The Major Ethiopian Milksheds

An assessment of development potential

Wytze Brandsma, Dawit Mengistu, Binyam Kassa, Mahlet Yohannes and Jan van der Lee

LIVESTOCK RESEARCH
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Summary
The development potential of 8 milksheds in Ethiopia was assessed and ranked for potential for value chain development, as part of the MIDD project. Major criteria for ranking were market potential, production potential, presence of services, and commercialization level of the value chain.
Highest ranking milk sheds were Addis Abeba, Adama-Asella, and Bahir Dar–Gondar milksheds.

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[1] Names under 'Stakeholder' column written in bold are influential to the dairy sector development in Jimma Milkshed

Preface

This assessment of the major milksheds in Ethiopia was carried out by a team of staff and consultants from Wageningen UR Livestock Research, SNV Ethiopia, as part of the Market-linked Innovation for Dairy Development Program (MIDD), a Netherlands Embassy funded project implemented by Wageningen University & Research and SNV Netherlands Development Organization.

We would like to us this opportunity to thank all parties involved in the assessment underlying this report. Without their help this report could not have been completed.

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ACRONYMS AND ABBREVATIONS

ADLI	Agricultural Development Led Industrialization
ADA	Amhara Development Association
AEZ	Agro Ecological Zone
AGP	Agricultural Growth Project
AI	Artificial Insemination
ALPPIS	Addis Livestock Production and Productivity Improvement Service
ANDM	Amhara National Democratic Movement
ANRS	the Amhara National Regional State
ARARI	Amhara Region Agricultural Research Institute
BOA	Bureau of Agriculture
CDI	Centre for Development Innovation
CSA	Central Statistics Agency
DA	Development Agents
DCU	Dairy Cooperative Union
EMDTI	Ethiopian Meat and Dairy Technology Institute
FDRE	Federal Democratic Republic of Ethiopia
FRG	Farmers Research Groups
FTC	Farmers Training centre
ILDP	International Livestock Development Program
ILRI	International Livestock Research Institute
LDC	Least Developed Countries
LoL	Land O'Lakes
Masl	Meter above Sea Level
MIDD	Market-Linked Innovation for Dairy Development project
NAIC	National Artificial Insemination Centre
NAHDIC	National Animal Health and Disease Investigation Centre
NGO	Non-Governmental Organizations
PASDEP	Plan for Accelerated and Sustainable Development to End Poverty
PDC	Primary Dairy Cooperative
RDP	Rural Development Policy
SDDP	Smallholder Dairy Development Project
SDPRP	Sustainable Development and Poverty Reduction Program
SHOATS	Sheep and Goats
SNNP	Southern Nations Nationalities and Peoples Region
SNV	Netherlands Development Organization
STD	Sexually Transmitted Diseases
TDA	Tigre Development Association
TVET	Technical and Vocational Education and Training
UHT	Ultra High temperature Milk
UNDP	United Nations Development Programs
UNOCHA	UN Office for the Coordination of Humanitarian Affairs
VOCA	Volunteers Overseas Cooperative Assistance

Executive summary

This assessment of the major milksheds in Ethiopia was carried out as part of the Market-linked Innovation for Dairy Development Program (MIDD), a Netherlands Embassy funded project implemented by Wageningen University & Research and SNV Netherlands Development Organization.

The objective of the study was to provide a preliminary description of the milksheds of Ethiopia, out of which four would eventually be selected by the program for its further planning. Multiple tools of data collection have been employed. Both qualitative and quantitative data have been collected for the study.

Based on the assessment carried out, the report gives a characterization of the milksheds, substantiated by data, at area and district level; an overview of the value chain in the area; an assessment of the stakeholders involved in dairy in the area; and their geographic coverage. The eight milksheds covered include Adama - Asella; Ambo - Woliso; Addis Ababa; Hawassa - Shashemene; Gondar - Bahir Dar; Mekele; Dire Dawa – Harar; and Jimma.

The report also includes a description of universities and research institutes in Ethiopia and their involvement in dairy value chain development.

The Ethiopian dairy systems can be categorized under five systems of operation; a. pastoral (traditional pastoral livestock farming); b. agro-pastoral (traditional lowland mixed crop-livestock farming); c. mixed crop livestock-system (traditional highland mixed farming), d. urban and peri-urban (emerging smallholder specialized dairy farming), and e. specialized commercial intensive dairy farming. The type of milk and dairy products that needs to be considered are: a. whole, liquid milk and b. other dairy products from fermented processing (butter, ghee, *ergo*, a*yib*, *metata ayib, ititu*, buttermilk etc.).

The rural dairy system, which includes pastoral, agro-pastoral and mixed crop-livestock system, contributes 98% of total production, while the peri-urban & urban and the commercial dairy farms produce only 2% of the total milk production of the country. Indigenous stock produce 97% of the milk produced from cattle and the remaining 3% from improved exotic crosses and pure grade exotic cattle. Most of the milk produced in the rural dairy system is retained for home consumption and it is non-market oriented (CSA 2008/09).

Five criteria were used to compare the development potential of the eight milksheds: Production potential; Marketing potential; Development stage of the value chain; Fit with AGP; and Other factors affecting chain development.

Based on this assessment, this report concludes that the eight milksheds rank as follows for potential achievement of program objectives, i.e. value chain development and sector development: 1. Addis Ababa (Northern Shoa), 2. Adama-Asella-Ada/Debre Zeit (Eastern Shoa) 3. Hawassa-Dilla-Shashemene, 4. Bahir Dar-Gondar, 5. Ambo-Woliso (Western Shoa), 6. Mekele, 7. Dire Dawa, and 8. Jimma. In the latter two milksheds farmers make their livelihoods from cash crops like chat and coffee, and it will be hard for milk to compete with these crops. That situation is exacerbated by the low availability of fodder in both areas, in Dire Dawa due to low rainfall, in Jimma due to intensive cropping. The situation in Mekele seems to be a bit ambivalent, with fodder availability and investment climate being uncertain factors.

The development of the dairy value chain in none of the areas can match that of Addis Ababa, although Adama-Asella seems to be at the verge of catching up and realizing its vast potential, with road infrastructure improving quickly. Hence any combination of Addis milkshed with one or more other milksheds would offer an interesting combination of areas with varied maturity of value chains. A spread over regions would advocate inclusion of Bahir Dar and/or Hawassa milksheds.

While the potential of each of these milksheds will likely only gradually be realized in a step-by-step manner, one can expect that each new step will open up new opportunities in terms of both market diversification (new markets, new products) and expansion – beyond these milksheds lie other zones with high potential, that can be utilized once physical infrastructure and market infrastructure develop: Wollega, Bale, Wolayta, Dessie etc.

The four highest ranking milksheds can be described as follows:

1. **Addis Ababa milkshed**. The dairy value chains in this Addis Ababa milkshed are already more developed than in the other milksheds, with linkages along the value chain between input suppliers, producers, processors, and retailers. The milkshed is considered leading for dairy development in Ethiopia. Situated in an agro-ecological zone with high potential for roughage production and with plentiful by-products, the area has received much public and international support. This support (including input supply & farm management) has strengthened the primary production and also the cooperatives and cooperative unions. It resulted in a relatively high number of crossbreds, and AI service that is functioning relatively well, a large number of relatively strong cooperatives and unions for milk marketing, a growing number of processors, and private sector interest to further invest in dairy processing and production (large scale producers, local and foreign investments for dairy plant establishment). Being close to the capital city has created multiple opportunities in terms of marketing to the largest and most affluent population centre of Ethiopia. Being near to the capital city has also created opportunities in terms of sector coordination, which among others resulted in the establishment of sector associations and the recent initiative to form the envisaged Ethiopian Dairy Board/Platform.

2. **Adama-Asella** milkshed currently is mainly supplying to secondary towns. Potentially it has a very large market, as new roads are opening up providing opportunities for supply to Addis city and additional towns. The area around Asella has received support to production and farmers' organizations for a very long time, latest by FAO. Except for the area closest to Debre Zeit, currently the major bottleneck seems to be the lack of commercial processors to buy the milk. A new processing facility in the area would most likely start a major transition, especially if processing for long shelf-life is envisaged. The area has high potential for roughage production (bio-physical conditions) and by-products are plentiful. The number of crossbred dairy animals is relatively high. The AI service in the area is functioning quite well. The new Adama University offers new opportunities for dairy value chain support, e.g. through its institute for AI.

3. **Bahir Dar-Gondar** milkshed has a reasonably large market; the area has a high potential for roughage production, a significant number of primary cooperatives, and few but active cooperative unions involved in milk processing. Services like AI are functioning fairly well.

4. **Hawassa** milkshed also has untapped opportunities to supply secondary towns and cities. Feed & roughage in this area will be more crop residue based than in the other areas. The small private and cooperative processing facilities so far are able to collect, process, and market limited volumes only. Increase in processing and marketing capacity is seen as a major bottleneck. This milkshed has the potential to be enlarged with bordering areas of Wolayta and Dodola.

Samenvatting

Deze exploratie van de belangrijkste melkveehouderijregio's in Ethiopië is uitgevoerd als onderdeel van het Market-linked Innovation for Dairy Development project (MIDD), een door de Nederlandse Ambassade gefinancierd project dat is uitgevoerd door Wageningen Universiteit & Research centrum en SNV Ethiopië.

Het doel van de studie was een voorlopige beschrijving van de melkveehouderijregio's van Ethiopië, waarvan er uiteindelijk vier door het programma werden geselecteerd voor verdere planning. Meerdere methodes zijn gebruikt voor het verzamelen van zowel kwalitatieve als kwantitatieve gegevens.

Op basis van de uitgevoerde beoordeling en onderbouwd met gegevens, geeft het rapport: een karakterisering van de melkveehouderijregio's op regio - en districtsniveau; een overzicht van de waardeketen in het gebied; een beoordeling van de partijen die bij zuivel in het gebied betrokken zijn; en hun geografische dekking. De acht regio's die aan bod komen zijn: Adama - Asella; Ambo - Woliso; Addis Abeba; Hawassa - Shashemene; Gondar - Bahir Dar; Mekele; Dire Dawa - Harar; en Jimma.

Het rapport bevat verder een beschrijving van de universiteiten en onderzoeksinstituten in Ethiopië en hun betrokkenheid bij zuivelketenontwikkeling.

De Ethiopische melkveehouderij kan onder vijf systemen worden ingedeeld; a. pastoraal (traditionele pastorale veeteelt); b. agro-pastoraal (traditionele gemengde bedrijven in het laagland); c. gemengd bedrijven (traditionele gemengde bedrijven in het hoogland), d. urbane en peri-urbane (opkomende kleinschalige gespecialiseerde melkveehouderij), en e. gespecialiseerde commerciële intensieve melkveehouderij. Typische melk en zuivelproducten die onder de loep moeten worden genomen, zijn: a. volle vloeibare melk en b. andere zuivelproducten uit gefermenteerde verwerking (boter, *ghee, ergo, ayib, metata ayib, ititu,* karnemelk, enz.).

Melkveehouderijsystemen op het echte platteland, die pastorale, agro-pastorale en gemengde systemen omvatten, dragen 98% van de totale productie bij, terwijl de urbane & peri-urbane en de commerciële melkveebedrijven slechts 2% van de totale melkproductie van het land opbrengen. Inheemse runderrassen produceren 97% van de (door runderen geproduceerde) melk, de resterende 3% komt van verbeterde exotische kruisingen en puur exotisch vee. Het merendeel van de zuivelproducten die op het platteland worden geproduceerd is voor eigen verbruik, een klein deel wordt vermarkt (CSA 2008/09).

Vijf criteria werden gebruikt om het ontwikkelingspotentieel van de acht melkveehouderijregio's te vergelijken: Productiepotentieel; marketing potentieel; ontwikkelingsfase van de waardeketen; match met AGP; en overige factoren die van invloed zijn op ketenontwikkeling.

Op basis van deze exploratie concludeert het verslag dat de acht melkveehouderijregio's als volgt te rangschikken zijn op hun potentiële bijdrage aan de doelstellingen van het MIDD programma, dat wil zeggen ketenontwikkeling en ontwikkeling van de zuivelsector: 1. Addis Ababa, 2. Adama-Asella-Ada/Debre Zeit, 3. Hawassa-Dilla-Shashemene, 4. Bahir Dar-Gondar, 5. Ambo-Woliso, 6. Mekele, 7. Dire Dawa, en 8. Jimma. In de laatste twee melkveehouderijregio's halen boeren hun levensonderhoud uit cash crops zoals chat en koffie, het zal moeilijk zijn om melk te laten concurreren met deze gewassen. Die situatie wordt nog versterkt door de geringe beschikbaarheid van ruwvoeder in beide gebieden, in Dire Dawa vanwege geringe neerslag, in Jimma door de intensieve akkerbouw. De situatie in Mekele lijkt wat ambivalent, met de beschikbaarheid van voedergewassen en het ondernemingsklimaat als onzekere factoren.

De ontwikkeling van de zuivelketen kan in geen van de gebieden tippen aan die van Addis Abeba, hoewel Adama-Asella op het punt staat een inhaalslag te maken en een enorm potentieel heeft, waar met verbeterde infrastructuur snel verbetering valt te realiseren. Vandaar dat de combinatie van de Addis regio met een of meer andere melkveehouderijregio's een interessante combinatie zou opleveren, met gebieden met waardeketens in uiteenlopende ontwikkelingsfases. Een spreiding over regio's zou het opnemen van Bahir Dar en / of Hawassa melkveehouderijregio's bepleiten.

Hoewel het potentieel van elk van deze melkveehouderijregio's waarschijnlijk slechts geleidelijk en stapsgewijs gerealiseerd zal worden, kan men verwachten dat elke nieuwe stap zal leiden tot nieuwe kansen in termen van marktdiversificatie (nieuwe markten, nieuwe producten) en marktuitbreiding. Buiten deze melkveehouderijregio's liggen andere zones met een hoog potentieel, die kunnen worden gebruikt zodra de fysieke infrastructuur en de infrastructuur ontwikkelen: Wollega, Bale, Wolayta, Dessie etc.

De vier hoogst scorende melkveehouderijregio's kunnen als volgt worden omschreven:

1. **Addis Abeba regio**. De zuivelketens in de Addis Abeba regio zijn al verder ontwikkeld dan in de andereregio's, met verbindingen in de keten tussen input leveranciers, producenten, verwerkers en retailers. De regio wordt beschouwd als toonaangevend voor zuivelontwikkeling in Ethiopië. Gelegen in een agro-ecologische zone met een hoog potentieel voor ruwvoerproductie en met een overvloed aan bijproducten, heeft het gebied veel publieke en internationale steun ontvangen. Door deze steun (inclusief input supply & bedrijfsvoering) zijn de primaire productie, de coöperaties en de coöperatieve verenigingen versterkt. Dit heeft geresulteerd in een relatief hoog aantal kruislingen en een KI dienst die relatief goed functioneert, een groot aantal relatief sterke coöperaties en unies voor marketing, een groeiend aantal melkverwerkers, en een particuliere sector die geïnteresseerd is om verder te investeren in zuivelproductie en -verwerking (grootschalige producenten, lokale en buitenlandse investeringen in melkfabrieken). De nabijheid van de hoofdstad creëert allerlei mogelijkheden op het gebied van marketing in het grootste en meest welvarende bevolkingscentrum van Ethiopië. De nabijheid van de hoofdstad geeft ook mogelijkheden wat betreft sectorale coördinatie, die onder meer heeft geresulteerd in de oprichting van brancheorganisaties en het recente initiatief om een Ethiopian Dairy Board te vormen.

2. **Adama-Asella regio** - levert momenteel voornamelijk aan secundaire steden. In potentie heeft de regio een zeer grote markt, zodra nieuwe wegen de mogelijkheid bieden voor levering aan Addis en andere steden. Het gebied rond Asella heeft lange tijd steun gekregen voor productie-en boerenorganisaties, laatst via de FAO. Behalve voor het gebied dat het dichtst bij Debre Zeit ligt, is het gebrek aan commerciële processors die de melk opkopen momenteel de grootste bottleneck. Een nieuwe verwerkingsinstallatie in het gebied zou waarschijnlijk een grote verandering inluiden, vooral als verwerking tot lange houdbare melk wordt overwogen. Het gebied heeft een groot potentieel voor productie (agro-ecologische omstandigheden) en bijproducten zijn er in overvloed. Aantallen gekruist melkvee liggen relatief hoog. De KI-dienst in het gebied functioneert goed. De nieuwe Adama Universiteit biedt nieuwe mogelijkheden voor zuivelketen ondersteuning, bijv. via haar KI instituut.

3. **Bahir Dar-Gondar regio** heeft een redelijk grote markt; het gebied heeft een hoog potentieel voor ruwvoerproductie, een aanzienlijk aantal coöperaties, en weinig, maar actieve coöperatieve unies die betrokken zijn bij de melkverwerking. Diensten zoals KI functioneren redelijk goed.

4. **Hawassa regio** heeft ook volop onbenutte kansen om aan secundaire steden leveren. Kracht- en ruwvoer zullen in dit gebied meer op gewasresten gebaseerd zijn dan in andere gebieden. De kleine private en coöperatieve verwerkingsinstallaties verzamelen, verwerken en vermarkten tot nu toe heel beperkte volumes. Verhoging van de verwerkings- en afzetcapaciteit wordt als een belangrijk knelpunt gezien. Deze regio heeft het potentieel om uit te breiden naar de aangrenzende gebieden van Wolayta en Dodola.

Part I – General Analysis

1. Introduction

This study is conducted as a pre-project assessment of the major milksheds in Ethiopia. The Market-linked Innovation for Dairy Development Program (MIDD) is a Netherlands Embassy funded project implemented by Wageningen University & Research and SNV Netherlands Development Organization. This study covers eight milksheds. The assessment was conducted in two teams. This report summarizes the results of the assessments in all eight milksheds, and attaches more detailed reports for each milkshed. These eight milksheds include:

- Adama - Asella (Eastern Shoa)
- Ambo - Woliso (Western Shoa)
- Addis Ababa (Northern Shoa)
- Hawassa - Shashemene (including Dilla, Kofele, Dodola, Alaba and Yirgalem)
- Gondar - Bahir Dar
- Mekele
- Dire Dawa - Harar
- Jimma.

1.1 Objective of the study

The objective of the study was to provide a preliminary description of eight milksheds of Ethiopia, out of which four would eventually be selected by the program for its further planning. The assessment was expected to come up with a report that addresses:

- Characterization of the milksheds, substantiated by data, at area and district level
- Overview of the value chain in the area
- Assessment of the stakeholders involved in dairy in the area, and their geographic coverage. See annex 1 for a more detailed Terms of Reference.

1.2 Methods of data collection

During the study, multiple tools of data collection have been employed. Both qualitative and quantitative data have been collected for the study. In order to get comprehensive and useful information, the study team has used the following data collection techniques:

- Review of secondary sources: This includes research reports and reports from international organizations, NGOs, government offices, private organizations, and cooperatives. Internet resources were explored as well.
- Interview: Ranges of persons in different positions and offices have been interviewed during the study.
- Government office holders, private business managers (supermarkets, farms, etc.) cooperatives, international organizations, and other individuals were interviewed during the study.
- Observation: the study team employed observation as additional key tool to fill gaps that could occur during the data collection. Dairy farms, smallholders' backyards and cafe's are among the visited sites. Pictures were used to retain observed facts.

1.3 Limitations of the study

Because of the limited time available for the study, data and analysis submitted in this study are limited to the availability of information. As a result, the depth of data and information presented in this report varies from one milkshed to another.

2. The Ethiopian Dairy Sector

2.1 Overview of the Ethiopian dairy sector

Ethiopian modern dairy development activities date back to the 1940s, soon after the end of the Second World War. Its development over these years was highly influenced by the nature of the political system that the country was in. The sector registered a relatively better pace in recent years than the majority of its past. The number of smallholders, commercial farmers, cooperatives, processors, retailers increased significantly.

Categorization of dairy farming systems: The Ethiopian dairy systems can be categorized under five systems of operation; a. pastoral (traditional pastoral livestock farming); b. agro-pastoral (traditional lowland mixed crop- livestock farming); c. mixed crop livestock-system (traditional highland mixed farming), d. urban and peri-urban (emerging smallholder specialized dairy farming), and e. specialized commercial intensive dairy farming (Ethiopian Dairy Policy Inventory, 2009).

Dairy products: In the Ethiopian context, the type of milk and dairy products that needs to be considered are: a. whole, liquid milk and b. other dairy products from fermented processing (butter, ghee, ergo, ayib, metata ayib, ititu, buttermilk etc.).

Production: From the overall Ethiopian milk production, the rural dairy system, which includes pastoral, agro- pastoral and mixed crop-livestock system, contributes 98%, while the peri-urban & urban and the commercial dairy farms produce only 2% of the total milk production of the country. Indigenous stock produce 97% of the milk produced from cattle and the remaining 3% from improved exotic crosses and pure grade exotic cattle. Most of the milk produced in the rural dairy system is retained for home consumption and it is non-market oriented (CSA 2008/09).

According to the survey of CSA, the annual net cow milk production for the rural sedentary areas of the country during Nov. 11, 2009 to Nov. 10, 2010 was about 4.06 billion litres. On the other hand, the estimate of camel milk for the same areas of the country is about 262.8 million litres (CSA 2010).

Utilization: Based on CSA survey in 2009/10, the utilization of dairy products in rural Ethiopia reveals that of the total annual milk production, 85% was used for household consumption, 7% was sold, only 0.3% was used for wages in kind and the remaining 8% was used for other purposes (could be for the production of butter, cheese, and the likes). With respect to the utilization of butter, 61 per cent of the produce was used for household consumption although a considerable portion (36%) was sold. Most of the total cheese produced was used for household consumption that is about 87%, and the rest about 13% was sold and used for other purposes (CSA 2010).

2.2 Policy environment

There is no consolidated or comprehensive dairy policy in Ethiopia. Nonetheless, based on a study conducted by SNV, the existing fragmented policies and strategies at sectoral level and programs developed thereof in Ethiopia have indicated that the overall objective of the policies and strategies are more or less comprehensive in addressing basic principles of development with the exception of a few items. Intuitional capacity, ownership, follow-up, coordination and continuity are among the main challenges which deter the effectiveness of these policies. A livestock policy has been drafted in 2002 (SNV 2009). Some of the relevant issues on dairy development are summarized and annexed to this report. The study team would like to emphasize the current three major strategies and programs which have direct relevance to dairy sector development.

a. **Agricultural Development Led Industrialization (ADLI):** ADLI is the foundation of agricultural development in the country's overall economic development policy. Agricultural development is expected to adequately drive the process of industrialization. Firmly anchored on ADLI is the Rural Development Policy and Strategy (RDPS) which is designed to ensure, among others, effective and efficient utilization of resources to promote agricultural growth, integrate agricultural development activities with other sectors, and establish an effective agricultural marketing system.
b. **Growth and Transformation Plan (GTP):** GTP is a five year strategy of the Government of Ethiopia for the period from 2010/11 to 2014/15. The plan indicates that dairy resource development technology is one of the focuses in the livestock resource development strategy[2]. The expansion of infrastructure, mainly roads and electricity grit, will have a direct link to dairy marketing. Lack of access to road deprives a lot of smallholders from reaching collection centres and markets. Frequent interruption or absence of 24 hours electric power supply discourages shops and retailers to distribute dairy products.

c. **Agricultural Growth Program (AGP):** AGP is a multi-donor program designed with the objective of ending poverty and enhancing growth. Its strategic interventions will have some peculiar features, including:

   i) Comprehensive: AGP is a broad based program that attempts to improve the whole range of production, marketing, and agro-processing of agricultural products through enhancing productivity, value addition, and market and irrigation infrastructure.

   ii) Value chain: The program will be implemented along the value chain dealing with stakeholders including producers, assemblers/traders, processors, distributors, exporters, retailers and finally consumers.

   iii) Decentralized and demand driven**:** Bottom-up planning processes will be practiced to give greater power to kebele and woreda level development initiatives, with particular attention to ensuring equal and active participation of both women and men.

Program Scope and Target areas: AGP is a five-year program and will operate only in four regions; namely, Amhara, Oromiya, Southern Nations, Nationalities and People's (SNNP) and Tigre. Based on criteria such as suitability for agriculture, potential for irrigation, access to infrastructure and institutional capacity, 80 woredas are selected; i.e., 34 in Oromiya, 22 woredas in Amhara,19 in SNNPR and 5 in Tigre.

AGP Components: AGP gives priority to improve the livelihood of small farmers. Inseparably, it supports key public institutions and private business that have multiplier effects on the growth of the agricultural sectors along the value chain. Major components of the program are broadly categorized into two. These are (i) Agricultural Production and Commercialization, (ii) Small-scale Rural infrastructure Development and Management. Three sub-components are identified under the first component. These include: institutional strengthening and development, scaling up of best practices, and market and agribusiness development.

