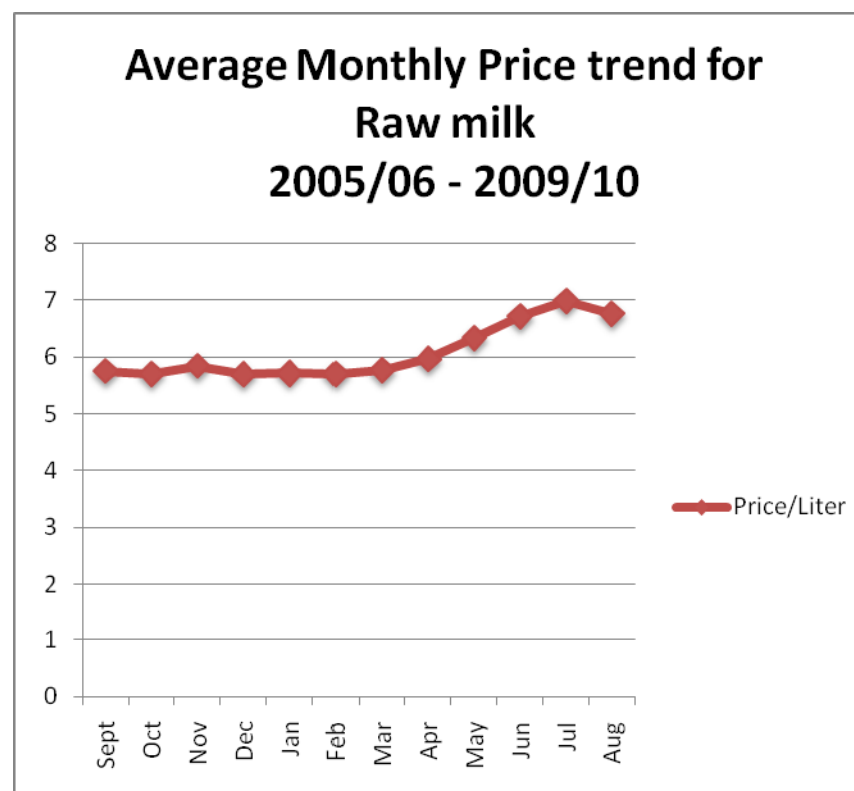
* Ghee is more widely used in Humera than Butter

Annex Figure 8.3.11. Value Chain Map of Actors.



**Annex Table and Figures 8.3.12. Average monthly Price trend
- 2005/2006 - 2009/2010**

Month		Sum of months	Price/Liter
Sept	5.75	28.75	5.75
Oct	5.7	28.53	5.71
Nov	5.84	29.21	5.84
Dec	5.69	28.44	5.69
Jan	5.71	28.56	5.71
Feb	5.70	28.52	5.70
Mar	5.76	28.80	5.76
Apr	5.96	29.80	5.96
May	6.33	31.67	6.33
Jun	6.71	33.56	6.71
Jul	6.98	34.91	6.98
Aug	6.76	33.79	6.76
Average =	6.07		



Source: CSA