Program costs AGP is estimated to cost about US$ 281.2 million. A number of donors have shown interest to finance the program (World Bank, UNDP, CIDA, REN, USAID and others). The GoE and the beneficiary population will also put in significant resources for the accomplishment of the program.

Program management: AGP is a government program and its implementation will follow government policies and strategies in a way that ensures transparency and local ownership. The MoA at federal and the sector bureaus at region and district levels will have the overall responsibility and accountability for execution of the program.

[2] Growth and Transformation Plan, Government of Ethiopia

The following are expected outputs of AGP in relation to livestock breed improvement:

- Four semen collection and processing sub centres established i.e. one in each program region;
- NAIC strengthened and delivering quality training and technical assistance services;
- Holetta Bull Calf Rearing Station strengthened;
- Capacity built of seven Liquid Nitrogen Plants;
- Four AI technician training sub centres of program regions strengthened;
- Capacity of existing AI staff upgraded;
- 140 additional AI technicians trained;
- 220 farmers trained as Assistant inseminators;
- Technical Assistance provided to private AI service actors.

3. Results

3.1 Development potential of the eight milksheds

For full detail on milkshed data, please be referred to the full assessment reports per milkshed that are added as annexes to this report.
Table 1 below contains the scoring of the eight milksheds based on available data and observations. Five criteria were used to compare these milksheds:

1. Production potential
2. Marketing potential
3. Development stage of the value chain
4. Fit with AGP
5. Other factors affecting chain development.

For more detail on the data underlying these criteria, please see table 2. Table 2 shows how each of these main criteria is build up from a number of sub-criteria.

Table 1

Scores of proposed milksheds on five selection criteria (1 = lowest/ worst, 5 = highest/best)

	Addis North Shoa	Adama Asella	Hawassa Shashemene	Bahir Dar Gondar	Ambo Woliso	Mekele	Dire Dawa	Jimma
Market potential	5	4	3	2	2	1	3	3
Production potential	5	5	3	3	1	1	1	2
Chain status	5	4	3	3	2	3	2	1
Fit with AGP	2	5	4	3	4	1	1	1
Other factors	5	5	3	3	2	3	1	1
PRIORITY	**1**	2	3	4	5	6	7	8

Table 2

Comparative analysis of the eight milksheds in Ethiopia, based on available data and obser vations

Scoring: 1 = lowest / worst, 10 = highest / best

Milkshed Indicators	Addis North	Adama Asella, Ada'a	Hawassa Shashemene	Bahir Dar Gondar	Ambo Woliso	Mekele	Dire Dawa	Jimma
PRIORITY	1	2	3	4	5	6	X	X
MARKET POTENTIAL								
Market size	10	8	6	6	6	4	6	3
-size urban pop score	4000	350	300	450	240	300	400	135
-access to nearby	5	3	3	4	2	3	4	1
markets	5	5	3	2	4	1	2	2
Socio-economic setting	8	9	9	7	6	6	10	9
-student pop.	5	5	5	5	4	5	5	4
-chat use	3	4	4	2	2	1	5	5
Impact of fasting (high impact = low score)	2	2	2	1	2	1	4	5
PRODUCTION POTENTIAL								
Production potential	14	14	10	11	7	6	5	8
-roughage	4	4	3	5	5	2	1	5
-by-products	5	5	3	3	1	2	3	2
/concentrate	5	5	4	3	1	2	1	1
-dairy animals								
AI services	5	4	3	3	1	2	2	2
Vet & extension	5	5	3	2	1	1	1	2
Infrastructure								
Road access	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Water & electricity								
CHAIN STATUS								
Producer organizations (no.& volume)	5	5	3	4	3	3	1	1
Large private producers	5	5	3	3	3	4	4	1
Processors (regularly, not as buffer measure)	5	4	3	3	1	2	2	1
FIT WITH AGP / POLICIES GoE								
Proximity to AGP woredas	2	5	4	3	4	3	1	1
No of AGP woredas included or in close proximity	4	8	6	5	3	4	0	0
FACTORS AFFECTING CHAIN DEVELOPMENT (ENABLING ENVIRONMENT)								
Agricultural research & education institutes	4	5	3	3	2	3	3	2
Stakeholder interest in joint action	5	4	4	3	2?	4?	1?	1?
Private sector interest	5	5	3	2	?	2-3	?	1
Distance from AA (km) (communication, visibility, team dynamics)	50 5	170 4	270 3	700 2	120 4	800 1	550 2	360 2
Presence other projects [not complete]	VOCA HUNDEE LoL Self-help	FAO IPMS ILRI KOICA Other NGOs	LIVES FAO?	IPMS ILRI LoL NGO?	Agri-Services	IPMS VOCA RCC LoL Well Fnd		
Coordination between projects needed	yes	Yes	yes	yes		Yes		
Key bottlenecks for VC development				Fasting impact		Private sector interest?	-Chat main livelihood -Border trade	Coffee main livelihood

3.2 How the eight milksheds rank on five criteria

Market potential

Looking at the market potential of all milksheds, it is clear state that Addis Ababa milkshed has the largest market for dairy products. There is a large population and a large group of consumers with purchasing power for dairy products, be it through the formal or the informal market. The second biggest market consists of Adama, Asella and Debre Zeit. After this Hawassa-Shashemene, Bahir-Dar-Gondar, Mekele, Dire Dawa-Hara are scoring better than Jimma and Ambo-Woliso. The last two have very small populations. In almost all milksheds the impact of fasting is of relevance, only in Dire-Dawa it is less of an issue as the majority of the population is Muslim.

Production potential & presence of services

The milksheds with highest potential for roughage production, based on bio-physical conditions, are Addis, Bahir Dar-Gondar, and Adama (Asella highlands). In Addis and Adama milksheds by-products are more plentiful than in the other areas. Looking at the genetic material (crossbreds) suitable for producing milk, Addis and Adama/Asella/Debre Zeit are having a high number of crossbreds. Artificial Insemination (=AI), veterinary services and extension services are or should be present in all milksheds at woreda level. From the assessments the best-developed services can be found in Addis and Adama milksheds, where even private services (AI) are available, followed by Hawassa and Bahir Dar milksheds.

Value chain status

In Addis and Adama milksheds more milk is processed then in other milksheds. A large number of primary cooperatives can be found here. Here private sector interest to invest in dairy seems to be largest as well. From all milksheds, Dire Dawa and Jimma have the lowest number of producer organisations and the volume of milk handled is small compared to Addis and Adama. The other milksheds are at intermediate levels. Most large scale producers are concentrated around Addis / Adama. Then, Mekele and Dire Dawa milksheds have more processing capacity than the remaining four. See par 3.3 for more information on value chain actors.

Fit with AGP

Out of the 80 AGP Woredas, the following Woredas have identified milk as priority commodity and are within or close to the milksheds discussed in this report:

- Addis Ababa milkshed: Debre Libanos, G/Jarso, Y/Gulele (North Shoa, Oromiya) and Anitsokiya Gemza (North Shoa, Amhara).
- Ambo-Woliso milkshed: Ejere Ambo (West Shoa), Bacho (Tulu Bolo) and Woliso (Southwest Shoa).
- Adama-Asella milkshed: Ada'a, Liban, Lume, Gimbichu (East Shoa), Limu-Bilbilo, Digalu-Xijo, Shirka, and Munesa (Arsi).
- Bahir Dar-Gondar milkshed: Dejene, Enmaye, Debay-telatgin (East Gojam), Dera, and Fogera (South Gondar).
- Shashemene-Hawassa milkshed: Dodola, Adaba, Asasa (West Arsi) Gorche, Melga, and Wondo Genet (Sidama).
- Mekele milkshed: Ofla, Raya Azebo, Endamehoni and Alamata.
- Dire Dawa milkshed: None.
- Jimma milkshed: None.

The scoring was done through counting the relative number of AGP woredas in the milkshed or in the proximity of the milkshed that have milk as prioritized commodity. The Adama-Asella milkshed scores best with 8 woredas in or close to the milkshed. Secondly, the Hawassa milkshed has several woredas in the milkshed and a number in its proximity (total 6 woredas). The Ambo milkshed has three woredas, out of a relatively small number of woredas. Bahir Dar comes fourth with four woredas in or close to the milkshed. In the Addis milkshed there are three woredas, only they are at the outskirts of the milkshed. The Mekele milkshed has 4 woredas in the proximity of the milkshed. In the remaining two milksheds there are no woredas with milk as AGP priority.

Other factors affecting chain development

All milksheds have knowledge institutes in their vicinity that could provide supporting services. Annex 3 elaborates on the general and dairy specific characteristics of universities and research institutes in the vicinity of selected milksheds. Looking at current outreach activities of the different knowledge institutes, broad multi sector support that can be expected from knowledge institutes is more significant in some milksheds (e.g. Bahir Dar, Dire Dawa, Hawassa) than in others (e.g. Jimma, Ambo, North Shoa).
Due to a lot of changes in ongoing projects, we were not able to assess the degree of overlap with other projects. This is however an important issue, for which efforts need to be coordinated.

Table 3 -
Dairy production related data in selected milksheds

Milkshed	Zone	Total no of cattle, in 1000	Estimate d no. of dairy cows, in 1000	Estimated annual production (Million ltrs)	Rep'te d[2]) no PDCs and (DCUs)	Source
Addis Ababa [1)]	North Shoa Amhara	489	437	208	5 (1)	Oromiya, N.Shoa ZLMA
	North Shoa Oromiya		271	100	31 (1)	CSA, 2009
Sub total			**708**	308	**36 (2)**	
	West Shoa	1694	569		14 (1)	West Shoa ZLMA, 2011
	Southwest Shoa		159	43		CSA, 2009
Sub total			**728**	**43**	**14 (1)**	
Adama-Asella	East Shoa		160	42	16	CSA, 2009
	Arsi		467	187	31 (1)	CSA, 2009
Sub total			**627**	**229**	**47 (1)**	
Hawassa Shashemene	Hadia		231	45		CSA, 2009
	Sidama		827	159	3 (1)	Sidama 2011 & CSA, 2009
	Gedeo		34	5	2	CSA, 2009
	West Arsi		419	142		CSA, 2009
Sub total			**1510**	**351**	**5 (1)**	
Bahir Dar-Gondar	North Gondar		461	121	7 (1)	CSA, 2009
	South Gondar		278	65		CSA, 2009
	East Gojam		217	42		CSA, 2009
	West Gojam	1670	282	59	3	West Gojam ZLMA, 2011
Sub total			**1238**	**287**	**10 (1)**	
Mekelle	South Tigray		16	0	25 (1)	CSA, 2010; Tigre BoA, 2011
Dire Dawa	various zones	1491		0	3	CSA 2011
Jimma	Jimma				2	
Total			**4828**	**1218**	**139 (7)**	

1) In this table, Ambo-Woliso has been included in Addis Ababa milkshed (West Shoa and Southwest Shoa zones).
2) This study, augmented with data from Land O'Lakes, 2010. The Next stage in dairy development for Ethiopia Dairy value chains, end markets, and food security.

3.3 Production and marketing capacity

Table 3 summarizes the data on dairy cattle population, milk production, and cooperative organizations in the different milksheds as collected by this study. Data on cattle population, number of crossbreds, number of dairy cattle, and number of milking cows are so inaccurate and varying between sources, that the data presented only give an indication of populations and production. The number of crossbred and purebred cattle reported for the Addis milkshed amount to 11% of the cattle population. The numbers of crossbred and purebred dairy cattle reported for the areas outside the Addis area are very low, often not amounting to 1% of all cattle. Whether these data are accurate should be checked during further assessments.

The total reported annual milk production of 1,218 Million litres likely is an underestimation, as no production data were available from West Shoa (over 10% of dairy cows), Mekelle, Jimma, and Dire Dawa milksheds. 1,218 Million litres/year amounts to 3,3 Million litres/day. It also amounts to 287 litres/dairy cow/year, using dairy cow and production data from table 3 (not counting cows in areas without production data).

It is rather hard to identify the actual number of primary dairy cooperatives (PDCs), and sources vary widely in numbers given. Reasons for this include:

2. PDCs may have been active in the past, but ceased collection and marketing of milk/dairy products due to management or marketing difficulties;
3. cooperatives may be multi-purpose cooperatives that have milk as minor activity and/or may just be marketing liquid milk, and not processing;
4. farmer groups may not be registered as PDC with the cooperative development agency, but may still carry out milk marketing activities.

The number of PDCs and Dairy Cooperative Unions (DCUs) in table 3 below has been taken from the assessments in this study, and has only been adapted when data sources suggested the need to do this.

This study suggests that PDCs and DCUs regularly cease operations when marketing is too difficult or when they run into management issues. This underlines the need for capacity development of cooperatives and for a strong connection to markets for milk and dairy products.

3.4 Processing capacity

Based on this assessment and on validation of results with various stakeholders, the processing capacity for fresh milk can be estimated at some 168,000 litres per day, or 60 M litres per year, of which the vast majority is situated in and around Addis Ababa (see table 4). Some small scale processing capacity is present in primary cooperatives in Asella, Shashemene, Mekele, and Haramaya, but actual processing rarely exceeds 500 litres per day.

It is estimated that at the point that most milk is available, not more than 70% of the processing capacity actually is utilized. In some seasons this may be considerably lower than 50%.

A conservative estimate of an average utilization of processing capacity of circa 50% would then lead to an annual processing volume in the formal value chain of 85,000 litres/day or 30 M litres per year. This is less than 2% of all milk produced.

Taking into account that the vast majority of this milk comes from North Shoa (Oromiya and Amhara), Sululta, and Debre Zeit area, and assuming that the data in table 3 are accurate, one can see that 5 to 10% of the milk produced around Addis is being processed in dairy plants. Very little of the milk produced further away from Addis or of milk produced in other milksheds reaches a processing plant.

According to the data in tables 3 and 4, there is no reason to assume that the percentage of milk produced that is being processed in dairy plants nationwide, differs from the 2% that is usually quoted

Table 4 -
Milk Processors, processing capacity and processed volumes in Ethiopia

No	Main processors	Brand	Processing capacity	Source	Actual processed quantity	Sales outlets	Product range
Addis milkshed							
1	Sebeta Agro Industry	Mama	48,000	all around Addis Ababa	42,000	supermarkets, small stores, Mama and Berta also use own outlets, restaurants and cafes	cheese, yogurt, fruit yogurt,
2	Lame Dairy Plc	Shola	30,000	all around Addis Ababa	30,000		cheese, yogurt, butter
3	Mb Plc.	Family	20,000	all around Addis Ababa	7,000		cheese, yogurt, butter
4	Rut & Hirut		4,000	Chacha	3,200		cheese , butter
5	Fantu		5,000	own, and Holetta	5,000		no milk
6	Berta		9,000	Selale and own farm	6,000		cheese and cream only
7	LifeAgro Industry		3,000	Sululta and own farm	n.a.		pasteurized milk and mainly
8	Lema		10,000	Debre Zeit and Addis Ababa	3,000		cheese, yogurt,
9	Yadene dairy Farm	Bora	15,000	Debre Zeit	7,000		yogurt
10	Genesis		5,000	Debre Zeit and Asella	5,000		
11	Holland dairy		5,000	Debre Zeit and Asella	5,000		cheese, yogurt, fruit yogurt,
12	Ada'a Dairy Cooperative		15,000	Debre Zeit and Asella	3,000		milk, cheese and butter
Hawassa-Shashemene milkshed							
13	Almi Fresh Milk, Hawassa	Almi	1,500	Hawassa and Shashemene	5,000		pasteurized milk, yogurt, butter,
Bahir Dar- Gondar milkshed							
14	Jan Tekel DCU, Gondar	Fasil	1,500	Gonder	200		pasteurized milk, butter and
	Total		152,000		133,200		

N.B.

- Figures of production may vary depending on the season (fasting, non-fasting and rainy/dry season) / Prices may change seasonally and from processor to processor /
- No detailed work done on gross margin /
- Additional small scale cooperative processors are present in Asella, Shashemene Haramaya and other places.
- No data are available on Sebeta Agro Industry Plc. in Debre Birhan, Temeret Agro Industry Plc. in Sendafa, Dessie Dairy Processing Plc. in Dessie, Tigre Dairy Processing Plc. in Tigre, Afraq Dairy

4. Conclusions and recommendations

Based on the results of this assessment, MIDD concludes that the eight milksheds rank as follows for potential achievement of program objectives, i.e. value chain development and sector development: 1. Addis Ababa (Northern Shoa), 2. Adama-Asella-Ada/Debre Zeit (Eastern Shoa) 3. Hawassa-Dilla-Shashemene, 4. Bahir Dar-Gondar, 5. Ambo-Woliso (Western Shoa), 6. Mekele, 7. Dire Dawa, and 8. Jimma. In the latter two milksheds farmers make their livelihoods from cash crops like chat and coffee, and it will be hard for milk to compete with these crops. That situation is exacerbated by the low availability of fodder in both areas, in Dire Dawa due to low rainfall, in Jimma due to intensive cropping. The situation in Mekele seems to be a bit ambivalent, with fodder availability and investment climate being uncertain factors.

The development of the dairy value chain in none of the areas can match that of Addis Ababa, although Adama-Asella seems to be at the verge of catching up and realizing its vast potential, with road infrastructure improving quickly. Hence any combination of Addis milkshed with one or more other milksheds would offer an interesting combination of areas with varied maturity of value chains. A spread over regions would advocate inclusion of Bahir Dar and/or Hawassa milksheds.

While the potential of each of these milksheds will likely only gradually be realized in a step-by-step manner, one can expect that each new step will open up new opportunities in terms of both market diversification (new markets, new products) and expansion – beyond these milksheds lie other zones with high potential, that can be utilized once physical infrastructure and market infrastructure develop: Wollega, Bale, Wolayta, Dessie etc.

4.1 Description of the four highest ranking milksheds

Next follows a brief description of the four highest ranking milksheds:

1. **Addis Ababa milkshed**. The dairy value chains in this Addis Ababa milkshed are already more developed than in the other milksheds, with linkages along the value chain between input suppliers, producers, processors, and retailers. The milkshed is considered leading for dairy development in Ethiopia. Situated in an agro- ecological zone with high potential for roughage production and with plentiful by- products, the area has received much public and international support. This support (including input supply & farm management) has strengthened the primary production and also the cooperatives and cooperative unions. It resulted in a relatively high number of crossbreds, and AI service that is functioning relatively well, a large number of relatively strong cooperatives and unions for milk marketing, a growing number of processors, and private sector interest to further invest in dairy processing and production (large scale producers, local and foreign investments for dairy plant establishment). Being close to the capital city has created multiple opportunities in terms of marketing to the largest and most affluent population centre of Ethiopia. Being near to the capital city has also created opportunities in terms of sector coordination, which among others resulted in the establishment of sector associations and the recent initiative to form the envisaged Ethiopian Dairy Board/Platform.
   a. Administrative Zones: North Shoa (R3), North Shoa (R4), and West Shoa.
   b. (Potential) Partners for future cooperation: BoAs, Ambo University, Addis Ababa University, Debre Berhan University, OARI, ARARI (Debre Berhan), EIAR Holetta, ATVETs, BDS and LCB service providers.

Recommendation to include Ambo-Woliso in the Addis milkshed. *In the milkshed assessment, the Ambo- Woliso (West Shoa) and North Shoa milksheds were considered as separate milksheds. The assessment has shown that the dairy chain in the Ambo-Woliso milkshed currently is quite undeveloped, especially in the number of private sector actors in input and processing and the organization of smallholder farmers. However, there appears to be large production potential. Given the potential to grow input services like fodder & feed, and given its proximity to Addis Ababa, it is recommended that the program includes the Ambo-Woliso milkshed in the Addis Ababa milkshed.*

2. **Adama-Asella milkshed currently is mainly supplying to secondary towns. Potentially it has a very large** market, as new roads are opening up providing opportunities for supply to Addis city and additional towns. The area around Asella has received support to production and farmers' organizations for a very long time, latest by FAO. Except for the area closest to Debre Zeit, currently the major bottleneck seems to be the lack of commercial processors to buy the milk. A new processing facility in the area would most likely start a major transition, especially if processing for long shelf-life is envisaged. The area has high potential for roughage production (bio-physical conditions) and by-products are plentiful. The number of crossbred dairy animals is relatively high. The AI service in the area is functioning quite well. The new Adama University offers new opportunities for dairy value chain support, e.g. through its institute for AI.
    a. Administrative Zones: East Shoa and Arsi.
    b. (Potential) Partners: BoAs, Adama University (Asella School of Agriculture), OARI.

3. **Bahir Dar-Gondar** milkshed has a reasonably large market; the area has a high potential for roughage production, a significant number of primary cooperatives, and few but active cooperative unions involved in milk processing. Services like AI are functioning fairly well.
    a. Administrative Zones: East Gojam, West Gojam, South Gondar, and North Gondar.
    b. (Potential) Partners: BoAs, Bahir Dar University, Gondar University, ARARI, ATVETs.

4. **Hawassa** milkshed also has untapped opportunities to supply secondary towns and cities. Feed & roughage in this area will be more crop residue based than in the other areas. The small private and cooperative processing facilities so far are able to collect, process, and market limited volumes only. Increase in processing and marketing capacity is seen as a major bottleneck. This milkshed has the potential to be enlarged with bordering areas of Wolayta and Dodola.
    a. Administrative Zones: Sidama, Gedio, East Shoa (Shashemene, Arsi Negele), and Arsi (Kofele). b. (Potential) Partners: BoAs, Hawassa University, SARI, OARI, ATVETs.

Part II – Milkshed Reports

A Ambo-Woliso milkshed report
B. Hawassa-Shashemene-Dilla milkshed report
C. Bahir Dar-Gondar milkshed report
D. Mekele milkshed report
E. Addis Ababa milkshed report
F. Adama-Asella milkshed report
G. Dire Dawa milkshed report
H. Jimma milkshed report

Part II-A

Ambo - Woliso Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

This study is conducted as a pre-project assessment on eight major milksheds in Ethiopia. The Market-linked Innovation for Dairy Development Program (MIDD) is a Netherland Funded Project implemented by Wageningen University & Research and SNV Netherlands Development Organization. The study covers eight milksheds. The assessment conducted in two teams. This report (1 out of 4) covers the assessment of one of the following milksheds:

- Western Shoa (Ambo, Tulu Bolo and Woliso)
- Hawassa-Shashemene and wider environment (including Dilla, Kofele, Dodola, Alaba and Yirgalem)
- Gondar, Bahir Dar and wider environment
- Mekele and wider environment

1.1 Objective of the study

The objective of the study is to provide preliminary description of eight milksheds of Ethiopia out of which four will eventually be selected by the program for its further planning. The assessment is expected to come up with report, which addresses:

- Characterization of the milksheds, substantiated by data, at area and woreda level
- Overview of the value chain in the area
- Assessment of the stakeholders involved in dairy in the area, and their geographic coverage.

1.2 Methods of data collection

During the study of this project, multiple tools of data collection have been employed. Both qualitative and quantitative data have been collected for the study. In order to get comprehensive and useful information the study team has used the following data collection techniques.

- Review of secondary resources: This includes researches and reports from International organizations, NGOs, government offices, private organizations and cooperatives. Internet resources were also explored.
- Interview: Ranges of persons who are at different position and offices have been interviewed during the study. Government office holders, private business managers (Supermarkets, farms…) cooperatives, International organizations and individuals were interviewed during the study.
- Observation: the study team employed observation as additional key tool to feel gaps that could happen during the data collection. Dairy farms, smallholders' backyards and cafe's are among the visited sites. Pictures were used to retain observed facts.
- Key informants: Key informants were also interviewed.

1.3 Limitation of the study

Because of the limited time allotted for the study, reports and analysis submitted in this study are limited to the availability of information. As a result the depth of data and information presented in this report varies from one milkshed to another.

1.4 Overview of the Ethiopian Dairy Sector

Ethiopian modern dairy development activities date since 1940s soon after the end of the Second World War. Its development over these years was highly influenced by the nature of political system where the countries were in. The sector registered a relatively better pace in recent years than its majority past. The number of smallholders, commercial farmers, cooperatives, processors and retailers increased significantly.

Category of the Dairy system: The Ethiopian dairy systems can be categorized under five systems of operation; pastoral (traditional pastoral livestock farming), Agro-pastoral (Traditional lowland mixed livestock farming), mixed crop livestock system (traditional highland mixed farming), Urban and peri-urban (the emerging smallholder dairy farming) and Commercial (specialized commercial intensive dairy farming) (Ethiopian Dairy Policy Inventory 2009)

Dairy products: In the Ethiopian context, the type of milk and dairy products that needs to be considered are whole milk (liquid milk, *Ititu,* Ergo, buttermilk etc.) and other dairy products from fermented processing (butter, ghee, Ayib, Metata Ayib etc.),

Production: From the overall Ethiopian milk production, the rural dairy system, which includes Pastoral, Agro-pastoral and Mixed crop livestock system, contributes 98%, while the peri-urban and urban including the commercial dairy farms produce only 2% of the total milk production of the country. Indigenous stock produce 97% of the milk produced from cattle and the remaining 3% from improved exotic crosses and pure grade cattle. Most of the milk produced in the rural dairy system is retained for home consumption and it is non-market oriented (CSA 2008/09).

According to the survey of CSA, the annual net cow milk production for the rural sedentary areas of the country during Nov. 11, 2009 to Nov. 10, 2010 is about 4.06 billion litres. On the other hand, the estimate of camel milk for the same areas of the country is about 262.8 million litres (CSA 2010).

Utilization: Based on CSA survey in 2009/10, the utilization of dairy products in rural Ethiopia reveals that of the total annual milk production, 85% was used for household consumption, 7% was sold, only 0.3% was used for wages in kind and the remaining 8% was used for other purposes (could be for the production of butter, Cheese, and the likes). With respect to the utilization of butter, 61 per cent of the produce was used for household consumption although considerable portion (36%) was sold. Most of the total Cheese produced was used for household consumption that is about 87 per cent, and the rest about 3 % was used for other purposes (CSA 2010).

1.5 Policy environment

There is no consolidated or comprehensive dairy policy in Ethiopia. Nonetheless, based on study conducted by SNV, the existing fragmented policies and strategies at sectoral level and programs developed thereof in Ethiopia had indicated that the overall objective of the policies and strategies are more or less comprehensive in addressing basic principles of development with a the exception of few items. Intuitional capacity, ownership, follow-up, coordination and continuity are among the main challenges, which deter the effectiveness of these policies. Livestock policy has been draft in 2002(SNV 2009). Some of the relevant issues on dairy development are summarized and annexed to this report. The study team would like to emphasize on the current three major strategies and programs which have direct relevance to the dairy sector development.

a. **Agricultural Development Led Industrialization (ADLI):** ADLI is the fundamentals of agricultural development in the country's overall economic development policy. Thus, agricultural development is expected to adequately drive the process of industrialization. Firmly anchored on ADLI is the Rural Development Policy and Strategies (RDPS), which is designed to ensure, among others, effective and efficient utilization of resources to promote agricultural growth, integrate agricultural development activities with other sectors, and establish effective agricultural marketing system.

b. **Growth and Transformation Plan (GTP):** GTP is a five-year strategy of the Government of Ethiopia for the period from 2010/11 to 2014/15. The plan indicated that Dairy resource development technology is one of the focuses in livestock resource development strategy.[3] The expansion of infrastructure mainly road and electricity will have a direct link to dairy marketing. Lack of access to road deprived a lot of smallholders to reach collection centres and markets. Frequent interruption or absence of 24 hours electric power supply discourages shops and retailers to distribute dairy products.
c. **Agricultural Growth Program (AGP):** AGP is a multi-donors program designed with the objective of ending poverty and enhancing growth. Its strategic intervention will have some peculiar features. These are:
    i) Comprehensive: AGP is a broad based program that attempts to improve the whole range of production, marketing and agro-processing of agricultural products through enhancing productivity, value addition, and market and irrigation infrastructure.
    ii) Value chain: The program will be implemented along the value chain dealing with stakeholders including producers, assemblers/traders, processors, distributors, exporters, retailers and finally consumers.
    iii) Decentralized and demand driven**:** Bottom-up planning process will be practiced to give greater power to kebele and woreda level development initiatives with particular attention to ensuring equal and active participation of both women and men.

Program Scope and Target areas: AGP is a five-year program and will operate only in four regions; namely, Amhara, Oromiya, Southern Nations, Nationalities and People's (SNNP) and Tigre. Based on criteria such as suitability for agriculture, potentials for irrigation, access to infrastructure and institutional capacity, 80 woredas are selected; i.e., 34 in Oromiya, 22 woredas in Amhara,19 in SNNPR and 5 in Tigre.

AGP Components: AGP gives a priority to improve the livelihood of small farmers. Inseparably, it supports key public institutions and private business that have multiplier effect on the growth of the agricultural sectors along the value chain. Major components of the program are broadly categorized into two. These are (i) Agricultural Production and Commercialization, (ii) Small-scale Rural infrastructure Development and Management. Three sub-components are identified under the first component. These include: institutional strengthening and development, scaling up of best practices and market and agribusiness development.

Program costs AGP is estimated to cost about USD $ **281.2** million. A number of donors have shown interest to finance the program (World Bank, UNDP, CIDA, REN, USAID and others). The GoE and the beneficiary population will also put in significant resources for the accomplishment of the program.

Program management: AGP is a government program and its implementation will follow government policies and strategies in a way it ensures transparency and local ownership. The MoA at federal and the sector Bureaus at Regional and woreda levels will have the overall responsibility and accountability for execution of the program.

[3] Growth and Transformation Plan, Government of Ethiopia

Out of the 80 AGP Woredas, the following Woredas are within the four milksheds discussed in this report:

- Ambo – Tulu Bolo and Woliso Milkshed: Ambo, Bacho (Tulu bole), Wenchi and Woliso
- Bahir Dar – Gondar Milkshed: Bahir Dar Zuria. Dangla woreda is in close proximity to the milkshed.
- Shashemene – Hawassa – Dilla Milkshed: Wondo Genet
- Mekele Milkshed: Woredas in close proximity to the milkshed are Ofla, Raya Azebo and Endamehoni

The following are outputs of AGP in relation to livestock breed improvement (See Annex 6 for detail information):

- Four semen collection and processing sub centre established i.e. one in each program region;
- NAIC strengthened and delivering quality training and technical assistance services,
- Holetta Bull Calf Rearing Station strengthened;
- The capacity of Seven Liquid Nitrogen Plants built;
- Four AI technician training sub centres of program regions strengthened;
- Capacity of existing AI staffs upgraded;
- 140 additional AI technicians trained;
- 220 farmers trained as Assistant inseminators;
- Technical Assistance to private AI service actors provided;

2 Ambo Wolisso Milkshed

2.1 Administrative Zones of West Shoa and South West Shoa

Mirab Shoa (or "West Shoa") is one of the 12 zones of the Oromiya Region in Ethiopia. Its highest point is Mount Wenchi (3386 meters); other notable peaks include Mount Menagesha and Mount Wechacha. Towns and cities in Mirab Shoa include Alem Gena, Ambo, Holetta Genet and Woliso[4]. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 2,058,676, of whom 1,028,501 are men and 1,030,175 women; with an area of 14,788.78 square kilometres, Mirab Shoa has a population density of 139.21/sq. km. While 242,352 or 6.10% are urban inhabitants, a further 53 individuals are pastoralists. A total of 428,689 households were counted in this Zone, which results in an average of 4.80 persons to a household, and 415,013 housing units (Fig. 1). More than 80% of the population is Orthodox Christian. Between 2002 and 2005, a number of woredas were separated from Mirab Shoa to create Debub Mirab Shoa Zone.

Source: UN **Office** for the Coordination of Humanitarian Affairs (UNOCHA)

According to 2010 estimates of CSA, the total population of the two Woredas is 2.3 million, with population density of 157 people per square kilometre, which is higher than the region average (106), and much lower than other milksheds (Table 1).

[4] Wikipedia

Table 1

Population of West Shoa and South West Shoa Zone

West Shoa Zone and South West Shoa Zone Name of Woredas	Population
Ginde Beret	117,669
Jeldu	227,591
Ambo	121,261
Nidakegn	89,112
Cheleya	176,982
Bako Tibe	139,051
Dano	109,121
Nono	94,428
Tikur Enchini	80,134
Dendi	187,035
Aejere	97,858
Wolmera	93,940
Ada Berga	135,942
Meta Robi	157,495
Ambo Town	57,007
Abuna Ginde Beret	122,355
Toki Kutayu	135,211
Jibat	80,973
Elfata	64,289
Holetta	30,138
Zone total	**2,317,592**

Source: CSA 2010

2.2 Ambo-Woliso Milkshed

Situated in the West and Southwest Shoa zone of Oromiya regional states, Ambo-Woliso milkshed is one of the potential milksheds of the regional state. West Shoa zone has 18 woredas with varying degree of livestock concentration, milk production and farming system. According to the zone livestock development and health officer, in the area there is a long-aged tradition of milk production in both the rural and urban (peri urban) settings. The annual milk production per head estimated to be 450-540 litres per cow. In order to improve the genetic diversity and production potential of the area, 1515 Borana and 75 improved Jersey-Holstein heifers have been distributed by the zonal government.[5]
The milkshed is concentrated along the main road from Addis Ababa to Ambo and From Addis Ababa to Woliso (Figure 2). There is a gravel road that connects Ambo and Woliso. If the road is improved, it will create market access and opportunities to the farmers residing along the road.

Tulu Bolo is one of the Woreda, in the milkshed. In the area, the number of exotic dairy cow population is small (140 cows and heifers) as compared with the Woredas nearer to Ambo and Woliso towns. Below is the summary of livestock data in Tulu Bolo Woreda. According to the livestock office of the Woreda, the average milking per day of exotic cows is between 7 to 10 litres. The milk contribution of the area is small as compared to the neighbouring woredas such as Woliso and Ambo. Farmers may keep bulls for traction purpose for drafting. The total number of herds (including cows, heifers, calves, and bulls) in Woliso Woreda as of June 2011 was 47,614 (See Table 3)

[5] Zonal Livestock agency

Figure 2: *Ambo-Woliso Milkshed* *Map: Google earth, milkshed sketch by study team*

The total cattle population is estimated to be 1.9 million including 568,948 cows, 317,222 heifers and 46,373 calves (Table 2).

Table 2

The total livestock resource of the areas (the west Shoa zone) is summarized in the following table.

S.No	Woredas	Cattle					Total
		Oxen	Cows	Bull	Heifer	Calves	
1	Ada'a Berga	38777	44317	11079	16621	0	110794
2	Abuna G/barag	25709	28406	20932	24480	0	99527
3	**Ambo**	29110	33597	12441	24353	14034	113535
4	Bako Tibe	33843	40231	17932	20059	0	112065
5	Challiya	14860	13042	7956	8598	7200	51656
6	Dano	19673	22185	13274	12618	0	67750
7	Dandi	29157	64191	19421	26920	0	139689
8	Ejere	22792	24043	14040	16693	0	77568
9	Ifata	28575	17654	10041	12562	1621	70453
10	Illu Gelan	10882	12208	6370	7462	2474	39396
11	Gindeberet	28712	45290	24625	28613	0	127240
12	Jeldu	42021	51275	30406	31167	15294	170163
13	Jibat	19220	27174	16256	17920	0	80570
14	Meta Robe	42312	50362	35720	26328	0	154722
15	Mida Kagny	30079	17959	12341	12828	0	73207
16	Nono	29821	17909	11818	12396	0	71944
17	Toke Kutaye	27827	45361	9054	10359	0	92601
18	Tukur Incini	8085	13744	6337	7245	5750	41161
	Total	**481455**	**568948**	**280043**	**317222**	**46373**	**1964041**

Source: West Shoa Zone Livestock Agency

Table 3 *Summary of herd composition of Woliso Woreda*

S.No	Cattle type		Quantity as of 2003 (2010/11)	Remark
1	Cows	Local breeds	21,582	
		Exotic breeds	43	
		Total	**21,625**	
2	Heifers	Local breeds	8845	
		Exotic breeds	97	
		Total	**8,942**	
3	Calves	Male		The number of calves is not segregated in to male and female
		Female	8139	
		Total	**8,139**	
	Bulls	Local breed	8,844	
		Exotic breed	64	
		Total	**8,908**	
	Herd total		**47,614**	
4	Average yield/cow		1.5 litres/head	7-10 litres for cross breeds

2.3 Milk Value Chain

2.3.1 Input Suppliers

Vet Services: In West Shoa Zone, particularly Ambo and Woliso woredas, government is the main actor in providing veterinary services for livestock holders in general and dairy farmers in particular. The overall distribution of livestock health centres looks as follow. The standards of the health centres vary from places to places.
In the zone, there are 4 B type clinics and 102 other type clinic and health posts run by Government. There are 3 private vet clinics and 28 vet drug stores (Table 4).

Table 4
Summary of health centres and drug vendors of West Shoa zone

S.No	Service providers	2001	2002	2003	Remark
1	"B" standard clinic	5	4	4	Services such as vet diagnosis and treatment are given at "B" level clinics
2	"C" standard clinic	10	10	10	Simple treatments and preliminary services such as vaccines are given
3	"D" standard clinic	60	76	92	
4	Private clinics			3	
5	Drug shops			17	
6	Rural drug shops			11	
	Total health facilities			**137**	

Source: Office of Agriculture: West Showa Zone

In Ambo woreda, there are eight government owned and two private owned health posts. These eight government health posts supplies drugs in addition to vet services to the farmers**.**

Breeding services: In Ambo woreda, there are 15 AI technicians and 13 AI centres. During the year 2010/11, the agricultural office inseminated 617 cows out of which only 151 cows gave birth to calves. Semen is obtained from Nekemt and Asella centres. The Woreda has a plan to establish semen collection centre with liquid nitrogen plant.

Bull services: Farmers in Ambo woreda use bulls for breeding whenever AI is not available. W/ro Abebech Gobena farm provides a bull service in the town of Ambo for birr 30. Unlike other places, the fee is based on conception. No additional fee is paid for repeated mate until the cow gets pregnant.

2.3.2 Chain Actors

2.3.2.1 Smallholders

There are a number of smallholders in the town of Ambo. The holding size varies. In this town, crossbreeds dominate the local dairy cows. Usually, urban farmers keep dairy cattle for income out of milk sales. Crossbreeds give better yield (milk) as compared to local zebus under normal management system. For this reason, urban farmers who are engaged in dairy farming keep cross breeds though the level of blood varies. The team could not get the number of smallholders in Ambo town.

W/ro Roman: She has three cows, and three calves (two males and one female). The farm sells milk to traders at a price of 4.50 birr/litre. During lactation period, the cows provide 9 to 10 litres per day. Major source of feed for the cows is hay and mill by products
Vet and AI services: The farm gets AI service from agricultural office. Two years ago, many cows died of Lymph and skin diseases.
The challenges faced by the farm are weak demand during fasting seasons, unavailability of better productive cows in the area and unavailability of concentrate feed in the area

2.3.2.2 Commercial farmers

The team visited two big farms in Ambo town. There are a number of dairy farmers in the area including surrounding of Ambo.

a. Abebech Dairy Farm: It is more than 5 years (2006) since the farm is established. The farm is situated on spacious place where expansion can easily be done. Abebech farm has the following herd composition and milk product (Table 5).

Table 5

Herd composition and milk products at Abebech Farm

S.No	Herd description	Quantity	Remark
1	Lactating cows	32	
2	None lactating (Dry) cows	28	(This includes both heifers and dry cow)
3	Calves	6 males	
4	Bulls	2	
5	**Total farm animals**	**68**	
6	Total herd yield of the farm	178 litres	This is the amount of milk the farm produces per day.
7	Highest milking cow	20 litres/day	

Sketched based on the survey

- Marketing: Abebech dairy farm delivers its farm products to hotel and café which belongs to the same owner. Milk is delivered to Ambo Mini café at Birr 8/litre. Male calves are sold and slaughtered at the hotel owned by the farm owner.
- To combat water shortages, the farm has prepared a borehole for water supply.
- Feed source: Abebech gets feed from Jajji farm, which has about 70-80 hectares of forage land. Forage in the form of hay, is pressed by a machine (in bale form) and transported to Ambo. In order to meet the nutritional and energy requirement of dairy cattle, the farm uses industrial by-products such as wheat bran, nough cake and other concentrate feed.
- AI and health issues: The farm has its own qualified health personnel who look after the cows. According to the farm doctor, the dairy cattle provided with all the necessary vaccinations and de-worming drugs. Anthelmintic are given to the cattle. An outbreak of FMD diseases had occurred on the farm, which resulted in overall reduction of milk production by about 20 litres per day.

b. Gadissa Gobena Dairy Farm: is one of the farms situated in Ambo town, near river Huluka. The farm has 81 dairy cattle including 32 lactating cows (table 6).

Table 6:

Dairy population of Gadissa Gobena Dairy Farm

S.No	Herd description	Quantity	Remark
1	Lactating cows	32	
2	Heifers	19	All are pregnant
3	Calves	30	Male and 17 female
4	Bulls	0	
5	**Total farm animals**	**81**	
6	Total herd yield of the farm	180 litres	This is the amount of milk the farm produces per day

Marketing: This farm has two milk distribution centres at different places in Ambo. Most of the customers of the shops are households, which take milk for home consumption; and for infant (about 75% of the milk goes to households is meant for infants and children). The price of one litre of milk is Birr 7 to 8. During fasting season, the sales volume reduces by about 65%. Therefore, to avert the market situation, the farm produces other milk products such as butter and traditional cheese.

Feed: The farm uses different agro industrial by-products. Such as nough cake, telba/flaxseed cake, concentrate feeds from flour factories:

- Nough cake ……...350.00 birr per quintal
- Telba cake ……..870.00 birr per quintal
- Wheat by-products……..320.00 birr per quintal
- Soya bean is obtained from farm (Ano agro industry-Bako)

Challenges: The farm has chronic water problem; water is transported on donkeys back from Huluka River. Prevalence of mastitis is because of sanitation and hygiene, which is in turn caused by scarcity of water. The farm has planned to dig water well. Shortage and inconsistency of AI service because of the irregular semen supply and unavailability of better breed (with the required blood level) is the other challenge.

2.3.2.3 Associations

According to the officer in West Shoa zone cooperative office; there are a number of associations, which are organized by the cooperative promotion office. Currently, more than 14 primary dairy cooperatives have been registered with a total capital of about Birr 700,000.

a. **Biftu Berga dairy cooperative Union.** Total capital of the union has reached 715,977.30 birr. The union has been formed by 13 primary cooperatives, which have about 645 members (435 male and 210 female). It has one ISUZU truck to transport milk to different places. The acquisition of the truck helped the union a lot. The vehicle is purchased on loan basis.
   The union currently collects more than 2000 litres of milk per day. It supplies to a dairy processing enterprise at Holetta. The enterprise converts the milk in to different milk products such as butter, cheese and so on. Biftu Berga has plans to grow in to agro processing. The union provides loan to its members. On the other hand, the union procures and distributes feed to its members. It also supplies vet drugs to cattle holders. In addition to this, the union has large scale of land on which they grow forage such as alfalfa.

b. Primary level cooperative in Ambo area: According to the cooperative promotion office officer, a primary cooperative, which works on milk marketing, had been organized from 16 associations. The total number of members in this cooperative is about 560 (321 male and 239 female). Its capital is Birr 55,390. Most of the associations are located in the rural areas around Ambo town in scattered manner. Some are found within 50-70 km radius away from Ambo town where marketing of milk would become difficult for farmers around there. The road facilities are not well developed to create access to regular and convenient transportation.

Challenges faced by the primary cooperative:

- The zonal cooperative agency is not properly staffed to provide the required and expected services to the coops. The follow up of the cooperative office is weak.
- Some of the dairy associations are located some 50-70 km away from Ambo. Therefore, it is not easy to supply their milk to Biftu Berga dairy union or to any other market outlet.
- The dairy associations, which are within 50 to 70-kilometre distance, sell their milk to end consumers' level that increases their transaction costs and bearing of the risk from milk spoilage.
- The dairy associations are not equipped with refrigerator and chilling machines. Thus, it became difficult to keep and store milk for extended period, to store milk by products until it is fully sold and consumed. On the other hand the cooperative could not collect all the available milk supply due to lack of these equipment. The associated problem is unavailability of electric power.
- During fasting season, the market reduces by 50%. There are no milk collection centres in the rural areas. The rural marketing is different from the town of Ambo. In the rural areas, people are more homogeneous with uniform religious background. Majority of the rural people around Ambo are Christian Orthodox Thus fasting seasons are respected and followed. Due to this, demand for milk falls. The cooperative buys limited milk and convert unsold milk to butter.
- In Ambo, there is no feed selling centres. Farmers buy feed from Addis Alem and/or Addis Ababa

c. **Burka Anani milk association (Woliso):** It is a new association with small number of members. The association has opened new shop that sells Yoghurt and milk (boiled and raw milk). The shop is situated near the bus station. The association has 11 members and one employee. The members supply 45 litres of milk per day to their shop. Members sell one litre of milk at a price of birr 5.50 and the association retails a litre of milk at Birr 7.00. One glass of fresh milk (about 0.3 litre) not boiled, is sold at Birr 2.50, the same quantity of yoghurt at Birr 3.00. In addition to the milk sold at the shop (at Woliso), the association sells 20 litres of milk every day to milk trades who sell/ retail it at Wolkite (30-35 km away from Woliso. The milk is collected and transported by the agents who are paid on monthly basis by milk traders who are at Wolkite. Transporters charge 2.00 birr for ten litres of milk to transport to Wolkite. The milk traders receive their milk (which sent through their agents) and retail it at Wolkite. The surveying team, found this experience to be good strategy that can create more market access, reduce running costs and involvement of labour, which can lead to further expenses. Moreover, the trust built among actors of the business plays an important role in the marketing system. In Wolkite town, there are many people who drink raw milk especially those who chew chat. Up to five litres is sold as raw milk in the shop. Fasting seasons do not affect sales volume as demand for milk outweighs the supply. This could be attributed to the composition of the religion, chat chewing practice (which accompanies high consumption of milk) and so on.

2.3.2.4 Collectors

There are no milk collection centres in Ambo area except in areas such as Ejere, Wolmera, Adea Berga and Holetta.

a. **Hassen Aman (Woliso milk collector)** During fasting season, the collector buys milk at a price of 4.00-4.50 birr/litre and at none fasting seasons; he buys at a price of 5.00 birr/litre. At Wolikite, the milk is retailed at prices of Birr 6.50-7.00/litre. Quality of milk is checked through traditional ways. In order to keep the flavour of the milk good, they smoke plastic containers by an aromatic wood called "Wacho". In the area, raw milk is preferred than in any form (boiled milk, yoghurt…) by chat chewers and yoghurt is also liked by dwellers. People complain for shortage of milk in Wolkite. According to Hassen, it is common to see people from Wolkite buying milk from Woliso with plastic water bottles (aka highland bottle) particularly on market days of Wednesday and Saturday. On a daily basis, 500-600 litres of milk are shipped from Woliso to Wolkite. Hassen Receives Birr 150.00 per month for working as an agent. Wolkite is 42 km away from Woliso.

2.3.2.5 Café and Restaurants

The survey team has contacted three cafés in Ambo town. In Ambo, tradition of milk consumption is high at cafes and restaurants. Summary of sales of milk products by the cafes visited is shown in Table 7.

a. **Sweet café Ambo:** Sweet cafe sells about 30 litres of milk every day in different forms. The cafe' has a potential to sell up to 50 litres/day if the milk supply is available. In Sweet café, 60-70% of the milk is sold as hot milk and 30-40% as macchiato. The local people are accustomed to drink hot milk than macchiato. The café buys milk at a price of 8 birr/litre. It receives milk from five suppliers. It worked with these suppliers for the last five months. The café and the suppliers do not use quality control equipment. The café uses butter up to 30 kg/month (Estimated price 80-90 birr). Most of the customers are passers-by and the local people. There is a high demand of milk in the town. There is also shortage of milk in the café.
b. **Ambo mini café (W/ro Abebech Metaferia):** The café owner has dairy farm (Abebech farm), which supplies milk to the café the café receives 40-50 litres of milk per day. 75% of the milk is sold as hot milk and the remaining 25 % as macchiato. One litre of milk is purchased for Birr 8. According to the cafe supervisor, Milk quality has never been a challenge to the café and there is no complaint from the customers. During the fasting seasons, the decline in demand is not significant. Customers are the local dwellers and passer-by. There is no market problem.
c. **Ambo Ethiopia Hotel** There is no big sell of milk in this hotel.

Table 7

Summary of cafes selling milk and macchiato in Ambo town

No	Name of the café	Amount of milk received /day		Products/by-products		Remark
		Non Fasting Season	Fasting Season	Macchiato /cap	Milk/cap	
1	Sweet café	30 ltrs	-	3.00 birr	3.00 birr	Yoghurt 3.00 birr/glass
2	Ambo mini café	45ltr	35 ltrs	2.50 birr	2.50 birr	There is no significant drop during fasting seasons
3	Ethiopia Ambo hotel café	4.5 ltrs	-	6.25 birr	6.25 birr	

2.3.2.6 Consumers

a. **Institutional Buyers:** According to Gadissa Gobena farm manager, Ambo Hospital, Bullet factory, prison house and police collage are some of the customers where the farm sells its products. Gadissa Gobena farm sells only 25-to 30 % of its milk production to these institutions.
b. **Households:** as we were been informed by farms contacted, most of consumers of milk are households particularly infants and children. Potential for demand is high at household level. Some households get milk consistently when they have house-to-house suppliers on a contract basis. Due to the limited number of village level shops and of limited or no distribution of milk through such shops, milk is not accessible to many households.
c. **Individual consumers:** individual consumers are different from household consumers as they consume milk at places of work and cafe's. It is common that a lot of people consume milk while chewing Chat (for Woliso context) and the likes. In Woliso area, individual consumers are relatively high in number. The team observed in this area while individuals drink raw milk, which is not boiled or pasteurised. The shopkeeper of Burka Anani milk association explained that this is a common phenomenon. Those people who chew chat are accustomed to drink raw milk.
d. **Consumers at Wolkite:** milk from Woliso is sent to Wolkite by public transportation every morning. There are individuals who collect and send milk to Wolkite. These individuals receive up to 150 birr per month for the service they provide. According to Ato Hassen, (milk collector) to Wolkite, individuals and households are major consumers of the milk. According to Woliso livestock development and health office head, more than 1000 litres of milk is sent to Ameya and Didalla and Wolkite, where Wolkite takes the lion share.

2.3.3 Service Providers

a. **Office of Agriculture:** In Ambo and Woliso woredas, the woreda livestock and health offices are responsible to provide livestock development (breeding, feeding…) and health services. In Ambo woreda, there are eight government vet clinics and two private drug suppliers. In Woliso town, there are two clinics; one B type (In Woliso) and the other D type in Korke kebele. During the year 2003, the bureau of agriculture of Woliso had planned to provide AI service to 1400 cows per annum; however, the accomplishment was limited only to 760 services due to different factors.
   b. **Cooperative Promotion Agency:** The cooperative office is the responsible government body, which has the mandate of organizing and certifying cooperatives of any purpose including dairy cooperatives. The cooperative office provides the following supports to organized cooperatives.
      - Organizing smallholders into any forms of groups (associations, unions…) following legal procedures
      - Loan facilitation, for instance, writing letter to banks, government office, certifying coops organized and support letters to different organization when needed
      - Providing training on Dairy farm management
      - Providing Auditing services and financial management
   c. **GTZ and Eden agro industry: GTZ-**Is one of the international NGOs serving the farmers. GTZ provides seeds and other inputs for farmers through its "sustainable land management "project. On the other hand, Eden Agro Industry supplies various feed seeds to farmers on fair prices. However, currently the industry has stopped delivering seeds because of increased price (700.00 birr-Alfalfa). World Vision, Self Help, Rural Capacity Building, UNDP are the other stakeholders working to improve feeding status of the areas.
   d. **Ambo University:** the attempt to get data and other information was not successful. However, according to head of Animal science department, there are different initiatives by the research and extension office.

2.4 Chain Context

a. **Policy:** Oromiya region has established an agency, which is mandated to work on livestock development to improve product and productivity. The agency works to improve the health condition of livestock of the region, improve the husbandry and management practice and feeding. At national level, the ministry of agriculture is having a short term and long term plans to the livestock development of the nation. Draft policy regarding livestock development has been formulates.
b. **Culture and Religion:** People within the milkshed have long aged tradition of rearing cattle. Beyond sense of holding cattle for economic purpose, the people have cultural attachment with cattle. The people also have tradition of consuming milk. Ambo and Woliso, share this fact with different degrees. People in Ambo-Woliso milkshed are heterogeneous in religious composition with varying degree of Christians, Muslims and Protestant. The consumption patterns of people from these religions vary accordingly. For instances, people from both Muslim and protestant background consume milk all year round while orthodox Christians jump days and sometimes months without consuming milk. The mix in religion of this area privileges farmers producing milk year round milk market.
c. **Weather and Ecology:** Explained above.
d. **Research Institutes:** Ambo University can be considered as research institute for the dairy development in its agricultural collage.
e. **Agricultural Research Institutes and TVETS** Holetta agricultural research centre can work with farmers and other institutions near Ambo. Moreover, the centre research findings can also benefit farmers around Ambo.

2.5 Collaboration

Collaboration among stakeholders for dairy development is crucial to mobilize resources and exploit opportunities. In both Ambo and Woliso Woredas, the government offices are better in terms of

exerting efforts to improve the agricultural productivity of the area particularly dairy. The agricultural bureau of the two woredas deserves appreciation for their effort to improve the recording and information system including their willingness to share. In Ambo and Woliso woredas, Ambo University and Woliso TEVET can work together with farmers and other stakeholders to share their technical experience and new farming systems, which particularly can improve the dairy sector.

From observation, the survey team was able to draw lesson on smooth ground to get land and other supports from the West Shoa zone investment office. The number of investors who received land for investment purpose is annexed.

2.6 Challenges

During the assessment, the team has explored different challenges at different levels, which to avoid them needs different inputs and efforts.

a. **Government offices face** challenges like lack of skilled manpower, budget shortage, transportation problem, and so on.
b. **Farmers Organizations:** On the other hand, cooperatives face the following major challenges; market shortage, access to micro finance services, and limited supply of inputs. In order to avoid these problems, multi sectorial collaboration and efforts need to be exerted. Producers are the other chain actors who confront severe market shortage and weak farmers' organization, which represents them in the broader market context. In order to reduce the challenges, all rounded efforts should be applied across actors of the chain particularly for service providers and decision makers as the role of these actors significantly affect the benefit and productivity of the producers and other chain actors. These decision makers and service providers include, bureau of agriculture, cooperative office, farmers' organizations (associations, cooperatives...) and other private institutions.
c. **Milk Quality:** In both Ambo and Woliso milkshed the milk quality is of great concern. In both places, application of scientific ways (lacto meter, alcohol test and other) of examining quality of milk is not widely used. Most cafes and restaurants experienced (except few mentioned above) complaints of customers for the quality of hot milk or macchiato. According to West Shoa zone livestock development and health officer, an aquatic worm called "Alkit" is one of the causes of law quality milk in Ambo woreda. On the other hand adulteration is also a problem.
d. **Feed Challenge:** Among farmers, concentrate feed is the greatest challenges in terms of supply, quality and prices.
e. **Limited budget:** in almost all cases, budget is a limiting factor. In government office particularly office of livestock, suffers shortage of budget to buy semen, nitrogen, to train efficient AI technicians, to build well equipped health facilities and more are the biggest drawbacks.
f. **Infrastructure:** As was clearly seen in Gadiss Gobena farm, water unavailability was a challenge. Due to lack of water, there had been high incidence of mastitis. This on the other hand affects the overall productivity of the farm to greater extent. In areas around Ambo and Woliso, there is a problem in transportation and other facilities. Thus, farmers may not deliver their agricultural products in general and milk in particularly to the nearby market in due course.
g. **Market access to the rural community:** though there is a better tradition of consuming milk in both areas particularly Woliso (also taken to Wolkite), promotion works needs to be done to enhance all year round marketing of milk and milk by-products. While dealing with demand development, it is important to consider the situation of the rural community where great opportunities could be gained. Therefore, in the rural areas, selling milk and supplying it to the market is not well developed. Thus it is important to work on this area.

2.7 Opportunities

a. **Active role of BoA and the respective offices and departments:** the livestock issues are handled by the livestock agency. This is a good opportunity to work focused activities. The active role of the livestock office to expand AI in the area is of great importance. On the other hand, at different places of the region there are different ranches where improved heifers can be accessed. These ranches should be scaled out for better results.
b. **High demand and consumption culture:** The high demand of milk remains almost constant throughout the year resulting in better market opportunities. In both areas such as Ambo and Woliso, the socio-cultural situation of the area could be considered as a good opportunity for marketing of milk and milk by products. For example, Protestants and Muslims consume milk all-round the year and thus, the seasonality in consumption of milk by the orthodox fellows could be filled by the earlier groups.
c. **Large institutions:** Ambo University, Bullet factory, police collage, Ambo and Woliso Hospitals remains big market opportunities if appropriate market linkage is done. Though the visiting team did not assessed the market situation of the above institutions due to shortage of time, the large number of people working in the institutions and ten thousands of university students in Ambo University could be consumers of milk.
d. **Wolikite market:** could be considered as an opportunity. The well-developed custom of consuming milk especially by those who chew chat is to be encouraged with regular and quality supply of milk.

3. Stakeholders Interest and Influence Table

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
West Shoa zone cooperative office • Ato Getachew Ayele	To organize farmers and milk producers in to cooperatives, Provision of training and other supports to coops	At zone level	Facilitate accessibility of loan for dairy development (is it only for loan facilitation)	Capacity building to farmers organizations, formation of coops for dairy marketing, managing conflicts and facilitate financing	Good Channel in disseminating innovative knowledge and skills in coops management and marketing	Positive. However, challenges such as budget shortage and lack of skilled man power hindered the change from going onwards.	Ambo		0911 75 10 28
West Shoa zone livestock development and health office • Dr Segni Shimelis	Provide health and related services to farmers	At zonal level	To maintain health condition of the livestock resource of the area, what is the development part about?	Could contribute to milk quality as they go working against various dairy animal diseases (mastitis, TB…)	May create opportunities on how to prevent livestock disease with cost effective manner	Positive. But, Budget and limited capacity' in terms of technical efficiency, physical resources are some of the challenges against changes.	Ambo		0913 12 58 82

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
W/ro Abebech Farm • Dr Endrias	Milk production and marketing	Ambo town	Interested in breeding and best breed heifer distribution, milk productivity and marketing	The farm sells milk directly to a café which belongs to the same person; which in turn the café sells macchiato and milk at a relatively cheaper price (0.50 birr less)	Serves as learning centre for Ambo University students, as testing ground innovations in relation to breeding, milk quality and productivity.	P	Ambo		0911 89 48 02
Ato Gadissa Gobena farm • Ato Biftu Gadiss	Milk production and marketing	Ambo town	Interest in breeding, milk productivity (He has a farm in Bako)	can play multiple role in the value chain through milk production and feed producer	Can serve universities as learning centres	Positive. The chronic water problem on the farm has put problems on expansion and development.	Ambo		0911 46 99 70
Woliso livestock development and health office	To provide husbandry and VET service to dairy herd owners in particular	Woliso	Improve health and breeding situation in the area	Improved forage supply there by quality and cheaper milk in the market of the area	Application of proved innovation through their regular service delivery	P	Woliso		0912 67 00 07 (Ato Fikadu Ketema)

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
Hassen Aman milk collector and trader	Collect milk and sending to Welkite	Woliso-Wolkite	Marketing, Chilling and milk quality	Plays active role in creating market opportunities for milk producers in Woliso	May contribute to traditional milk handling and preservation systems including milk quality control	P	Woliso		0911 33 48 16
Tullu Bollo livestock development and health office • Ato Tamirat Tsegaye	To provide health and breeding service to farmers in the area	Tullu Bollo	Providing AI and health service	Increase productivity through coordinated effort		P	Tulu Bollo		0911 08 60 34

Annexes

Annex 1

West Shoa zone Investment office Ambo

S.No	Kebele/location	Name of the investor	Sector	Sub sector	Capital	Size of land	Status
1	Senkelle and Faris	Deginet Gutema	Agriculture	Dairy farm and cattle management	1254.00	35.2ha	Operational
2	Ambo town	Gadissa Gobena	Agriculture	Dairy development	1500.00	17.5 ha	Operational
3	Guder 02	Alemu Assefa	Industry (related with dairy?)	Agro processing	6812.48	1.02 ha	Operational
4	Kolba lencha	Sileshi Abebe	Industry (related with dairy?)	Dairy and poultry farm and processing	3000.00	1.00 ha	Under construction
5	Addis Alem	Aster Dawit	Agriculture	Dairy farm and processing	1039.35	2 ha	Operational
6	Chire	High land dairy development enterprise	Agriculture	Dairy farm with processing	3333.34	10.26 ha	Under construction
7	Damotu	Koket PLC	Industry	Animal feed processing	5019.00	8.20 ha	Under construction

Annex 2 People Contacted

S.No	Name of the contacted person	Organization / responsibility	Telephone	Remark
1	Agere Mokonnen	West Shoa Zone livestock and milk expert	0911 979091/ 0112 36 37 50	
2	Ato Negash Ajema	Ambo Woreda Livestock development office	0922 42 28 47	
3	Ato Getachew Ayele	Agricultural coops work process	0911 75 10 28	
4	Dr Segni Shimelis	Livestock office health department	0913 12 58 82	
5	Ato Geremew Obssa	Sweet Café	0922 43 61 89	
6	Ato Nega Hirpo	West Shoa Zone investment office	0112 36 47 89/35/20	
7	Ato Biftu Gadissa	Biftu Frm manager	0911 46 99 70	
8	Ato Chere	Abenezer Hotel	0916 27 06 00	
9	Ato Fikadu Ketema	Woliso livestock office head	0920 67 00 07	
10	Ato Hassen Aman	Woliso milk collector and sender	0911 33 48 16	
11	Ato Tamirat Tsegaye	Tullu Bollo livestock office	0911 08 60 34	
12	Dr Endrias	Ambo University	0911 89 48 02	

Annex 3: Tullu Bollo woreda livestock development and health offices

- **Livestock population of the woreda (is this of only Tulu Bollo woreda?)**

S.No	Cattle type		Quantity as of 2003	Remark
1	Cows	Local breeds	21582	
		Exotic breeds	43	
		Total	**21625**	
2	Heifers	Local breeds	8845	
		Exotic breeds	97	
		Total	**8942**	
3	Calves	Male		The number of calves is not segregated in to male and female
		Female	8139	
		Total	**8139**	
	Bulls	Local breed	8844	
		Exotic breed	64	
		Total	**8908**	
	Herd total		**47614**	
4	Average yield/cow		1.5 litres/head	7-10 litres for cross breeds

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PART II - B

Hawassa–Shashemene–Dilla Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

This study is conducted as a pre-project assessment on eight major milksheds in Ethiopia. The Market-linked Innovation for Dairy Development Program (MIDD) is a Netherland Funded Project implemented by Wageningen University & Research and SNV Netherlands Development Organization. The study covers eight milksheds. The assessment was conducted in two teams. This report (1 out of 4) covers the assessment of one of the following milksheds:

- Western Shoa (Ambo, Tullu Bolo and Woliso)
- Hawassa-Shashemene and wider environment (including Dilla, Kofele, Dodola, Alaba and Yirgalem)
- Gondar, Bahir Dar and wider environment
- Mekele and wider environment

1.1 Objective of the study

The objective of the study is to provide preliminary description of eight milksheds of Ethiopia out of which four will eventually be selected by the program for its further planning. The assessment is expected to come up with report, which addresses:

- Characterization of the milksheds, substantiated by data, at area and woreda level
- Overview of the value chain in the area
- Assessment of the stakeholders involved in dairy in the area, and their geographic coverage.

1.2 Methods of data collection

During the study of this project, multiple tools of data collection have been employed. Both qualitative and quantitative data have been collected for the study. In order to get comprehensive and useful information the study team has used the following data collection techniques.

- Review of secondary resources: This includes researches and reports from International organizations, NGOs, government offices, private organizations and cooperatives. Internet resources were also explored.
- Interview: Ranges of persons who are at different position and offices have been interviewed during the study. Government office holders, private business managers (Supermarkets, farms…) cooperatives, International organizations and individuals were interviewed during the study.
- Observation: the study team employed observation as additional key tool to feel gaps that could happen during the data collection. Dairy farms, smallholders' backyards and cafe's are among the visited sites. Pictures were used to retain observed facts.
- Key informants: Key informants were also interviewed.

1.3 Limitation of the study

Because of the limited time allotted for the study, reports and analysis submitted in this study are limited to the availability of information. As a result the depth of data and information presented in this report varies from one milkshed to another.

1.4 Overview of the Ethiopian Dairy Sector

Ethiopian modern dairy development activities date since 1940s soon after the end of the Second World War. Its development over these years was highly influenced by the nature of political system where the

countries were in. The sector registered a relatively better pace in recent years than its majority past. The number of smallholders, commercial farmers, cooperatives, processors, and retailers increased significantly.

Category of the Dairy system: The Ethiopian dairy systems can be categorized under five systems of operation; pastoral (traditional pastoral livestock farming), Agro-pastoral (Traditional lowland mixed livestock farming), mixed crop livestock system (traditional highland mixed farming), Urban and peri-urban (the emerging smallholder dairy farming) and Commercial (specialized commercial intensive dairy farming) (Ethiopian Dairy Policy Inventory 2009)

Dairy products: In the Ethiopian context, the type of milk and dairy products that needs to be considered are whole milk (liquid milk, *Ititu,* Ergo, buttermilk etc.) and other dairy products from fermented processing (butter, ghee, Ayib, Metata Ayib etc.),
Production: From the overall Ethiopian milk production, the rural dairy system, which includes Pastoral, Agro-pastoral and Mixed crop livestock system, contributes 98%, while the peri-urban and urban including the commercial dairy farms produce only 2% of the total milk production of the country. Indigenous stock produce 97% of the milk produced from cattle and the remaining 3% from improved exotic crosses and pure grade cattle. Most of the milk produced in the rural dairy system is retained for home consumption and it is non-market oriented (CSA 2008/09).
According to the survey of CSA, the annual net cow milk production for the rural sedentary areas of the country during Nov. 11, 2009 to Nov. 10, 2010 is about 4.06 billion litres. On the other hand, the estimate of camel milk for the same areas of the country is about 262.8 million litres (CSA 2010).
Utilization: Based on CSA survey in 2009/10, the utilization of dairy products in rural Ethiopia reveals that of the total annual milk production, 85% was used for household consumption, 7% was sold, only 0.3% was used for wages in kind and the remaining 8% was used for other purposes (could be for the production of butter, Cheese, and the likes). With respect to the utilization of butter, 61 per cent of the produce was used for household consumption although considerable portion (36%) was sold. Most of the total Cheese produced was used for household consumption that is about 87 per cent, and the rest about 3 % was used for other purposes (CSA 2010).

1.5 Policy environment

There is no consolidated or comprehensive dairy policy in Ethiopia. Nonetheless, based on study conducted by SNV, the existing fragmented policies and strategies at sectoral level and programs developed thereof in Ethiopia had indicated that the overall objective of the policies and strategies are more or less comprehensive in addressing basic principles of development with a the exception of few items. Intuitional capacity, ownership, follow-up, coordination and continuity are among the main challenges that deter the effectiveness of these policies. Livestock policy has been draft in 2002(SNV 2009). Some of the relevant issues on dairy development are summarized and annexed to this report. The study team would like to emphasize on the current three major strategies and programs which have direct relevance to the dairy sector development.

a. **Agricultural Development Led Industrialization (ADLI):** ADLI is the fundamentals of agricultural development in the country's overall economic development policy. Thus, agricultural development is expected to adequately drive the process of industrialization. Firmly anchored on ADLI is the Rural Development Policy and Strategies (RDPS), which is designed to ensure, among others, effective and efficient utilization of resources to promote agricultural growth, integrate agricultural development activities with other sectors, and establish effective agricultural marketing system.
b. **Growth and Transformation Plan (GTP):** GTP is a five-year strategy of the Government of Ethiopia for the period from 2010/11 to 2014/15. The plan indicated that Dairy resource

development technology is one of the focuses in livestock resource development strategy.[6] The expansion of infrastructure mainly road and electricity will have a direct link to dairy marketing. Lack of access to road deprived a lot of smallholders to reach collection centres and markets. Frequent interruption or absence of 24 hours electric power supply discourages shops and retailers to distribute dairy products.

c. **Agricultural Growth Program (AGP):** AGP is a multi-donors program designed with the objective of ending poverty and enhancing growth. Its strategic intervention will have some peculiar features. These are:

iv) Comprehensive: AGP is a broad based program that attempts to improve the whole range of production, marketing and agro-processing of agricultural products through enhancing productivity, value addition, and market and irrigation infrastructure.

v) Value chain: The program will be implemented along the value chain dealing with stakeholders including producers, assemblers/traders, processors, distributors, exporters, retailers and finally consumers.

vi) Decentralized and demand driven**:** Bottom-up planning process will be practiced to give greater power to kebele and woreda level development initiatives with particular attention to ensuring equal and active participation of both women and men.

Program Scope and Target areas: AGP is a five-year program and will operate only in four regions; namely, Amhara, Oromiya, Southern Nations, Nationalities and People's (SNNP) and Tigre. Based on criteria such as suitability for agriculture, potentials for irrigation, access to infrastructure and institutional capacity, 80 woredas are selected; i.e., 34 in Oromiya, 22 woredas in Amhara, 19 in SNNPR and 5 in Tigre.

AGP Components: AGP gives a priority to improve the livelihood of small farmers. Inseparably, it supports key public institutions and private business that have multiplier effect on the growth of the agricultural sectors along the value chain. Major components of the program are broadly categorized into two. These are (i) Agricultural Production and Commercialization, (ii) Small-scale Rural infrastructure Development and Management. Three sub-components are identified under the first component. These include: institutional strengthening and development, scaling up of best practices and market and agribusiness development.

Program costs AGP is estimated to cost about USD $ **281.2** million. A number of donors have shown interest to finance the program (World Bank, UNDP, CIDA, REN, USAID and others). The GoE and the beneficiary population will also put in significant resources for the accomplishment of the program.

Program management: AGP is a government program and its implementation will follow government policies and strategies in a way it ensures transparency and local ownership. The MoA at federal and the sector Bureaus at Regional and woreda levels will have the overall responsibility and accountability for execution of the program.

Out of the 80 AGP Woredas, the following Woredas are within the four milksheds discussed in this report:

- Ambo – Tulu Bolo and Woliso Milkshed: Ambo, Bacho (Tulu bole), Wenchi and Woliso
- Bahir Dar – Gondar Milkshed: Bahir Dar Zuria. Dangla woreda is in close proximity to the milkshed.
- Shashemene – Hawassa – Dilla Milkshed: Wondo Genet
- Mekele Milkshed: Woredas in close proximity to the milkshed are Ofla, Raya Azebo and Endamehoni

[6] Growth and Transformation Plan, Government of Ethiopia

The following are outputs of AGP in relation to livestock breed improvement (See Annex 6 for detail information):

- Four semen collection and processing sub centre established i.e. one in each program region;
- NAIC strengthened and delivering quality training and technical assistance services,
- Holetta Bull Calf Rearing Station strengthened;
- The capacity of Seven Liquid Nitrogen Plants built;
- Four AI technician training sub centres of program regions strengthened;
- Capacity of existing AI staffs upgraded;
- 140 additional AI technicians trained;
- 220 farmers trained as Assistant inseminators;
- Technical Assistance to private AI service actors provided;

2 Shashemene - Hawassa - Dilla milkshed

2.1 Administrative Map of the milkshed

Shashemene – Hawassa – Dilla milkshed located in south of Addis Ababa in West Arsi zone of Oromiya regional state, Sidama, Alaba and Gedio zone of SNNPR regional state along the main roads. Figure 1and 2 show the map of the milkshed.

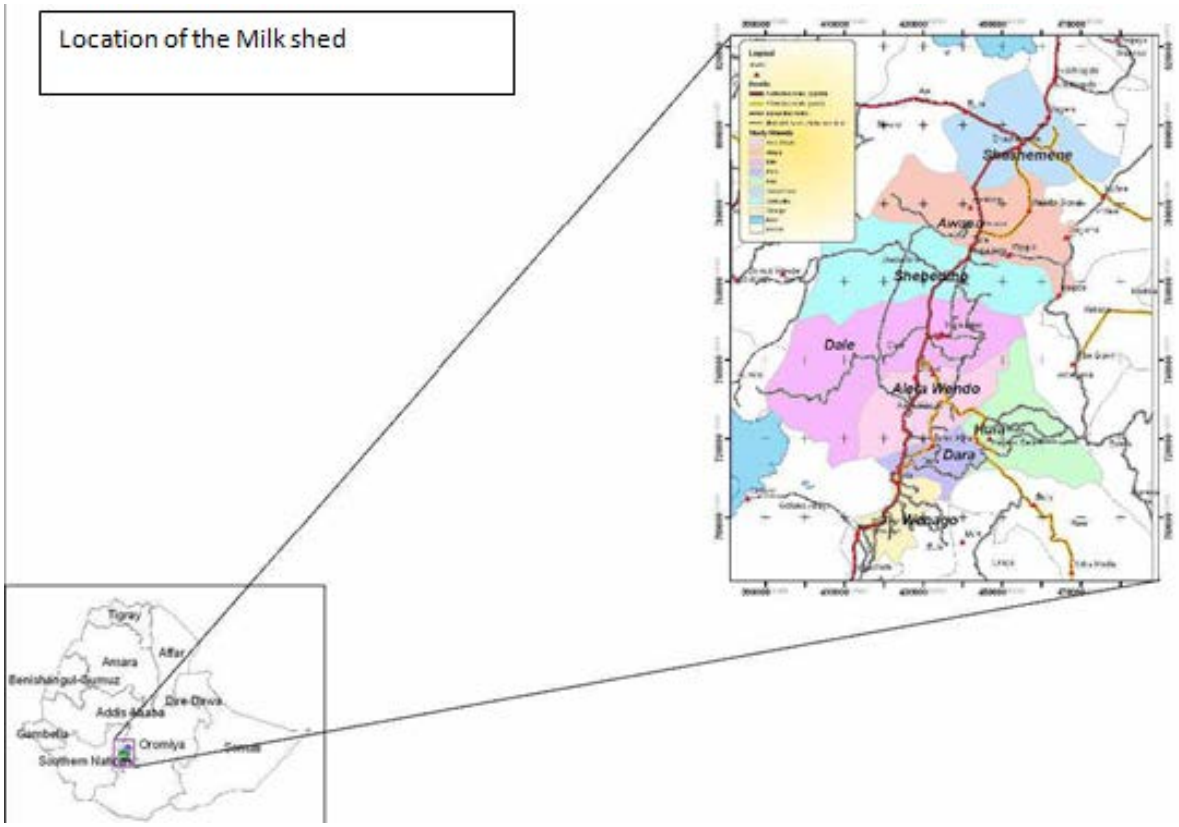


Figure 1 *Administrative Map of the milkshed.* Source: Wolde Michael Somano

Figure 2 *Shashemene – Hawassa – Dilla Milkshed* Map: Google earth, milkshed sketch by study team

2.2 Description of the Milkshed

Most of parts of the milkshed are located within the Great Rift Valley. According to study made by IPMS, more than 97% of the urban producers in the town of Shashemene, Hawassa, Dale and Dilla use their own residence compound for dairying, which is only 200–400 square meters (Sinatyehu et al 2008). Average herd size per household in the cereal based mixed system (3.8 ± 0.42) was higher than in the *enset*–coffee based systems (2.3 ± 0.36). Out of the total herds of urban producers, 32% of cattle were local cows while 19% were crossbred. An estimated total of 9,645,020 litres of milk was produced annually from 4463 small and medium farms in the four towns. The majority of producers (61.7%) in the mixed crop–livestock system process milk at home, while the majority of urban producers (79.2%) produced milk for sale (Sentayehu et al 2008).

According to 2007 census, out of the total population of SNNPR, Protestant represents 56%, and Orthodox Christian 20% and Muslim 14%. Orthodox Christian in the urban area of SNNPR is higher than the region average, which 39%. When it comes to the specific milkshed, Protestant religion dominates in Sidama and Gedeo zone, whereas in Arsi and Alaba, Muslim region is dominant. Based on the census of 2007, Orthodox Christian followers have significant numbers in towns than in urban areas of SNNPR. This is evident from the fact that the Christian fasting seasons has significant impact on the demand for milk products.

According to Central Statistical Agency survey of 2010, number of dairy cow in Hadya, Sidama, Gedio and West Arsi zones is 230,558, 827,205, 33,551 and 418,924 respectively. Table 1 shows the estimated annual milk production in the year 2010. Total milk production was not estimated for Sidama as information on average lactation period is not provided.

Table 1

Dairy cow Population of Shashemene – Hawassa – Dilla milkshed

Geographic Area	Number of Dairy Cows	Number of Milking Cows	Average Daily Milk Prod. (litre/day/cow)	Average Lactation Period (Months)	Total Milk Production (Lt)
Hadiya	230,558	186,396	1.186	7	44,828,878
Sidama	827,205	632,507	*	7	*
Gedio	33,551	27,021	1.168	5	4,832,700
West Arsi	418,924	425,958	1.561	7	141,950,051

Source: CSA (Dairy cow population does not include non-pregnant heifers and calves.

2.2.1 West Arsi zone

2.2.1.1. General Information

Main town of West Arsi Zone is Shashemene. Shashemene is a business hub for a number of Woredas in Oromiya and SNNPRs including Bale, Hawassa, Alaba, Arsi Negele and Wondo Genet. The town is busy at all times. Dairy development is mainly in urban areas of the zone. Famers (rural communities) are mainly engaged in crop production. The relevant woreda for the milkshed are Arsi Negele, Kofele, Dodola, Shashemene and Shala. Table 2 shows the population of the woreda. The total population of the zone is 2.2 million.

Table 2

Relevant woreda in West Arsi Zone

Population density 188

Woredas	Male	Female	Total
Zone Total	**1,097,757**	**1,115,962**	
Shala	84,045	83,949	167,994
Arsi Negele	145,775	148,437	294,212
Kofele	100,865	100,224	201,089
Dodola	107,438	111,489	218,927
Shashemene Town	59,941	58,940	118,881
Shashemene Surrounding	137,928	138,650	276,578
Total: Relevant woreda	635,992	1,757,651	2,393,643

Source: CSA 2010

2.2.1.2 Features of Dairy production in West Arsi Zone

AI Service: The livestock office provides AI services. This service is challenged by frequent shortage of semen and nitrogen at distribution centres. Agricultural offices in Arsi zone obtain semen from Asella, and if not available the second option is Kaliti National Artificial insemination centre.

Feed: The livestock office has 1.5-hectare plot of land of its own for forage development. The land is used by the office for forage trials and researches that could serve as demonstration site for farmers on improved pastures/ forages. Among the on-going projects are:

- Promotion of silage feed with project under Professor Girma Abebe, Hawassa University. The feed development is actually targeted for sheep and goats.
- Some NGOs are working on multiplication of new varieties of forage and distribute to farmers.

According to the estimate of the livestock agency office of West Arsi zone, 90% of feed source is pasture (natural grazing). For smallholders in Arsi Negele and Shashemene area, conventional feed such as residue of local liquor (attela) production (Areki) are important feed sources for dairy cows.

Review of Dodola woreda dairy features

- Dodola woreda is found in West Arsi Zone, east of Shashemene. It was one of the sampled woreda for this assessment. According to the livestock office of the woreda, the livestock population is estimated to be 116,000 based on a survey made in the year 2003. Among these, dairy cow population is estimated to be 2,585.
- **Breeding (better use AI or Breeding as title):** The only AI service provider in the woreda is the office of agriculture. During the year ended June 30, 2010 and 2011, it provided 1140 and 862 AI services respectively. Budget and shortage in supply of semen contributed for low performance in 2011. Three farmers were trained as AI technicians. These trained technicians were drawn from famers and was organized by the regional livestock agency in collaboration with an NGO. AI equipment is not yet distributed to them. The demand for AI service is high. The necessary supplies, which enable provisions of services, are to be availed by the regional government; yet, the necessary requirements are not fulfilled. The trained farmers would be the one who manage the work right after fulfilment of equipment. The assignment of AI technicians will play a significant role in passing down technologies and minimize costs arising from missing of heat periods, communication and travels expenses.
- **VET services: There are nine health centres in** the woreda. The health centre at Hiraro provides both AI and health services. Health centres are not established in three kebeles.
- **Feed:** According to the livestock officer, forage development is the most neglected issues. Feed is mainly based on hay and factory by products. The area is well known for crop production than dairy development and hence little is done so far for feed development.
- **Milk Production:** According to the woreda livestock office, the average daily production of milk is 2 litres for local breeds and 12 litres for cross breeds.
- **Milk marketing:** major customers for the smallholder farmers are cafes and hotels. Households also purchase on contractual basis from smallholders. The price of one litre of milk is 6 birr. It is estimated that the daily milk sales in the town is about 300 litres. To address common challenges of the smallholders, a cooperative was formed with a membership of 44 people. However, the coop liquidated because of less commitment among members. The livestock office is considering re-organizing of the cooperative.
- **Challenges:** Shortage of semen and nitrogen is a challenge to the livestock office. Feed cost is increasing (Concentrate costs Birr 900 per quintal, and one small size sack of hay cost Birr 13).

2.2.2 Hawassa Town

Hawassa (formerly Hawassa) is a capital city of SNNPR, 267 Km south of Addis Ababa. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia, this city has a total population of 258,808, with an area of 157.21 square kilometres; Hawassa has a population density of 1,646.26. While 157,879 or 61.00% are urban inhabitants, a further 616 or 0.24% are pastoralists. A total of 61,279 households were counted in this city, which results in an average of 4.22 persons to a household, and 57,469 housing units.
According to a report of Municipality of Hawassa town, Hawassa Junior Agricultural College and SOS Children's village had been supplying the town with milk since long period of time. Currently the town of Hawassa is major sales outlet for milk and milk products for the dairy farmers in the town of Hawassa and nearby surroundings including Shashemene and Arsi Negelle. Pasteurized milk of Sebeta Agro Industry is also

distributed through supermarkets of Hawassa. The dairy value chain actors' features of Hawassa will be explained in the value chain section of this report.

Effort made by the team to get the recent dairy cow population in the town of Hawassa was not successful. Based on a survey made in 2007 by Wolde Michael Semano, the dairy cow population of Hawassa town was 873 Local breeds and 383 cross breeds (Semano 2007), (Annex 1). As indicated by officers in the bureau, the livestock data consolidated at the level of Bureau of Agriculture of SNNPR are not reliable. Some Woredas exaggerated their livestock population data with the intention of having big budget for VET services.

2.2.3 Sidama Zone

There are 19 Woredas in Sidama zone with estimated population of 3.3 million with a population density of 506 people per square meter (Table 3). According to zonal Agriculture department, there are 9 Woredas known for better milk production. Out of the 9 milk Woredas, the largest milk producing Woredas are Dale, Aleta Wondo, Wondo Genet and Dara (Table 4). The Zonal office does not have data on the population/ farmers engaged in dairy development.

- **Milk production:** Based on the study of the woreda, the average milking per cow is 1.5 for the local breeds and 8 litres per day for the crossbreds.
- **VET services:** There are 11 animal clinics and 29 health posts. No private vet clinic operating in the zone. There are 5 drug suppliers in the zone. Information was not available as to the performance of the vet clinics and health posts.
- **Breeding Services:** AI service is provided nearly in 14 Woredas. According to the office, the success rate (conception rate) is 74% that is 1.35 times AI service per cow. This is to mean that there is high success rate in providing AI. This rate of success could be a function of timely identification of heat period, well-experienced AI technician, quality of semen, health of the cows and the overall management system. The service charged by the office for AI is Birr 5 per session.

Table 3

Human Population of Sidama Zone Population Density: 506

	Male	Female	Total	Town	Population
Zone Total	1,672,566	1,639,462	3,312,028		
Shebedino	132,294	129,797	262,091	Leku	15088
Hawassa Zuria	69,816	68,619	138,435		
Dale	139,247	135,577	274,824	Yirgalem	38702
Aleta Wondo	109,382	104,393	213,775		
Dara	85,942	88,477	174,419		
Borecha	140,497	139,532	280,029		
Gorchi	59,747	58,043	117,790		
Malga	62,267	60,498	122,765		
Wonsho	50,844	49,209	100,053		
Luko Abaya	56,377	54,160	110,537		
Cheri	67,527	66,819	134,346		
Bursa	57,739	57,892	115,631		
Checko	96,071	90,921	186,992		
Bona Zuria	68,350	67,466	135,816		
Wondo Genet	90,630	86,321	176,951		

Source: CSA 2010

- **Bull Services:** İndividual farmers provide Bull services. With a program funded by Plan International, farmers were provided with bull, which they will retain it after providing 100 breeding services to fellow farmers. Some farmers purchase by themselves. Bull service is provided at Birr 25 - 30 per mate. Most of the bulls used in rural areas are local breeds whereas bulls distributed with the knowledge of the agricultural department are crossbreds. The department advises and provide services on the determination of blood level of the bulls to be distributed. Cross breed bulls are mainly sourced from Wolayta area. During the year ended June 30, 2010, the department throughout the zone recorded 2815 AI services and 4,934 bull services. In the same year, a birth of 2, 664 calves were reported.

Table 4 a

Livestock Population in Sidama Zone Zones within the milkshed (2010)

		Local Breed					
	woreda name	Cows	Heifer	Calves	Cows	Heifer	Calves
1	Shebedino	35967	18391	19606	193	59	145
2	Hawassa Zuria	49282	19662	25705			
3	Dale	60670	28204	26198	586	230	180
4	Aleta Wondo	47383	22619	16118	372	130	109
5	Dara	27804	8180	8038	240	67	70
6	Borecha	52958	21973	34252	15		
7	Gorchi	60610	21436	17073		89	72
8	Malga	30478	8774	11331	6	6	
9	Wonsho	19265	9108	5044	42	23	28
10	Luko Abaya	39219	20606	10933			
11	Cheri	63783	13453	21984			
12	Bursa	38849	17229	15922	26	6	16
13	Checko	35595	5762	9159	124	27	49
14	Bona Zuria	40000	11058	12054	8	8	4
15	Wondo Genet	25238	7915	13124	250	115	314

Source: Sidama Zone: Office of Agriculture: Livestock Department

Table 4 b

Woredas outside the main road but with relatively high cross breed cows

S.NO	Name of the woreda	Local breeds			Cross breed		
		Cows	Heifers	Calves	Cows	Heifers	Calves
1	Arbegona	70067	19519	25024	129	29	43
2	Hula	38574	17229	15922	131	67	70

Source: Sidama Zone: Office of Agriculture: Livestock Department

- **Feed:** In Sidama Zone, the source of animal feed particularly dairy cows is, mainly from hay and natural grazing. Smallholders around urban areas uses factory by products in addition to hay and sometimes roadside grazing. In order to reduce the feed shortage challenge in the area, the agriculture office delivered varieties of forage seeds to the farmers such as elephant grass, Rhodes species, legumes, herbaceous trees and so on, so that farmers can grow them in their personal yards. Data was not available as to the quantity of the seed provided. There is a flour factory in Aleta Wondo that supplies by-products to urban farmers.

2.2.4 Gedio Zone

Gedio zone is located in the SNNPR region at the south most part of the Shashemene – Hawassa – Dilla milkshed. It has a population of 960,000 (CSA 2010) with a high population density of 792 people per square meter. According to the livestock office of the zone, there is a total of 211,177 cattle population (Table 5). Detail Data, which shows by cow and breed type, was not available to the team. It is estimated that (according to livestock officers) cow population would be about 30%.

- **Vet and AI services:** The livestock unit of the zone provides AI services in all of the six Woredas (Table 6). Two bulls, owned by farmers, are available for breeding services in Bule woreda. A cooperative in Kochere woreda has a bull for breeding service. There are six vet clinics and 4 private drug stores. Private farmers like Beteseb Farm (in Dilla town) use their own bull for breeding when AI service is not available.

Table 5:
Livestock population of Gedio zone

S.No	Woreda name	Cattle number
1	Dilla Zuria	25215
2	Wonago	11512
3	Yirga Cheffe	54762
4	Cochere	12663
5	Gedeb	43510
6	Bule	63515
	Total	**211177**

Source: Gedio zone livestock office

Table 6
Summary of vet and AI services in the woredas

S.No	Type of service / service providing institution	Quantity per year	Remark
1	AI service provided	1350	230 in Dilla
2	Bull service	1334	3 bulls. 2 bulls in Bulle woreda (brought from Wolayta ranch); the other is in Kochere woreda
3	Vet clinics	6	
4	Private drug vendors	4	
5	Government drug vendors	6	All the clinics provide drugs as well

- **Milk production:** According to Gedio zone livestock office, the average daily milk production from local breed is estimated to be 1.5 to 2 litres. However, the cross breeds provide 5 to 7 litres per day.
- **Feed:** There is one factory in Dilla town, which provides wheat by-product feed. Most of urban smallholders get concentrate feed from this factory. As the supply is limited, other factory by-products are sourced from factories in Mojo and Akaki. For the rural community, natural grazing is the main source of animal feed. There is 2300 hectares of grazing land in Bule woreda and 3000 hectares of grazing land in Gedeb woreda. Some of the grazing lands are private and some are under public ownership. Large-scale forage development practices can be done on both the private and the public grazing lands to mitigate shortage of feed and maximize production/head of livestock.
- **Milk Marketing:** Milk supply in the zone is far behind the demand. Whatever produced will be sold. In Dilla, the maximum milk price has been recorded during the study. At Beteseb Farm one litre of milk is sold for 15 birr. Small quantities of milk are sourced from Guji zone (which is adjacent woreda in Oromiya regional state). The rural surrounding communities sell butter but

not milk. Selling milk is derogatory and of the volume of milk from local breed is not big enough for marketing. Communities in the surrounding have not the culture of selling milk. Arbegona is one of the sources of butter for butter demands for Dilla town. Though there are two cooperatives in Dilla town, their contribution to the milk supply and marketing is minimal to support the demand of the dwellers.

- **Collection centres:** Collection centres were established in Yirgachefie area, Dumorso Kebele (5km from Yirgachefie) that is in the zone but far (southwards) to this milkshed. The collection centre has not yet commenced operation. The collection centre was constructed with the help of SNNPR Bureau of Agriculture to be run by a dairy cooperative. The Bureau had also supported the cooperative with dairy processing equipment. Because of the disagreement of members, the cooperative was dissolved. There is recent initiative by the woreda office of agriculture and cooperative office to re-establish the cooperative and to commence operation.
- **Pricing: Dilla** is the most expensive town in the milkshed for fresh milk. The current price of a litre of milk is Birr 15. One glass of boiled milk is sold at a price of Birr 3 (which is Birr 18 per litre up on retailing). Yogurt is sold at a price of Birr 4 Birr per cup.

Table 7

Population of Gedio Zone

(Density - 792)

S.No	Zone Total	Male 481541	Female 478520	Total 960,061
1	Wonago	65389	66029	131,418
2	Yirga Chefie	109576	110047	219,623
3	Kochere	72852	74000	146,852
4	Bule	59302	58587	117,889
5	Dila Surrounding	54**956**	**54526**	**109,482**
6	Gedeb	79841	79533	159,374
7	Dila Town	39625	35798	75,423

CSA (2010)

2.3 Dairy Value Chain

Shashemene –Hawassa –Dilla Milkshed Dairy value chain comprises of the input providers, farmers (both smallholders and commercial dairy farmers), collectors, processors, retailers and consumers. There are a number of market chains within the overall value chain. The typical market chain is: Farmers > collector and Processor > Supermarkets and Cafes > consumers. Short market chain such as farmers direct to consumers (households) and Farmers > Cafés > Consumers are often common in all places with in the value chain. ALMI Milk plays triple roles in the value chain as a collector and processors and retailers as most of the big size processors Sebeta Agro and Lame are functioning. Figure 2 shows the value chain map. Each actor is described in the following section.

2.3.1 Input Suppliers

Feed: There are few flour factories in Hawassa town, which are among the sources of feed supplies to urban farmers in Hawassa and nearby towns. As the volume of the supply is not sufficient, many farmers are often sourcing feed from factories in Mojo and Nazareth (Adama) town. *Atella* (residue of local alcohol brewery) is supplied by households in the locality of Arsi Negelle to dairy farmers.

Elto Union - Feed Processor: A union called Elto in collaboration with VOCA is engaged in the establishment of feed processing plant. The civil work is completed. The Union will distribute feeds to Woredas in the zone after the commencement of operation. The union members are coops of crop producing farmers. The farmers will supply low-grade grains and grainy disposals for feed preparation as an input. There is no commercial plant for feed processing.

VET and AI Services: There is a number of VET drug stores mainly in Hawassa and in almost all of main towns in the milkshed. As stated in different parts of this report, livestock offices in the respective Woredas agricultural offices mainly provide AI and VET services.

Heifers and cows: Shashemene and Wolayta areas are among the main sources of heifers for new entrants and for those who wish to expand their stock through acquisition. A breeding farm at Kofele area is the sole private distributer of cross breeds and it is the only heifer multiplication and distributer within the milkshed.

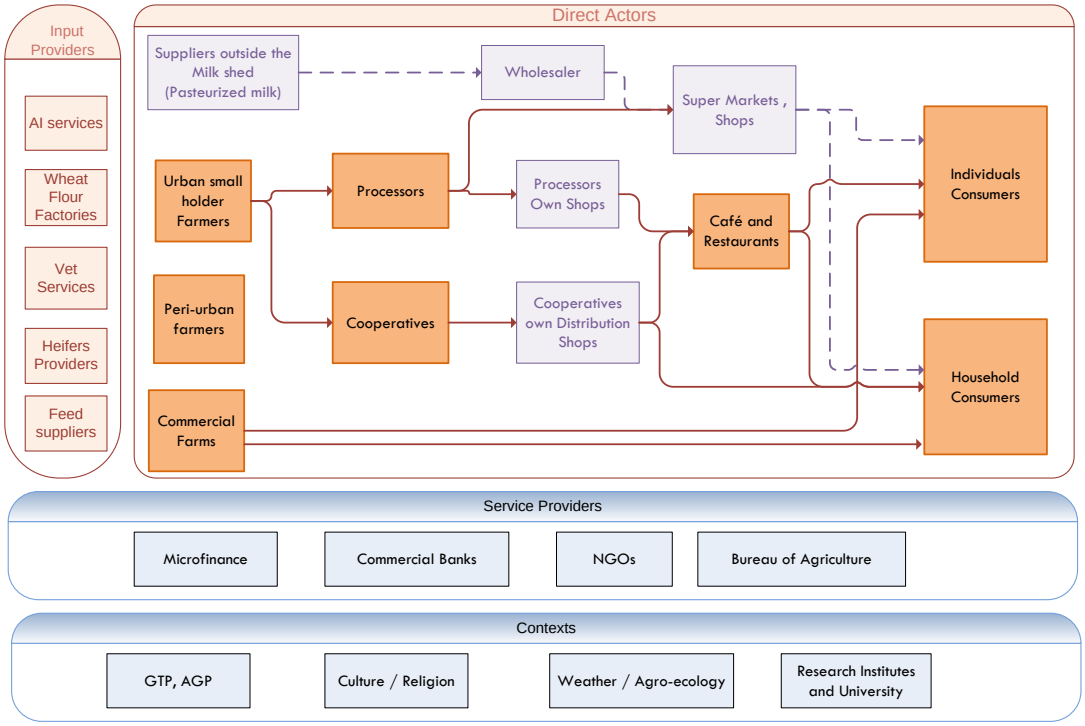


Figure 3 *Shashemene – Hawassa – Dilla milkshed Value Chain map Source: based on the survey*

2.3.2 Chain Actors

2.3.2.1 Smallholders

a. **Arsi Negele**: There are a lot of smallholder farmers in Arsi Negele. Though it is not possible to determine the number of livestock population, ALMI Tikus Milk Company collects more than 1500 litres per day. Because of the culture of producing local alcohols (Arake) in the town, distillation residues (cakes) are widely used as conventional feed for dairy cattle.

b. **Shashemene:** There is a large number of smallholders in Shashemene. Some of the smallholders are members of Biftu Dairy Cooperative.

c. **Hawassa:** In Hawassa there are a number of smallholders who mainly supplying to household customers. According to Woldemichael, there are about 283 cross breed cows owned by smallholders (1-5 cows) and 100 cows owned by farmers with holding of 6-10 cows (Woldemichael 2008).

According to the assessment of the team however, the current size of dairy cow is much higher than what estimated in the year 2008. The demand for milk is high. As it is a regional town, there is a sizable number of civil servants, educated family and traders who afford to buy milk at least to their infants. According to 2007 census, more than 60,000 households dwell in Hawassa.

d. **Dodola:** There are a number of smallholders in the town of Dodola. With the initiation of the government, cooperative was formed but did not go well. The team has visited two smallholders.

Ato Ayalew: He has two lactating cows in the herd. He started the business in 2008. He produces 10 litres of milk per day and his customers are hotels and cafés in the town of Dodola. One litre of milk is sold at a price of Birr 6, when it is for a café and restaurant, whereas the price for a household is Birr 9. During fasting seasons, the market declines and he converts it into butter and Ayib. Buttermilk has a good market. The rural community drinks more milk. Unlike other farmers, farmers in the surrounding do not keep dairy cows of their own. Male calf with age of one are often sold for Birr 1000.

For Ato Ayalew, the ever increasing feed price (concentrate feed 350.00 birr and nough cake 1000 birr per quintal) and limited supply (no trader supply feed in Dodola) is a challenge. Straw, which used to be cheaper in the past, is now getting expensive. He used to feed them three times a day, but now he reduces it to twice a day because of feed problem.

AI and VET Services: AI service is not readily available when demanded. He has a pressure from his neighbourhoods because of the size of his barn (at his backyard), and the lack of sufficient space for the disposal of waste is a worrying challenge. VET service is available on demand from the office of Agriculture.

Market challenges: Hotels and cafés are returns the milk when electric power is off.

W/ro Nuria: She started the business a year ago in 2010. She has one milking cow that gives 25 litres per day. She sells one litre of milk for 5 Birr to households. Her selling price is lower than Ato Tesfaye's sells. This is because of the location of her home, which is a bit away from the main road. During the Muslim fasting seasons, she sells milk during the evening. Butter produced will be consumed at home. She has now constructed a shop along the main road to have her own milk distribution shop and to sell her product between Birr 7-9 per litre.
Vet and AI service: She gets AI services from the Government offices and VET services from both Government and private individuals. There is one retired animal health worker rendering vet services for livestock holders in the town. He provides the service informally for the people just at his home. There are two drug vendors in the town.

e. **Sidama zone:** Most of the dairy farmers are well known to the agriculture department of the zone. There are a lot of smallholders in the zone. Individual farmers such as Mulugeta Tamene and Assefa Daya in Aleta Wondo (9 cows and 5 cows respectively), Getahun Abebe in Dale woreda (8 cows), Jemal and Shiferaw in Dara woreda are among the notable dairy farmers[7].

[7] According to Livestock unit of the Department of Agriculture – Sidama Zone

2.3.2.2 Commercial farmers

a. Kofelle

Gobe Farms Kofele (Ato Moges Tefera): Animal Breeding and Multiplication Centre: The farm has 1200 dairy cattle. This includes cows, heifers and calves. The farm was originally state owned farm. However, currently has been privatized. The major objective of the farm is heifer multiplication and distribution to the local market. The farm has currently 50 % blood level exotic breeds. It distributes cows to the local farmers on 30% discount. The farm facilitates loan to the receiving farmers. Farmers are provided with the heifers when they finally settled the last payment. The heifer will be maintained under custody of the farm. Sold heifers will stay in the farm until they become pregnant. When they give birth to calf, the owners will take them to home. The farm organized farmers to form association of milk producers so that they could supply their milk to the farm. The farm is situated in suitable agricultural zone for dairy farming. It has additional two multiplication centres called Deyu and Bershe.

Marketing: The farm collects milk at a price of Birr 5.50 per litre from farmers and gives it to distributors at a price of 7.5 birr. The distributors retail it again at a price of 12 birr. The existing profit margin enjoyed by the distributer worries the farm that it may discourage consumers to buy more or restrict other potential buyers from buying. In addition to selling through distributers, it supplies to cafés and hotels in the town of Kofele. The farm has plan of opening own milk selling shop in the town of Kofele and to open its own processing unit. Currently, the farm shed 252 litres of milk from both the farm and collection. During the dry season, milk product reduces. Calves are sold soon a buyer comes. The farm sells one pregnant heifer at a price of 10,000.00 and the demand is high.
AI and vet services: The farm has its own experienced AI technicians and health expertise and also provides AI services to the local farmers on 10.00 birr. Wolkite is the source of semen.

b. Hawassa: Eight dairy farms from Hawassa are listed in a dairy directory prepared by Land O' Lakes. The team has visited one commercial farm in the town of Hawassa.

Aberash Workneh Dairy Farm: The farm was established 4 years ago in the outskirt of Hawassa. The farm has 30 milking cows and about 25 heifers.
AI and vet services: The farm gets AI service from the agriculture offices. It pays Birr 5 paid for the service. On average, a single cow may receive 3-4 AI service until it conceives. The farm has its own private vet doctor. At this time around, there are no serious infectious diseases. There are some cases of mastitis. Some three years ago, there was an incidence of abortion of pregnant cows in from which more than 11 calves died. Survivors of this occurrence were left with blind eyes and other congenital defects.

Milk production: The highest yielding cow gives 20 litres of milk a day. During the fasting seasons, sales volume of milk reduces significantly. The unsold milk would be converted into other milk products such as butter and Ayib.
Marketing: Most of the customers of the farm are households. Milk is distributed in two sessions, during the morning and evening. The remaining milk is sold to restaurants.

c. Dilla town

The team visited two dairy farms in the town of Dilla.

Hasensha dairy farm: The farm was established some years ago by the help of the Government of Netherland to help orphan children in the area. The farm is not doing well and poorly managed. It has a big compound at the outskirt of the town. According to the attendant, more than 11 cows died of Tse Tse fly bite, poor health and poor feeding. During the visit time, the farm was under closing out process. There are board members who are supposed to oversee the operation of the farm. In addition, there are employed farm attendants.

Beteseb Dairy farm (Dilla Ato Tadesse):
This farm was established in 2004 with three dairy cows. The farm has a wonderful recording system including logbooks and activity ledgers per cow. Table 8 was extracted from the registers. The farm has 12 workers and has excellent farm management particularly in disease prevention. Since the establishment of the farm, no single cow died due to infectious disease, except one cow that died of calcium deficiency.

Beteseb Farm customers are mainly households who are mainly buying for their infants. Currently the farm has about 21 household customers. The owner of the farm has opened sometimes ago a café adjacent to the farm to combat price fluctuations at the time of fasting seasons. The café is named Fioree Café. At Fioree café, 36 litres of yoghurt and 8 litres of hot milk is sold per day.

Table 8

Dairy cows and cattle data: Beteseb Farm

S.No	Farm output		Quantity
1		Lactating	10
	Cows	Pregnant (not lactating)	1
		Total	**11**
2	Heifers	Pregnant	3
		Non pregnant	8
		Total	**11**
3	Calves	Male	2
		Female	4
		Total	**6**
	Herd total		28
4	Average herd yield		85 litres
5	Average yield/cow		8.5 litres
6	Lactation period		1 year
7	Number of service per conception		1-2 service/conception

Source: Beteseb Dairy Farm

During the fasting season, milk sales lasts only for about three hours, which is normally sold out (during non-fasting season) in an hour time.

The owner of the farm has land problem to expand the farm. According to the farm manager and owner, he was been requesting land for the past ten years, however, due to different reasons, yet he did not access land for expansion to big a farm. Due to the chronic space problem, the farm is destocking its dairy cow while cows were productive and paying. Since the establishment, 12 cows have been sold because of space problem. The other challenge to the farm is cost of feed. Currently, a quintal of concentrate feed is 370 birr. One cow may eat 7 kg/day. In order to avert the situation, the farm uses by products of millage, hay and other feed sources. AI service is not available to the required level. Supply of semen is not consistent. Lastly, unavailability of vaccination was the major challenge that should be solved by the government. The farm is not getting proper service from the agriculture office. During the team survey, the livestock unit head and other staffs visited the farm and appreciated the farm management system and record keeping tradition. A lot of lesson could be taken from this farm.

2.3.2.3 Cooperatives

a. Shashemene

Biftu Dairy Cooperative: Biftu Dairy cooperative is established in 2003 in the town of Shashemene by 60 members (34 men and 26 women). Currently, it has 320 members. The cooperative collects and distributes up to 1900 litres of milk on a daily basis. It has eight milk distribution and collection centres. The same centres serve as collection and distribution points. The town municipality provided five of the collection and sales points whereas the remaining three points are rented. In addition to Shashemene, the cooperative distribute milk house to house in the small town of Aje (25 km on the way to Alaba). About 200 to 500 litres could be sold in Aje during non-fasting seasons. During Muslim fasting season, the sales volume declines to 80 litres.

Some years ago, the cooperative used to distribute milk in the town of Hawassa. However, because of cooling shortage (unable to buy cooling machine), the distribution was halted. As the demand for milk is growing in the town of Shashemene, it is not in the short-term plan of the cooperative to go to Hawassa for distribution. Based on the assessment of the Cooperative, it is possible to sales about 4000 litres of milk a day in Shashemene. Long queue (line) for the purchase of milk is common in all distribution outlets (shops) of the cooperative in Shashemene

Pricing of milk and milk products from the sales outlet of the cooperative:

- Hot milk: Birr 8 /litre
- Butter Milk (Arera): Birr 3 per litre - The rural community is major customer for Buttermilk.
- Ayib: Birr 25 per Kg
- Butter: Birr 110 per Kg

Resources: The cooperative has lacto scan for testing, which the cooperative chairman claimed that the quality of collected milk increased since the usage of the equipment. The coop has also cream separator and butter making machine, storage and ISUZU truck. The cooperative was supported by Land O' Lakes and SNV Ethiopia through training.

Challenges: Challenges of the cooperative are lack of chilling unit or lack of the required finance or finance sources to scale up the market accessibility of the cooperative through different strategies including acquisition of cold chain.

Weak support from Government offices:

- Unable to get land for a communal dairy farm though repeated request submitted to the authority.
- The support of Agriculture office in the area of Vet and breeding is very weak.
- Feed: The ever-increasing cost of feed is a challenge to the business. Currently. Wheat brow is sold at Birr 500 per quintal, which is almost equivalent to the price of the main cereal.
- Financing: So far the cooperative did not manage to secure loan from financing institutions.

b. Sidama zone

There are newly established dairy cooperatives in Sidama zone including Lemela Cooperative (Aleta Wondo), Atote Dairy Cooperative (Arbegona), and Shebedino Dairy Cooperative (Shebedino).

Yichalal modern dairy association: Established in 2008 by three individuals. The association is established as a business entity and secured a dairy farm land of 10,560m2. The association has 20 cows, out of which eight of them are lactating. It collects 60-70 litres of milk per day and get 40-50 litres of milk from own farm. The average milk yield of a cow is 7 litres/day. The association sourced its heifers from Shashemene. Members of the association are growing elephant grass in their compound in addition to hay and concentrate feeding they buy from the market. The ecology is suitable for dairy farming.

Pricing: The collection site receives milk at a price of 5.33 birr/litre. Fresh milk is sold at a price of Birr 3.00 and yoghurt is sold at a price of 2.50 birr including boiled milk per glass. During fasting season, the association makes butter and cheese.

Breeding: The farm has its own bull for breeding services especially when no AI services available on demand. The Association does not give service to external farms because of fear of infections.

Challenges faced:

- Price of other feeds (factory by products) are ever increasing and in short supply. The price of concentrate is Birr 320 per quintal and Cake is sold at Birr 850 per quintal. Other feeds (by products) are purchased from Adama (Nazareth).
- AI service is not satisfactory. Vet service is a low level. The association has lost about 10 cows since its establishment where the cow would have been survive had the proper medication was provided. Drugs are available from Agriculture office.

Dilla and Surrounding Cooperative: The coop was established in the year 2007. It has 20 members out of which 15 of them are now contributing for the milk supply. The cooperative collects 170 –to 180 litres of milk per day. Milk contribution per members ranges from 4 litres to 40 litres. The cooperative has a rented distribution outlet in Dilla town.

Pricing:

- Butter: Birr 90 per kg
- Milk: Birr 23 per litre
- Fresh milk: 3 litres per cup (Birr 12 per litre)

Plan: The cooperative is working to secure a land to bring together the dairy cows of the members in to a single location for better management and to combat space challenges. In addition, the coop planned to open VET drug shop to increase its income and securing consistent supply of genuine drugs for its members and other customers in Dilla town. VET service is available at Bureau of Agriculture. There are also private service providers. Services to member: The Cooperative procures (from Mojo area) and distributes feeds such as by products and cakes to its members.

Challenges: members are facing challenges from AI service provision. Bureau of Agriculture often run out of semen and nitrogen. Though cooperative demanded to bring the required nitrogen, the office refused as this is not procedural. Finally, the AI service provision remained to be unsatisfactory. Fasting seasons will be expensive for them as the price of other converted milk products is not paying as much as fresh milk pays.

Siket Dairy Development Cooperative: It was established in the year 2010. It has 11 members with a daily milk collection of about 70 litres per day. The milk is fully supplied to University Teachers and students at Dilla University.

2.3.2.4 Collectors

Based on this survey, ALMI Tikus Wotet is the major collector in the milkshed next to Shebedino Dairy cooperative. Association in Yirgalem collects small quantities of milk from non-members. The nature and size of operation of the cooperatives is well described under cooperative section of this report. This section focuses on individual or private collectors.

Hawassa ALMI Tikus Wotet (ALMI Fresh milk): Established in 2004. The farm currently has its own small farm with 20 dairy cows with a daily milk production of 270 litres per day. The average milking per day per cow is 17 – 20 litres. The company is well known for its large milk collection than its own farm. The company collects 3200 litres of milk per day from 234 smallholder suppliers mainly Arsi Negele and Shashemene. Individual farmer's supply varies from 5 to 60 litres per day. The company has four collection centres in the town of Arsi Negele.

Most of the milk is distributed as whole milk without being packed. About 1500 litres of milk is packed every day for distribution. ALMI has 5 distribution outlets in the town of Hawassa. It distributes its product using its own vehicle. According to the marketing head of the cooperative, the pasteurized milk has a three-day shelf life if maintained within the appropriate temperature (fridge). It has a chilling unit with a capacity of 5000 litres. To promote its milk products and to maintain its customers the association recollects recall damaged (spoiled) milk and replace it fresh milk.

During fasting season, the sells volume reduces by 30-40%. ALMI converts the milk in other milk products such as Ayib, yoghurt, mozzarella and butter and continues to buy from its suppliers. The milk-processing machine was designed and fabricated locally by the owner of ALMI. ALMI is engaged in expansion of the project.

Milk quality testing equipment is used by ALMI and purchase only fresh milk, which passes the minimum quality test, set by the company. The company provides training to farmers on milk quality.

It often get technical support from Land O'Lakes (training and capacity building), technical support from livestock office. The farm transport and avails dairy animal feed to the farmers.

Pricing: The ALMI collects milk from farmers at a price of 6.50. According to marketing manager of ALMI, the farmers' selling price of milk in the past 9 months has increased from Birr 5 to Birr 6.5. The selling price of milk at Hawassa is Birr 8 for ALMI milk and Birr 11 for Mama's pasteurized milk.

Mama milk is competitor in exceeding quality traits such as superior package and longer shelf life. Even though, ALMI milk is well marketed in Hawassa, it needs further improvements particularly in areas of package and other qualities.

Challenges: ALMI Tikus is challenged by lack of sufficient space for expanding the farm. Lack of storage facility (refrigerator), unsatisfactory AI services, milk quality, high feed cost and packaging are also challenges to the company. The cost of heifer is increasing to Birr 17,000 (pregnant one) there by hampering the ease of expansion of the farm.

2.3.2.5 Processors

ALMI is the only processor, which has its own establishment in the milkshed. Sebeta Agro Industry dominates the Hawassa market for pasteurized milk. ALMI distribute its pasteurized milk in the town of Shashemene and Hawassa. Supermarkets are main outlets for pasteurized milk sales. ALMI process and pack 1500 litres of milk per day.

2.3.2.6 Supermarkets and shops

The team assessed four supermarkets in the town of Hawassa.

Milk supply to supermarkets is from two sources; Sebeta Agro Industries and from ALMI Tikus Wotet. Supermarkets source pasteurized milk of Sebeta Agro Industry through whole seller of Sebeta. Milk is transported by mini-buses from Addis Ababa. It is the responsibility of the whole seller to deliver the milk to taxi drivers. Cost of transportation per icebox is Birr 30. Mini buses operate at all times except on the 21st of the month (the date on which St Mary observed) and some of the minibuses on the 19th of the month. The service is sustainable as most of the mini-bus owners have more than one mini-bus.

Ice boxes serves to maintain the temperature of the pasteurized milk (in pouch). It has 20-liter (40 pieces) capacity. One icebox costs Birr 1,000. Taxi drivers do not take responsibility for loss of iceboxes (though happened rarely).

The Gross margin earning from mama milk is too small (like 30 cents per bag). Supermarket owners benefited from other products sales, which might be purchased by customers who come to buy milk. Cheese supply drops drastically during the period soon after the fasting seasons. Milk processors opt for milk than other milk products. The demand for milk is high and the profit margin earned from milk is much better than other milk products. The pricing and average daily sales of milk in each supermarket are depicted in Table 9.

Table 9 a

Merkado Supermarket

Milk / milk product	Daily average milk purchase (litre)			Gross Margin in Birr		
	Mama	ALMI	Berta	Mama	ALMI	Berta
Milk				.3	.75	

Table 9 b

Abazir Supermarket (Tesfaye)

Milk / milk product	Daily average milk purchase (litre)			Unit price		
	Mama	ALMI	Berta	Mama	ALMI	Berta
Milk	40 litre	50-60 litre		7.5 (1/2 litre)	6.5 (1/2 litre)	

Abazir Supermarket used to purchase and distributes yoghurts of Genesis Farms Ethiopia, which situated at Debre Zeit. The regional government because of health concerns, which the team could not find further information about it, had banned the product. Ayib and cream have markets but these products are not often available during non-fasting seasons.
Hawassa Supermarket: Milk products were not available during the visit.
Nan Supermarket: At the time of the survey, milk and cheese were not available.

Table 9 c
Price of milk products at Nan Supermarket

Milk/milk product	Daily average milk purchase (litre)			Unit price			Remark
	Mama	ALMI	Berta	Mama	ALMI	Berta	
Milk							Not available
Ayib					52 per kg		
Cheese							Stock is not available – short supply
Table butter					37/200gm		

Customers of Supermarkets: Customers for pasteurized milk are mainly households. Because of short supply of milk and quality concerns, some households prefer to buy from supermarkets (pasteurized milk). More than 70% of the customers for cheese are hotels. Berta is the main supplier of cheese. Their cheese is known for its quality, but sometimes encounters inconsistency in supply due to different reasons. The average holding period for cheese in supermarket is one week. In addition to fresh milk, supermarkets sell formula milk. For example, Abazir supermarket sells about 500 cans (average of 400gm) per month.
When dealing with marketability of pasteurized milk, Mama is the preferred product in Hawassa. A supplier with a brand name called Berta milk was once supplied to Hawassa. The milk was not consistent in term of quality and delivery. The product is no more available in Hawassa markets.

2.3.2.7 Cafés and Restaurants

a. Hotels and Restaurants in Shashemene

Rift valley Hotel- Shashemene: It is the biggest hotel in Shashemene town. Though substantial customers visit the hotel, the volume of hot milk and macchiato sales is small as compared with ordinary cafés in the town. The hotel purchase and sales 5 litres of milk a day. The volume of purchase increases up to 10 litres per day when the hotel hosts workshops and trainings. The hotel uses powdered milk (MaiLorado brand Formula) whenever there is shortage of milk supply. The demand for milk and macchiato decline during the fasting seasons it goes down to 2 to 3 litres per day. The hotel manager stressed that sometimes, the quality of the milk and butter is of a great concern.

Abdi Café: Abdi Café is located in the centre of Shashemene; it was opened some three years ago. Most of the customers of the café prefer milk than macchiato. Out of the total milk purchased (8 to 12 litres per day) 60% of it is sold in the form of hot milk and the remaining will be sold in the form of macchiato. The café is sourcing the milk from its two suppliers; a collectors who collects (10 -12 litres) and from dairy farmer (about 2o litres) per day. During Christian fasting seasons, the volume of milk sales shrinks to 20 litres. During Muslim fasting seasons, the volume of sales decline significantly. The problem with Muslim fasting season is not because the followers do not consume dairy products during fasting season, rather because breakfast and lunch are being skipped and the evening time is too short to sale and passers bye will not be around like the daytime. Milk sells significantly reduces during Islam fasting season. It reduces 10 litres more that during Christian fasting season. (20 litres during Christian fasting season)

Meridian café: This café is one year (2011) old since it is opened. It has a modern setup than cafes around it and is located at the central part of the town. The café is known for its macchiato in addition to the snacks and cakes. The café obtains milk from individual sellers and collectors. Currently, the café has two milk suppliers. During Christian fasting season, milk sells reduces but significantly drops during Muslim fasting. Most of the customers are passers bye who are not the resident of Shashemene. Table 10 shows the summary of pricing and volume of milk products sales by the three cafés assessed.

Table 10

Summary of milk products sales in Shashemene town – in sampled café

No	Name of the café	Amount of milk received /day		Macchiato per cap	Milk/cap	Remark
		Non fasting season	Fasting season			
1	Rift Valley hotel	5 ltrs	1-2 ltrs	5.00 birr	5.00 birr	
2	Abdi café	30 ltrs	20ltr	3.00 birr	3.00 birr	During Muslim fasting it drops to 10 ltrs
3	Meridian café	28 ltrs	14ltr	3.50 birr	3.50 birr	

b. **Large size cafeterias in Hawassa**

The team assessed few large size cafeterias with high customer number. These cafeterias are selling 10-15 litres of milk during the fasting seasons and from 20-25 litres of milk during non-fasting seasons. ALMI and other dairy farmers are main suppliers of these cafes. In most of the large cafes, macchiato represents about 60% of the total milk related sales and hot milk represents 40%.

Challenges: Common complaints by cafes in Hawassa are the inconsistent quality of milk and coffee. One of the big size cafeterias experienced a sharp fall of demand for macchiato some months ago because of the inferior quality of coffee. The café is now preparing its own coffee (preparing coffee for their own consumption). Currently, the demand is reviving but did not reach to the level that it has been some times ago)

Hawassa has significant number of visitors every day. According to SNNPR tourism bureau, Hawassa has more than 100 hotels and 50 pensions. These visitors are among the consumers of milk (both in the form of macchiato and hot milk).

2.3.2.8 Consumers

a. **Institutional Buyers:** Hawassa University is the largest institutions in the town. The cafés in the university and its college campuses attract more student customers. In addition, there are different factories in the town, which employed large number of employees, which will be potential consumer of milk through their in house cafés.

b. **Households:** According to the census of 2007, Hawassa has more than 60,000 households. Households are mainly sourcing milk from smallholder farmers on a contractual basis. Most of the households buy milks for infants, as a replacement or supplement of breast-feeding. As a result, they wish to have a consistent supply. As the milk is meant for infants, the demand will not be affected by fasting seasons.

c. **Individual Consumers:** Individual consumers are mainly customers for cafes and restaurants. There are instances where people buy and drink pasteurized milk as it is (without boiling).

2.3.3 Service Providers

a. **Bureau of Agriculture (BOA) and the respective agricultural offices:**
The team did not get sufficient information from SNNPR Bureau of Agriculture. Relevant data were not readily available. However, the team got information by contacting zonal officers.

b. **Sidama Zone Department of Agriculture:** The Zonal Department of agriculture provides VET and AI services to 19 woredas in the zone. The department has accomplished the following activities in relation to dairy development:

- Facilitation of loan financings from Government Warrantee scheme. The office issues letter of cooperation to the Bank once assessed the viability of the business of the client.
- Facilitate supports to cooperatives in supplying of equipment such as separators, churners and lacto meters.
- It provides vet services including vaccine, drug supply and health prevention activities.

The office has the following dairy development plan:

- Forage development
- Expanding of AI service provision
- Feed manufacturing and distribution
- Strengthening of milk marketing cooperatives and establishment of new ones
- Promotion and supports for those who wish to engage in milk processing.

Because of its strong network and access to relevant actors in the dairy sector within the zone, the livestock unit of the Agriculture department can play the following role:

- Awareness creation on milk quality,
- Working on quality of butters and other by products
- Magnifying role of cooperatives in the dairy farming and marketing system
- Encouraging (involving) the private sector
- Planned to hybridize 500 cows with superior quality semen in the first phase and additional 500 cows during the second phase (2004-2005).
- Planned to introduce feed chopper as it enhances feed intake and digestibility.
- The office will promote churners and other easily maintainable and affordable processing equipment to farmers

c. **Livestock Agency of West Arsi Zone:**

Major activities of the zonal livestock office are:

- Provide breeding services and genetic improvement of dairy cattle. The program is at regional level and it is a new approach for the regional research centres. Six Woredas in West Arsi zone will be beneficiary of this Program.
- Sources semen from Kaliti and Asella and sometimes from Nekemte and Wolayta Sodo.
- Facilitate distribution of heifers in collaboration with NGOs
- The woredas provides AI services; though the service could not be provided to the required level because of shortage or unavailability of semen.

Role that the office could play with development partners in dairy development, as identified by the head of the livestock unit

- Work with researchers and NGOs to improve dairy cattle performance of the area
- Improve vet and AI service in collaboration with different stakeholders (CDI-NGO that works on vet service and supply of vet equipment, distribute heifers to farmers).

d. **Gedio zone Cooperative Promotion Agency:** Dilla woreda cooperative agency provides support on the establishment of cooperatives, preparation of annual accounts and conducting of auditing, provision of training on marketing and management.

e. **Land O' Lakes:** Provides training to smallholder producers on milk quality.

f. **VOCA:** VOCA is currently constructing a feed processing plant in collaboration with a cooperative called Elto in Sidama zone. The civil work is completed and machinery installation is yet to be completed.

g. **World vision:** Engaged in distribution of heifers to farmers in Gedio zone

h. **Lem Ethiopia and Child Fund** are some of the NGOs working on dairy development in Sidama zone.

i. **Hawassa University:** Hawassa University has a Research Directorate. The team could not access the Director of the Research department for discussion. The Dean of College of Animal Science and Range Management, has explained to team that the Research institute has the experience and interest to work with institutions like ILRI and IMPS and willing to work with any dairy development related initiatives and researches. The team observed a number of dairy related researches made by MSC students as part of fulfilment of their MSc Degree.

In the strategic plan of Hawassa University (2009- 2013), the following strengths and weaknesses of the Research and Development Directorate are identified:

- Strengths
  - Clearly formulated Research Strategy
  - Good Research and teaching experience
  - Existence of well-developed Research and Development Process
- Weaknesses
  - Insufficient research facilities and funds
  - Absence of research centres of excellence in areas of national need
  - Limited emphasis on inter multi-disciplinary client oriented research
  - Low level (in number and quality)
  - Insufficient and poor system of consultancy service

The objective of the university during the strategic period are annexed (Annex 2).

j. **Centre for Development Innovation (CDI)** is a not-for--profit indigenous voluntary NGO (Charity) established in 1997, to engage in participatory development which makes a basic difference in the life of the marginalized community members with special emphases for children, youth, women and poor households in Ethiopia8. CDI operates in Arsi zone and supports the zonal livestock agency through provision of vet drugs, equipment and support farmers by providing heifers. It is also working with famer's organizations in Arsi zone.

2.4 Chain Contexts

a. **Policy:** The current agricultural development policy of the government is also giving due attention for the livestock sector. The livestock draft policy could be a good indicator and is a forward step in insuring the development of the sector.

b. **Culture and Religion:** The culture for milk consumption is conducive in the milkshed. The impact of fasting seasons is also felt in this milkshed even though the proportion of Orthodox Christian is lower than combination of Muslim and Protestants.

c. **Weather and Ecology:** Weather conditions various from place to place. As most of the region is located in the rift valley zone, the dry season is longer. In some areas like Gedio, the wet seasons longer than other parts of the milkshed.

d. **Research and Learning Institutes:** Hawassa University has a research directorate and has experience of engaging in research activities with different research institutes. Its strategic objective clearly describes its intention to pursue with its research activities (for further detailed information refer Annex 2).

e. **Agricultural Research Institutes and TVETS:** are also the most important institutions, which could play important role in innovation. Because of time constraints these institutions were not visited.

[8] www.**cdi-ethiopia**.org

2.5 Collaboration

- **BOA and Development organization:** offices of agriculture in different Woredas are working in collaboration with development partners.
- **Hawassa University:** Hawassa University is currently working with West Arsi Zone livestock office in forage research.
- **Cooperative and Extension Office with Union and Coops:** the cooperative office supports technically and financially the unions and coops. Most of the initiatives in cooperative formation came from the cooperative promotion agencies in the respective Woredas.

2.6 Challenges

a. **Post-harvest loss:** According to Sidama Zone Agricultural department, although no study has been conducted, post-harvest loss in milk production estimated to be high. However, though there are no empirical evidences for post-harvest losses; little or no quantification has been done for numerical explanation of losses at neither farm nor home level. In order to reduce post-harvest losses which could have resulted from lack of quality (due to hygiene and related factors), Land O' Lakes is doing awareness raising which is supported by application of practical quality control approaches such as alcohol test and lacto meter.

b. **Budget problem:** Zonal offices blamed the low level of budget for its limited outreach in provision of breeding services. Semen and nitrogen could not be availed as required because of lack of vehicle and / or budget for per diem and fuel. West Arsi, Sidama and Gedio zones share this problem. In some of the Woredas, clinics are not fully functioning because of lack of facilities.

c. **Machine breakdown:** on nitrogen manufacturing plant: Machine breakdown is a common problem reported by many Woredas as to the reason why they could not able to get nitrogen.

d. **Lack of sufficient number of AI technician**: When semen is available, the lack of the required level of AI technician is also a challenge in meeting demands. The technical ability of AI technicians in this area is limited due to different reasons. The amount and quality of the training provided, personal educational level, and salary paid to these technicians, lack of equipment, unavailability of vehicles and many more. Therefore, it would be strategic and pivotal to address these issues to full extent to change the situation in the area.

e. **Frequent shortage of semen:** Semen shortage is acute in most of the places including Asella and Wolayta. Some of them travel up to Nekemte and Akaki. Scaling the semen collection capacity of the factory could reduce the shortage of the semen. Unavailability of semen during time of need has sounding economic implication.

f. **Feed shortage:** Feed is often a challenge in almost all areas of the milkshed. In some of the woredas, including West Arsi, there are instances where the dry season prolongs to 8 months, which aggravates the feed problem.

g. **Milk quality:** some cafes and restaurants complained on the quality of milk supplied by producers.

h. **Fasting seasons:** Conversion of milk to other milk products is expensive to all actors. Collectors and cooperatives continue to buy from their suppliers to maintain the relationship.

i. **Little or no market for male calves:** with regards, farmers at Arsi Negelle and Shashemene suffer from unavailability of market for male calves. According to Tikus Wotet dairy cooperative manager, male calves are given for free to anybody else as nobody wants to keep them even for a single day. Male calves form one of the dairy industry products, which could be categorized as veal production. Therefore, it is important to design market for such sub products (not main) of farmers.

2.7 Opportunities

a. High demand for milk especially in the town of Shashemene, Hawassa and Dilla.
b. The rural communities are among the potential customers for milk especially in crop-based areas including West Arsi.
c. Presence of government structure (the livestock agency) which works towards this farming issues
d. A ready sector office to cooperatively work with partners and stakeholders on dairying and issues surrounding it.
e. Engagement of Development organizations in Dairy Development creates the opportunity for collaboration.
f. Existence of research centres such as Hawassa university and Hawassa TEVET
g. Enhanced loan opportunities for dairying currently, efforts are being made to secure loan for farmers – (The Household Asset Building project-HAB)
h. The area is known for production of locally made liquor called “Arake” in Arsi Negele and Shashemene area, which leave a residue called *Atella* (non-conventional animals feed). This *Atella* can cover significant demand of feed of dairy cows of the farmers. Because of this, the cost of feed tends to zero. Farmers with milk profit buy heifers.
i. Hawassa, as a national tourist (business and pleasure) destination, seat of the regional government and home of emerging factories and establishments will bring more demand for the dairy sector.

3. Stakeholders Interest and Influence Table

	Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
1	Aberash Workneh (Her son: Binyam Admasu)	Dairy Farmer	Hawassa	Milk productivity, feed and milk marketing	Have her own dairy farm, with a vision of expanding the business, a hard working family	She has good experience in dairy development, from breeding to marketing w	P	Hawassa		0916 823617 0916 581486
2	Gobe Dairy Farm Owner and Manager: Ato Tsegaye Koji D/Manager: Moges Tefera	Dairy Farmer	Kofele area	Intends to have to rehabilitate his old feed processing plant, interest on breeding, financing, chain management	Has huge feed farm, the only milk collector in the area, supplying heifers with special arrangements, the farm is also a breeding centre	He could play important role in learning and innovation in value chain financing, feed development	P	Kofele (Near Shashemene)		0911 852732 0912 003910 0461 190551
3	ALMI Tekus Wetete (ALMI Fresh Milk) Ato Zemede Bizuneh	Dairy processing and dairy farm	Arsi Negele, Shashemene, Hawassa	Intends to expand their dairy processing and milk collection capability	They are a customer for more than 230 dairy farmers (smallholders) in Arsi Negele area, and packed milk suppliers in the town of Hawassa and Shashemene	They demonstrate their innovation capability by introducing local-made processing and packaging equipment	P	Arsi Negele		0911 473854 0916 824232 0911 473854 046 2 20 6345

	Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
4	Beteseb Farm , Ato Tadesse Tesfay	Dairy Farm	Dilla town	Breeding, milk quality and productivity, feed	Supplying large portion of the household of the town The family has a strong modern management skills	They can share the planning, recording and monitoring skills and lot of wisdoms in dairy development	P	Dilla		0910 444182
5	Livestock Department Dilla woreda Head: Berhanu	Livestock development (breeding and health)	Dilla Woreda	AI service and VET	They are not strong, but could make a difference if supported	Animal health is a concern and could do more in traditional prevention methods, and more support in breeding.	P	Dilla		Berhanu - 0916 329518 Endegena Zeleol: VET 0911/983343
6	Sidama Zone – Livestock Development Breeding Head	Livestock Breeding	Sidama Zone	Dairy development (especially in breeding)	They are AI service coordinators throughout the zone	Could Contribute a lot in any innovation initiative in breeding areas	P	Hawassa		0916 329518
7	Hawassa University College of Animal Science and Range Dr. Mohammed Beyan (Dean)	Education, Research (number of researches by students in the area of dairy development)	Mainly Hawassa area, but students are free to choose study areas anywhere in Ethiopia	Interested in Dairy Development	Can influence their students in selecting dairy as area of research.	Most of the researches conducted by students for the MA degree thesis. They could facilitate the application of the out-standing researches	P	Hawassa		
8	Hawassa University, Research Directorate, Dr. Tesfaye									

	Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
9	Dilla and Surrounding Dairy Development and Milk marketing Cooperative Chairman: Worku Shalebo	Milk marketing cooperative	Dilla and surrounding	Milk quality and marketing, long shelf life milk products	Attracting of more members and delivery of quality of products		P	Dilla		C/o Cashier of the coop (Ato Ashenafi Asfaw) 0913 855569
10	Biftu Dairy Cooperative Chairman: Ato Berhanu	Milk collection and marketing	Shashemene, Hawassa, Aje	Milk marketing, processing, chilling centres	Large membership base (320 members) with 8 sales and collection outlet in the town of Shashemene	Could easily disseminate and facilitate innovation initiatives to members, high potential for learning from their marketing and distributing experience	P			0911660417
11	Abazir Supermarket Tesfaye	Supermarket, sales of milk and dairy products	Hawassa town	Milk quality and volume	Distribution		P	Hawassa		046 2213139
12	Arsi Zone Livestock office-head: Abdo Hassen Ali	Livestock health and development	Shashemene	Livestock development	Breeding	Influence innovation efforts in the area of dairy cow breeding and health in the zone (including area like Arsi Negele, Shashemene, Kofele and Dodola).				0916 85 7910

Annexes

Annex 1: Dairy cow population

Location	Type of Dairy Farm Owner (Local cows) Breed smallholders (1-5)	Local breed medium holders (6-10 cows)	Cross-small (1-5 cows)	Cross medium cows) (6-10)
Hawassa	573	300	283	100
Shashemene	431	-	166	53
Yergalem	179	103	119	46
Average	2.5	7	3	6
Total	1183	403	568	199

Annex 2: Strategic Objective of Hawassa University in relation to Research (Relevant objective to MIDD project)

Objective 4. Increase the volume and quality of research outputs and enhance the impacts of research and extension activities

Strategy 4.1 Increase staff participation in research

Strategy 4.2 Enhance Research Funding

Strategy 4.3 Enhance Research Linkage with industries and other stakeholders

Key Actions:

- *Create more time for staff to engage in research by introducing better and differential profiles of workloads and percentage of time devotion*
- *Improve the management of research and sabbatical leave and give enough time for those receiving external grants*
- *Train and mentor junior researchers*
- *Increase mobilization of internal, recurrent and capital funds allocated to research*
- *Conduct intensive fund raising activities*
- *Increase the international networks and collaborative projects by 10 %*
- *Develop policies and guidelines for university industry and stakeholder linkages within 6 months of implementation period.*
- *Initiate effective research partnership and consortia with potential industries and stakeholders*
- *Implement the joint appointment policy for research*

Strategy 4.4 Preserve and strengthen existing ones and develop new areas

Strategy 4.5 Improve Integration of Research and Teaching

Key Action

- *Introduce employment of fulltime research staff*
- *Develop the existing research excellence into an integrated research centres / institutes.*
- *Introduce new research areas, centres, and institutes*
- *Align the undergraduate senior research projects and post graduate research topics with the thematic areas of the university research projects*
- *Arrange forums for inviting researchers and distinguished scientists regularly for presenting lectures, research results to the academic community*
- *Establish a research data base system*
- *Introduce employment schemes for outstanding students as research staff*

Strategy 4.8 Enhance the research outreach activities

Key Action:

- *Increase the number of Public need based researches*
- *Strengthen the extension office for effective outreach activities*
- *Establish Technology Villages for model technology transfer and demonstration sites*

Strategy 4.9 Introduce and develop research culture in young faculties

Key Action:

- *Provide training for junior researchers -Establish mentor offices*

Objective 6: Develop strategic alliance with national and international universities and organizations

Strategies 6.1 Promote the use and exchange of resources to common goals with sister universities and teaching institutes

Key actions:

- *Signing 10 MoU with both Federal and Private Universities*
- *Strengthen the existing and engaging into new collaboration with international organizations and universities*
- *Establish university, industry linkage, with 10 enterprises*

Strategy 6.2 Create and strengthen collaborations with the regional government (SNNPR) with respect to training, research and consultancy.

Strategy 6.3: Establish and maintain collaborations with non-government organizations and community organizations.

Key Actions:

- *Prepare a document that identify the regional government needs and priorities in training, research and consultancy in one year period*
- *Engage in at least 5 research and consultancy activities and at least five short term trainings in the planned period*
- *Establish at least 5 collaboration projects with nongovernmental and other organizations in the planned period*

Strategy 6.4 Promote joint research projects with national and international institutions.

Key Actions:

- *organize workshops and training on how to prepare winning proposals for national and international organization*
- *Encourage and establish a rewarding system to researchers preparing research projects in collaboration*
- *Prepare at least five research projects in the planned period*
- *Promote staff and student exchange system*

Strategy 6.5 Initiate and conduct international training programs and workshops.

Key Actions:

- *Identify potential universities and organizations and prepare a curricula for joint training programs*
- *Handle at least one workshop per year with international partners*

Annex 3: Commercial Dairy Farmers in Hawassa (The list might not be complete)

Source: Dairy Directory)

- Tabor Dairy Farm
- Gebeyehu Getahun Dairy Farm
- Gizachew Amha Dairy Farm
- Eshetu Kassahun Dairy Farm
- Beteseb Dairy Farm
- Aynalem Biru Dairy Farm
- Almi Tikus Wotet Dairy Cooperative
- Aberash Workneh Dairy Cooperative

Annex 4: People Met and communicated during the study

S. No	Name	Organization and responsibility	Telephone	Remark
1	Aberash Workneh		0916 823617	
2	Ato Biniam Amasu		0916 58 14 86	Son of W/ro Aberash
3	Ato Mulugeta	Bureau of Agriculture	0462201316	
4	Dr Demeke	Sidama Zone livestock health unit	0913 459999	
5	Ato Abdo Hassen Ali	Arsi Zone Livestock office head	0916 85 7910	
6	Ato Kebede Hailu	Rift Valley Hotel manager	0910 05 88 86	
7	Ato Abate Wordofa	Abi Café and restaurant owner	0916 82 15 16	
8	Ato Gezahegn		0912 47 47 94	Milk supplier to Meridian café
9	Ato Anteneh	Meridian Café head	0916 01 04 78	
10	Ato Geremew	Abay hotel owner	0916 822300	
12	Ato Birhanu	Livestock head Dill woreda	0916 32 95 18	
13	Ato Endalkachew	Dilla coop office	0911 92 61 13	
14	Ato Oumar Hassen	Dilla marketing officer	0912 12 88 93	
15	Ato Wondwossen	Dilla Coop office marketing linkage work process	0916 06 39 25	
16	Ato Tadesse Tesfay	Beteseb Farm	0910 44 41 82	
17	Ato Zemede Bizuneh	Almi farm	0911 47 38 54	
18	Ato Mulugeta Kifle	AI technician Dolla	0910 49 54 43	
19	Ato Tsegaye Koji	Gobe farm owner	0911 85 27 32	Live in Addis
20	Ato Moges Tefera	Gobe farm manager	0912 00 39 10/0461190551	

Annex 5: Draft Livestock Development Policy

The draft document[9] indicated that the policy on livestock development is set with overall aim of increasing the contribution of livestock to the socio-economic development of the country with specific objectives of achieving food self-sufficiency in animal products, increasing employment and income, increasing industrial material supply, and increasing foreign currency earnings.

As component and part of the livestock development, the policy dairy development encompasses strategies on:-

- enhancing management of indigenous dairying cows,
- improving, multiplying, and distributing improved local breeds,
- promoting establishment of dairy farms in potential stratified areas using appropriate pure and improved dairy breeds,
- promoting dairy cooperatives and firms,
- characterizing local breeds, developing ranches for production of pure dairy breed and distribution,
- establishing a national centre for dairy Management Information System,
- identifying and prioritizing milkshed areas, and
- Enhancing and regulating quality of milk and milk products.

In relation to forage production, strategies include:-

- improving productivity and use of pasturelands through limiting carrying capacity,
- improvement of livestock water supply facilities, making use of appropriate forage technologies (low land areas),
- expanding and integrating use of improved forage species with soil and water conservation practices,
- identifying, enhancing, and using agricultural residues and industrial by-products, and
- Developing mechanisms for keeping emergency feed reserves in dry seasons.

Regarding animal health service delivery the focus given to be:-

- control and eradicate epizootic animal diseases through setting priorities for list "A" animal diseases, and
- Establish a functioning information and communication system.

Other key animal health strategies on dairy include:-

- strengthening of animal and animal products quarantine and inspection services,
- adopting and complying with OIE policies and regulations through harmonizing with the current Ethiopian situation,
- issuance of certificate of competence for processing and exporting institutions ,
- health and sanitary certificates for import and export of animals and animal products and
- Regulating production, importation and distribution of drugs and equipment in the field with respect to standards, quality, etc.

[9] *Ministry of Agriculture, 2002, Draft Livestock Policy and Strategy, Amharic version, Addis Ababa*

Annex 6: AGP: Main Activities and outputs of Livestock breed improvement

Activity : Livestock breed improvement through AI and Support to Public and Private Improved Livestock Breed Multiplication Centres

Responsible Organization / Department:

- **Lead Organization:** MoA/ RBOA
- **Supporting Organizations*:*** Regional States

Budget Allocated: US$ 5.9 million

Activity Objectives:

To sustainably develop efficient and easily accessible AI service delivery to farmers to produce productive animals that enhances livestock production and productivity.

Main Activities:

- Establishing four semen collection and processing centres i.e. one in each program region;
- Strengthening the capacity of the NAIC in delivering quality training and technical assistance, establishing and directing operations of AI sub centres in each program Regions;
- Strengthening and capacitating (in facilities and human resource development of) the existing Liquid Nitrogen Plants.
- Strengthening the AI technician training centres of program regions;
- Upgrading capacity of existing AI staff through short term skill training;
- Training of additional AI technician
- Training of farmers as Assistant inseminators and CAHWs;
- Providing Technical Assistance to private AI service actors
- Purchase of replacement stocks for ranches/centres;

Outputs

- Four semen collection and processing sub centre established i.e. one in each program region;
- NAIC strengthened and delivering quality training and technical assistance services,
- Holetta Bull Calf Rearing Station strengthened;
- The capacity of Seven Liquid Nitrogen Plants built;
- Four AI technician training sub centres of program regions strengthened;
- Capacity of existing AI staffs upgraded;
- 140 additional AI technicians trained;
- 220 farmers trained as Assistant inseminators;
- Technical Assistance to private AI service actors provided;

Monitoring, Reporting and Evaluation Arrangements.

- Yearly reports by MoA/RBOA/CSA.
- Field supervision by line departments and project personnel

Annex 7 Validation Workshop Report

Date of the meeting: - September 02 2011
Time of the meeting: - 4:30 am-8:00 pm local time
Place of the meeting: - Tadesse Enjory Hotel, Hawassa
Participants

S.No	Name	Organization	Address	Remark
1	Ato Birhanu	Gedio Zone Livestock development office		
2	Ato Zemede Bizuneh	Almi Tikus Wotet cooperative	0911473854	
3	Ato Tsegaye Koji	Gobe Farm		
4	W/ro Aberash Worknesh	Dairy Farmer		
5	Ato Tadesse Tesfaye	Beteseb Farm		Sickness
6	Ato Abdo Hussen	Arsi Zone Livestock Development office	0916857910	Absent, but well communicated
7	Ato Birhanu	Biftuy Dairy	0911660417	

Introduction

The purpose of this workshop is to validate the data; information and analysis presented in the milkshed report conducted by Target Business Consultants plc in relation with pre-project assessment of MIDD project. Shashemene-Hawassa-Dilla milkshed data validation workshop was conducted on September 02 2011 at Hawassa with relevant and most influential stakeholders at Tadesse Enjory Hotel. Small-scale farmers, government representative, office holders and cooperative representatives were invited on the workshop. However, on the meeting due to different reasons such as communication barriers, sickness and other issues, some of the invited guests did not attend the workshop. Despite the above conditions, a lot of lessons and experiences were drawn from the workshop.

Opening of the workshop

- Introduction about MIDD project was given by W/ro Mahlet Yohannes-SNV
- Finally, discussion with participants was proceeded

Discussions

Based on the discussion held with major stakeholders, the data validation workshop was found to be crucial as it gave us the opportunity to verify the already obtained data and information, built on the already collected data and helped participants to institutionally know each other. On the other hand, expectation of participants has risen to be part of the project and to work with SNV Ethiopia.
During the workshop, the following major issues were discussed

- Role of government offices at zonal and woreda level
- Inconsistency in services such as AI, vet and feed
- Land issues
- Identification of important stakeholders

1. **Role of government offices at zonal and woreda level;** The responsibility and the extent to which offices influence the dairy sector should be noted out so that proper intervention plan could be developed. On the discussion, it was raised that Woreda level office are the one which works at grassroots level with farmers and stakeholders on the same level. Accordingly, building capacities of these government bodies was found to be important for the growth of the sectors. On the other hands, government offices at zonal level provide supports to Woreda office by providing various guidelines and procedures, which should be implemented at grass root level. Moreover, zonal offices collect feedbacks (success, challenges and other), best practices and others for policy development and other package preparation as an input at national and/or regional level. Therefore, the participants found it to be important to work in accordance with functional structure of the government.

2. **Inconsistent AI, vet and feed services;** as the same in other milksheds, this milkshed also suffers from shortage of AI, vet and feed in the area. According, to the participants of the workshop, the above production traits are the very fundamental for successful dairying in the area. In the areas, it could be concluded that, government offices solely provide AI. The AI service lacks consistency and coverage. Most farmers complain and are suspicious about the quality of the semen. Some suffered from repeated delivery of male calves, which they attach it with the quality, repeated services and so on. The source for semen is the National Artificial Insemination Centre. In line with this, the problem with vet service remains chronic. Though the government offices claim it provides a better service, there are still complaints about it. There are no technical and advisory services from the government. According to W/ro Aberash-medium scale dairy farmer, she has lost 16 calves due to abortion following feeding of cows on banana by-products. Feed sources from papaya and false banana are friendly for health. According to Ato Tsegaye-owner of Gobe ranch (involved on breeding of cross breed heifers), he is trying to get and introduce varieties of forage seeds into the farm and the area in general. He is sourcing seeds from Kulumsa, Abernossa, Ethiopian Milk and Dairy Technology Institute (EMDTI) and Holetta. According to him, there is experience of growing fodder beet at Kulumssa. Moreover, at national level feed seed committee had been organized to expand application and utilization of forage at farmers' level. According to Gobe farm manager, the farm is playing role to minimize challenges of AI and vet services in his farm surroundings. For example, the farm provides AI service for the local farmers with cheaper and fair price. Moreover, health and delivery services are the other contribution of the farm for the local farmers.

3. **Land issues;** during the discussion, land for dairy purpose was raised as a major challenge. Currently, the municipality as before does not entertain land issues. Land administration authority is the responsible government body to issue land for any investment purpose. Farmers in Hawassa and in other urban settings face challenges to secure land for shops to sell dairy purpose and so on. According to one participant, the regional government has announced that, the there is no land for dairying unless it is outside of the city where basic infrastructures such as road, electricity and water services may not be accessible. Adding more, we can conclude from this the government did not give due attention for the sector like other such as
crop.

4. **Identification of important stakeholders;** during the discussion and
stakeholders ranking, it was raised that, for successful multilateral partnership among governmental, non-governmental organization and private sector in the development of dairy sector is crucial as it creates the synergy. It was noted that, government, particularly plays the pivotal role for the development of dairy industry in the country. Accordingly, the following offices were identified to be crucial.

Government offices

- Arsi Zone Cooperative office
- Woreda livestock agencies of Shashemene, Dilla, Hawassa Zuria
- Land administration offices Shashemene, Dilla and Hawassa
- Investment office Shashemene, Dilla and Hawassa
- Industry bureau Shashemene, Dilla and Hawassa

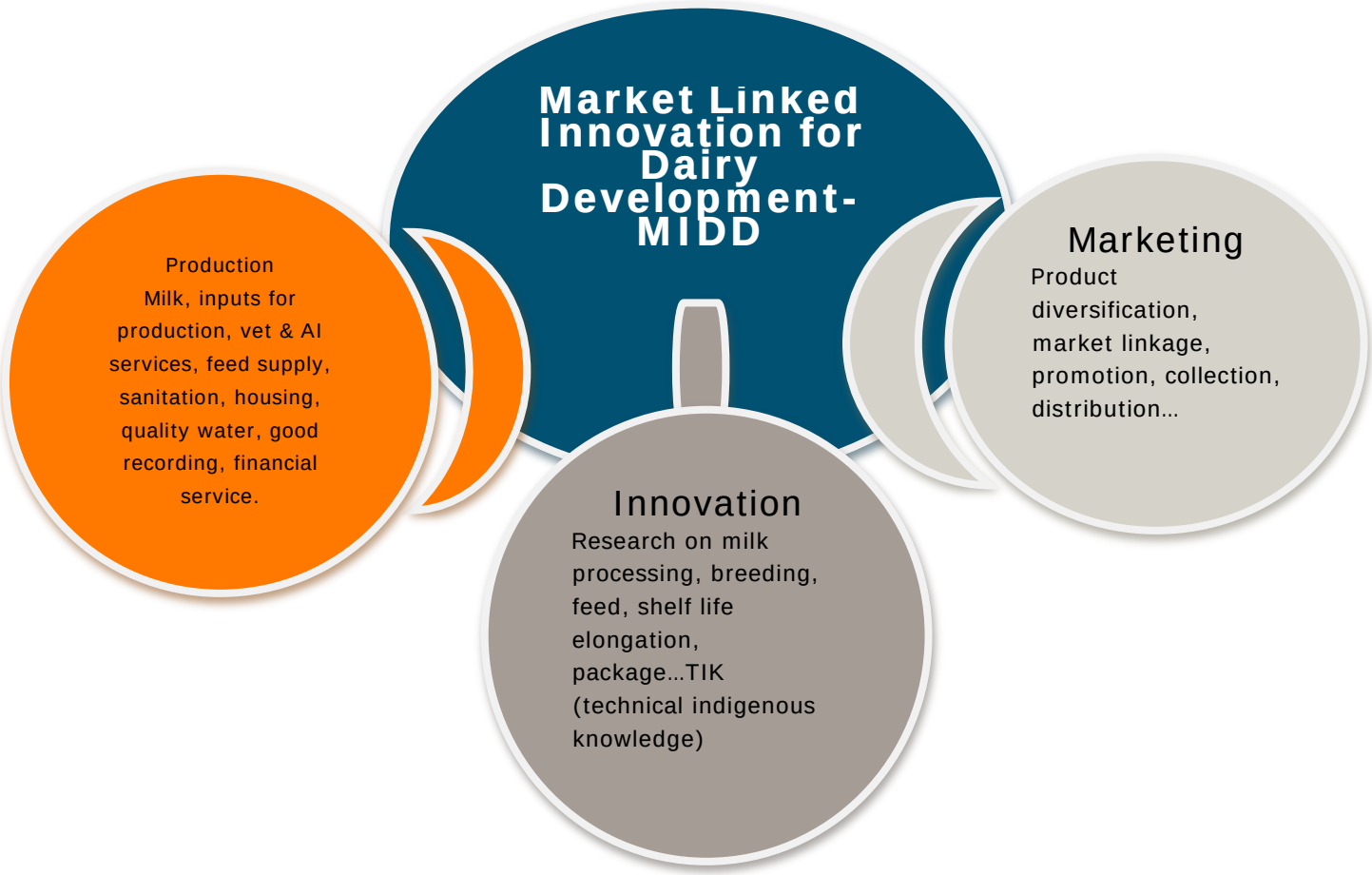
Producers

- Almi Tekus Wotet dairy cooperative
- Biftu dairy cooperative development cooperative
- Gobe farm/ranch

5. **SWOT analysis**: this analysis is conducted to assess strength, weaknesses, threats and opportunities in milkshed. The following template depicts the results for the analysis.

Parameters	S	W/L	O	T
Market			X	
Vet services		X		
General farm management		X		
Disease				X
Education/literacy/training		X		
Advisory services from government	X			
Feed production due to good climatic condition			X	
Large supply of milk			X	
Climatic condition			X	
Skilled personnel		X		
Milk quality	X			
Large cross breed population	X			
Drug availability		X		
Competition for feed		X		
AI services		X		
Organized through union and cooperative	X			
Traditional cattle farmers	X			
Development of private sectors		X		
Fasting days				X
Processing skill/availability		X		
Use of milk utensils		X		
Pollution because of manure				X
Demand for dairy products	X			
Use of biogas		X		
Information exchange		X		

The MIDD project was presented on the following pictures. The picture depicts that the MIDD is based on three pillars. These are the production, marketing and innovation, which should grow parallel to each other.



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Part II-C

Bahir Dar - Gondar Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

This study is conducted as a pre-project assessment on eight major milksheds in Ethiopia. The Market-linked Innovation for Dairy Development Program (MIDD) is a Netherland Funded Project implemented by Wageningen University & Research and SNV Netherlands Development Organization. The study covers eight milksheds. The assessment conducted in two teams. This report (1 out of 4) covers the assessment of one of the following milksheds:

- Western Shoa (Ambo, Tulu Bolo and Woliso)
- Hawassa-Shashemene and wider environment (including Dilla, Kofele, Dodola, Alaba and Yirgalem)
- Gondar, Bahir Dar and wider environment
- Mekele and wider environment

1.1 Objective of the study

The objective of the study is to provide preliminary description of eight milksheds of Ethiopia out of which four will eventually be selected by the program for its further planning. The assessment is expected to come up with report, which addresses:

- Characterization of the milksheds, substantiated by data, at area and woreda level
- Overview of the value chain in the area
- Assessment of the stakeholders involved in dairy in the area, and their geographic coverage.

1.2 Methods of data collection

During the study of this project, multiple tools of data collection have been employed. Both qualitative and quantitative data have been collected for the study. In order to get comprehensive and useful information the study team has used the following data collection techniques.

- Review of secondary resources: This includes researches and reports from International organizations, NGOs, government offices, private organizations and cooperatives. Internet resources were also explored.
- Interview: Ranges of persons who are at different position and offices have been interviewed during the study. Government office holders, private business managers (Supermarkets, farms…) cooperatives, International organizations and individuals were interviewed during the study.
- Observation: the study team employed observation as additional key tool to feel gaps that could happen during the data collection. Dairy farms, smallholders' backyards and cafe's are among the visited sites. Pictures were used to retain observed facts.
- Key informants: Key informants were also interviewed.

1.3 Limitation of the study

Because of the limited time allotted for the study, reports and analysis submitted in this study are limited to the availability of information. As a result the depth of data and information presented in this report varies from one milkshed to another.

1.4 Overview of the Ethiopian Dairy Sector

Ethiopian modern dairy development activities date since 1940s soon after the end of the Second World War. Its development over these years was highly influenced by the nature of political system where the countries were in. The sector registered a relatively better pace in recent years than its majority past. The number of smallholders, commercial farmers, cooperatives, processors and retailers increased significantly.

Category of the Dairy system: The Ethiopian dairy systems can be categorized under five systems of operation; pastoral (traditional pastoral livestock farming), Agro-pastoral (Traditional lowland mixed livestock farming), mixed crop livestock system (traditional highland mixed farming), Urban and peri-urban (the emerging smallholder dairy farming) and Commercial (specialized commercial intensive dairy farming) (Ethiopian Dairy Policy Inventory 2009)

Dairy products: In the Ethiopian context, the type of milk and dairy products that needs to be considered are whole milk (liquid milk, *Ititu,* Ergo, buttermilk etc.) and other dairy products from fermented processing (butter, ghee, Ayib, Metata Ayib etc.),

Production: From the overall Ethiopian milk production, the rural dairy system, which includes Pastoral, Agro-pastoral and Mixed crop livestock system, contributes 98%, while the peri-urban and urban including the commercial dairy farms produce only 2% of the total milk production of the country. Indigenous stock produce 97% of the milk produced from cattle and the remaining 3% from improved exotic crosses and pure grade cattle. Most of the milk produced in the rural dairy system is retained for home consumption and it is non-market oriented (CSA 2008/09).

According to the survey of CSA, the annual net cow milk production for the rural sedentary areas of the country during Nov. 11, 2009 to Nov. 10, 2010 is about 4.06 billion litres. On the other hand, the estimate of camel milk for the same areas of the country is about 262.8 million litres (CSA 2010).

Utilization: Based on CSA survey in 2009/10, the utilization of dairy products in rural Ethiopia reveals that of the total annual milk production, 85% was used for household consumption, 7% was sold, only 0.3% was used for wages in kind and the remaining 8% was used for other purposes (could be for the production of butter, Cheese, and the likes). With respect to the utilization of butter, 61 per cent of the produce was used for household consumption although considerable portion (36%) was sold. Most of the total Cheese produced was used for household consumption that is about 87 per cent, and the rest about 3 % was used for other purposes (CSA 2010).

1.5 Policy environment

There is no consolidated or comprehensive dairy policy in Ethiopia. Nonetheless, based on study conducted by SNV, the existing fragmented policies and strategies at sectoral level and programs developed thereof in Ethiopia had indicated that the overall objective of the policies and strategies are more or less comprehensive in addressing basic principles of development with a the exception of few items. Intuitional capacity, ownership, follow-up, coordination and continuity are among the main challenges, which deter the effectiveness of these policies. Livestock policy has been draft in 2002(SNV 2009). Some of the relevant issues on dairy development are summarized and annexed to this report. The study team would like to emphasize on the current three major strategies and programs which have direct relevance to the dairy sector development.

a. **Agricultural Development Led Industrialization (ADLI):** ADLI is the fundamentals of agricultural development in the country's overall economic development policy. Thus, agricultural development is expected to adequately drive the process of industrialization. Firmly anchored on ADLI is the Rural Development Policy and Strategies (RDPS), which is designed to ensure, among others, effective and efficient utilization of resources to promote agricultural growth, integrate agricultural development activities with other sectors, and establish effective agricultural marketing system.
b. **Growth and Transformation Plan (GTP):** GTP is a five-year strategy of the Government of Ethiopia for the period from 2010/11 to 2014/15. The plan indicated that Dairy resource development technology is one of the focuses in livestock resource development strategy.[10] The expansion of infrastructure mainly road and electricity will have a direct link to dairy marketing. Lack of access to road deprived a lot of smallholders to reach collection centres and markets. Frequent interruption or absence of 24 hours electric power supply discourages shops and retailers to distribute dairy products.
c. **Agricultural Growth Program (AGP):** AGP is a multi-donors program designed with the objective of ending poverty and enhancing growth. Its strategic intervention will have some peculiar features. These are:
    i) Comprehensive: AGP is a broad based program that attempts to improve the whole range of production, marketing and agro-processing of agricultural products through enhancing productivity, value addition, and market and irrigation infrastructure.
    ii) Value chain: The program will be implemented along the value chain dealing with stakeholders including producers, assemblers/traders, processors, distributors, exporters, retailers and finally consumers.
    iii) Decentralized and demand driven**:** Bottom-up planning process will be practiced to give greater power to kebele and woreda level development initiatives with particular attention to ensuring equal and active participation of both women and men.

Program Scope and Target areas: AGP is a five-year program and will operate only in four regions; namely, Amhara, Oromiya, Southern Nations, Nationalities and People's (SNNP) and Tigre. Based on criteria such as suitability for agriculture, potentials for irrigation, access to infrastructure and institutional capacity, 80 woredas are selected; i.e., 34 in Oromiya, 22 woredas in Amhara,19 in SNNPR and 5 in Tigre.

AGP Components: AGP gives a priority to improve the livelihood of small farmers. Inseparably, it supports key public institutions and private business that have multiplier effect on the growth of the agricultural sectors along the value chain. Major components of the program are broadly categorized into two. These are (i) Agricultural Production and Commercialization, (ii) Small-scale Rural infrastructure Development and Management. Three sub-components are identified under the first component. These include: institutional strengthening and development, scaling up of best practices and market and agribusiness development.

Program costs AGP is estimated to cost about USD $ **281.2** million. A number of donors have shown interest to finance the program (World Bank, UNDP, CIDA, REN, USAID and others). The GoE and the beneficiary population will also put in significant resources for the accomplishment of the program.

Program management: AGP is a government program and its implementation will follow government policies and strategies in a way it ensures transparency and local ownership. The MoA at federal and the sector Bureaus at Regional and woreda levels will have the overall responsibility and accountability for execution of the program.

[10] Growth and Transformation Plan, Government of Ethiopia

Out of the 80 AGP Woredas, the following Woredas are within the four milksheds discussed in this report:

- Ambo – Tulu Bolo and Woliso Milkshed: Ambo, Bacho (Tulu bole), Wenchi and Woliso
- Bahir Dar – Gondar Milkshed: Bahir Dar Zuria. Dangla woreda is in close proximity to the milkshed.
- Shashemene – Hawassa – Dilla Milkshed: Wondo Genet
- Mekele Milkshed: Woredas in close proximity to the milkshed are Ofla, Raya Azebo and Endamehoni

The following are outputs of AGP in relation to livestock breed improvement (See Annex 6 for detail information):

- Four semen collection and processing sub centre established i.e. one in each program region;
- NAIC strengthened and delivering quality training and technical assistance services,
- Holetta Bull Calf Rearing Station strengthened;
- The capacity of Seven Liquid Nitrogen Plants built;
- Four AI technician training sub centres of program regions strengthened;
- Capacity of existing AI staffs upgraded;
- 140 additional AI technicians trained;
- 220 farmers trained as Assistant inseminators;
- Technical Assistance to private AI service actors provided;

2 Bahir Dar-Gondar Milkshed

2.1 Administrative Map of Amhara regional state

The Amhara National Regional State (ANRS) is one of the nine regional states of the Federal Democratic Republic of Ethiopia (FDRE). ANRS is located between 9° 21 to 14° 0 North latitude and 36° 20 and 40° 20 East longitude. The total area of the Amhara region is estimated to be 170,752 square kilometres. The region shares borders with Tigre region in the North, Afar and Oromiya regions in the East, Oromiya region in the South, and Benishangul region and The Sudan Republic in the West. The region is divided in to 11 administrative zones including Bahir Dar special administration **(Figure 1)** and 114 Woredas**.**

Figure 1: Administrative Region and Woreda Map of Amhara regional state.

Figure 1 Administrative Map of Amhara Source: Disaster Prevention and Preparedness Commission

2.2 Physical characteristic

The Amhara region has topographic setup of a diverse nature. Lowland, midland and highland plains, mountains, rugged lands, undulating landforms, chains of plateaus are common land features in the region. The low lands (500-1500 meters above sea level) cover mainly the north western part of the region bordering the Sudan and the eastern parts bordering the Afar region. These areas are largely plain and constitute big part of the northern and eastern part of the region. The highland areas are rugged and mountainous with peaks rising up to 4620 masl at Ras Dashen (the highest peak in Ethiopia). In terms of the traditional agro-ecological classification, the region is composed of Bereha 3% (below 500 masl) Kolla 22% (500-1500 masl), 44% Woinadega (1500-2300 masl) 27% Dega (2300-3000 masl), 3.6% Wurch (3000-3700 masl) and 0.4% high Wurch (above 3700 masl)

2.3 Bahir Dar and its Surrounding Milkshed

Bahir Dar- Gondar Milkshed encompasses three adjacent zones of Amhara regional states. These are West Gojam Zone, South Gondar Zone and North Gondar Zone. The milkshed is concentrated on the main highway connect these three zones. The milkshed is mapped as indicated in Figure 2 below.

2.3.1 Description of the zones

West Gojam (Mirab Gojam) Based on the 2007 Census conducted by the CSA, this Zone has a total population of 2,106,596, with an area of 13,311.94 square kilometres; Mirab Gojam has a population density of 158.25. 184,703 or 8.77% are urban inhabitants. A total of 480,255 households were counted in this Zone, which results in an average of 4.39 persons to a household, and 466,491 housing units. The 1994 national census reported a total population for this Zone of 1,779,723 in 374,115 households; 107,238 or 6.03% of its population were urban dwellers at the time. The largest ethnic group reported in Mirab Gojam was the Amhara (99.43%); all other ethnic groups made up 0.57% of the population. 98.28% practiced Ethiopian Orthodox Christianity, and 1.59% of the population said they were Muslim.

According to a May 24, 2004 World Bank memorandum, the average rural household has 1.1 hectare of land (compared to the national average of 1.01 hectare of land and an average of 0.75 for the Amhara Region) and the equivalent of 0.7 heads of livestock.

The zone embraces 15 woredas including Bahir Dar Zuria woreda. Bahir Dar Zuria woreda administers 32 kebeles. The woreda takes a share in the Bahir Dar- Gondar milkshed. Out of the 32 kebeles, Sebat Hamit, Yigoma Huletu (where the Andassa livestock research centre is situated); Robit and Yinesa are known for their high dairy stock and milk production. In these kebeles, different sorts of intervention had been made by the government to improve the overall productivity of the area.

In Bahir Dar Zuria woreda, there are three dairy cooperatives which are organized by the woreda cooperative office.

South Gondar (Debub Gondar) Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 2,051,738. With an area of 14,095.19 square kilometres, Debub Gondar has a population density of 145.56; 195,619 or 9.53% are urban inhabitants. A total of 468,238 households were counted in this Zone, which results in an average of 4.38 persons to a household, and 453,658 housing units. The largest ethnic group reported in Debub Gondar was the Amhara (99.89%); all other ethnic groups made up 0.11% of the population. 95.49% practiced Ethiopian Orthodox Christianity, and 4.36% of the population said they were Muslim. According to a May 24, 2004 World Bank memorandum, the average rural household has 1 hectare of land (compared to the national average of 1.01 hectare of land and an average of 0.75 for the Amhara Region) and the equivalent of 0.6 heads of livestock.

North Gondar (Semen Gondar): Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), this Zone has a total population of 2,929,628; with an area of 45,944.63 square kilometres, Semien Gondar has a population density of 63.76. 462,700 or 15.79% are urban inhabitants. A total of 654,803 households were counted in this Zone, which results in an average of 4.47 persons to a household, and 631,509 housing units. The three largest ethnic groups reported in Semien Gondar were the Amhara (89.72%), the Qemant (8.25%), and the Tigrayan (0.94%); all other ethnic groups made up 1.09% of the population. 95.32% practiced Ethiopian Orthodox Christianity, and 4.54% of the population said they were Muslim. According to a May 24, 2004 World Bank memorandum, the average rural household has 1.2 hectare of land (compared to the national average of 1.01 hectare of land and an average of 0.75 for the Amhara Region) and the equivalent of 0.8 heads of livestock.

North Gondar is the other milkshed with remarkable milk production in the zone. The zone falls between 500-4620 masl- mount Dashen being the pick. North Gondar has 20 woredas and four urban city administration. The zone has 546 kebeles. According to key informant at the bureau of agriculture-North Gondar, all woredas of north Gondar zone have vet clinics with varying capacity to deliver services. According to him, one clinic serves three kebeles. Most of the clinics are ill equipped with internal facilities such as laboratory equipment and skilled workers. In the woreda, vaccination is given due attention because of high transhumance in the zone. There are two drug vendors in the zone at Chilga and Gondar town.

Figure 2 *Bahir Dar-Gondar Milkshed* *Surce: Map adapted from Google Map*

The area practices mixed farming system where livelihood is based on production of crops and utilization of livestock and their products such as milk and other products. However, like other mixed farming systems else in Ethiopia, the crop production and livestock rearing are interdependent agricultural practices, which the absence of one will influence the functioning of the other. However, it could be concluded that the agricultural practice (both the livestock and crop) of the region with small and/or no agricultural inputs, limited or poor farming technologies and rain fed agriculture with subsequent low yield.

2.3.2 Dairy Development Overview in the milkshed

In Bahir Dar Zuria woreda and North Gondar Zone there are four dairy cooperatives which are organized by the respective cooperative offices. The first three cooperatives are found in Bahir Dar Zuria woreda with close proximity to Bahir Dar town. The last cooperative is found in Gondar town. The cooperatives are commercial in their purpose where all of them buy (collect) milk from both members and non-

members to make profit upon reselling. The capacity of the cooperatives vary in capital thus in operation. The cooperatives do not own cattle, rather individual members of the coop own cattle which vary in number in number and quality. The cooperatives deliver the milk collected to Bahir Dar town cafes and restaurants. The major challenge of the cooperatives is road and transportation access to take their milk to consumers. During the fasting season, the milk is converted in to milk by products such as butter, cream and cheese. Table 1 depicts the cooperatives established by the respective cooperative promotion agency.

Table 1.

List of cooperatives organized in Bahir Dar and Gondar milkshed

S. No	Name of the cooperatives	Year established	Members			Capital	Remark
			Male	Female	Total		
1	Abay Zuria dairy primary cooperative	2006 (1998 E.C)	53	3	56	54,980	Remains along road sides
2	Addis Alem dairy primary cooperative	2004 (1996 E.C)	57	3	60	37,923	
3	Genet Lerobit dairy primary cooperative	2007 (2001 E.C)	24	1	25	-	Newly established
4	Jan Tekel milk resources development and marketing union	2006 (1999 E.C)	X	X	200	641,148	

Source: Cooperative Agency

The total cattle population Bahr Dar Zuria Woreda, in the year 2010 (2003 E.C) is estimated to be 121,528 heads. This is a crude figure including all categories of cattle (cow, calves, bulls, heifers, and oxen) and both breeds (local and crossbreds). Table 2 shows the livestock population of West Gojam zone. In the zone, there are 978 development workers, 266 Farmers training centres, 118 health centres and 139 health professionals (most of them are DAs).

Bahir Dar (a special administrative town), the capital of the Amhara regional state is one of the regional towns where urban agriculture is widely practiced. According to the Bahir Dar town urban agriculture office, the herd size of dairy cows in the town of Bahr Dar is estimated to be 8,450. This figure includes both the cross breed (with varying blood level-genetic potential) and the local breeds.

Bahir Dar Milk Development Primary Cooperative is the biggest cooperative establishment found in the city. It has 53 members (46 men and 7 women). Basically, it is a marketing cooperative which collects milk and sell its product as a whole milk and by-products such as butter and local cheese (Ayib) through its shops that are located in the different parts of the town. The cooperative has six product selling points which also collect milk from nearby producers.

Table 2.

Summary of cattle population, FTC, health professionals and other in woredas of West Gojam Zone

S. No	Name of the Woreda	Farmers population	Number of dev't workers			No. of FTC*	Animal Health centres			Animal Health professionals	Cattle population
			Male	Female	Total		Woreda	Stations	Total		
1	Bahir Dar Zuria	33464	85	15	100	27	1	14	15	20	121,528
2	Yilmana Densa	41765	84	5	89	12	1	10	11	13	123,213
3	Gonji Golella	21589	71	4	75	13	1	5	6	6	63,780
4	Mecha	53262	74	15	89	21	1	8	9	12	202,556
5	South Achefer	27964	48	10	58	17	1	6	7	11	168,218
6	North Achefer	30102	50	16	66	18		8	8	9	234,887
7	Sekella	24150	50	5	55	27	0	10	10	13	93,812
8	Bure Zuria	18332	55	8	63	17	1	1	2	10	81,200
9	Bure town	4256	9	3	12	2	-	-	-	-	15,113
10	Jabitehinan	33043	91	10	101	20	1	14	15	13	187,501
11	Wonberma	16460	61	3	64	18	1	7	8	7	81,407
12	Denbecha	20897	74	9	83	22	1	8	9	11	121,322
13	Quarit	22081	47	0	47	19	1	8	9	8	79,945
14	D/Damot	27195	60	9	69	31	1	8	9	8	86,863
15	F/S/ town	1237	6	1	7	2	-	-	-	-	8,905
	Total	**375,797**	**865**	**113**	**978**	**266**	**11**	**107**	**118**	**139**	**1,670,250**

*Farmers Training Centre Source; West Gojam Zone livestock office planning department

The interesting point to be raised here is that, the herd owners, who are members of the above dairy development cooperative have established a dairy village where about 300 dairy cattle reside in the same compound. The arrangement objective is for efficient management, waste management, resources sharing such as labour, social and other economic purposes. Even though, the cows reside in the same compound, they are managed by each herd owner. This dairy village has about 720 dairy cattle (300 cows, 120 heifers, 300 calves). The arrangement was designed by the government as an efficient strategy to control the waste and other discharges of cowherds. There were also complaints from the neighbourhood dwellers against discharges from farms as it is affecting their health.

In the town, there are also farms and smallholders with various stock magnitude and milk production potentials. The town urban agriculture does not have exact number of dairy cows segregated in to cross breed and local breeds as inventory of dairy herds is not yet done by the town urban agriculture office.

2.4 Dairy Value Chain

The dairy value chain includes the main actors, the service providers, the chain context and the input providers. The relationship and flow of products are depicted in Figure 3.

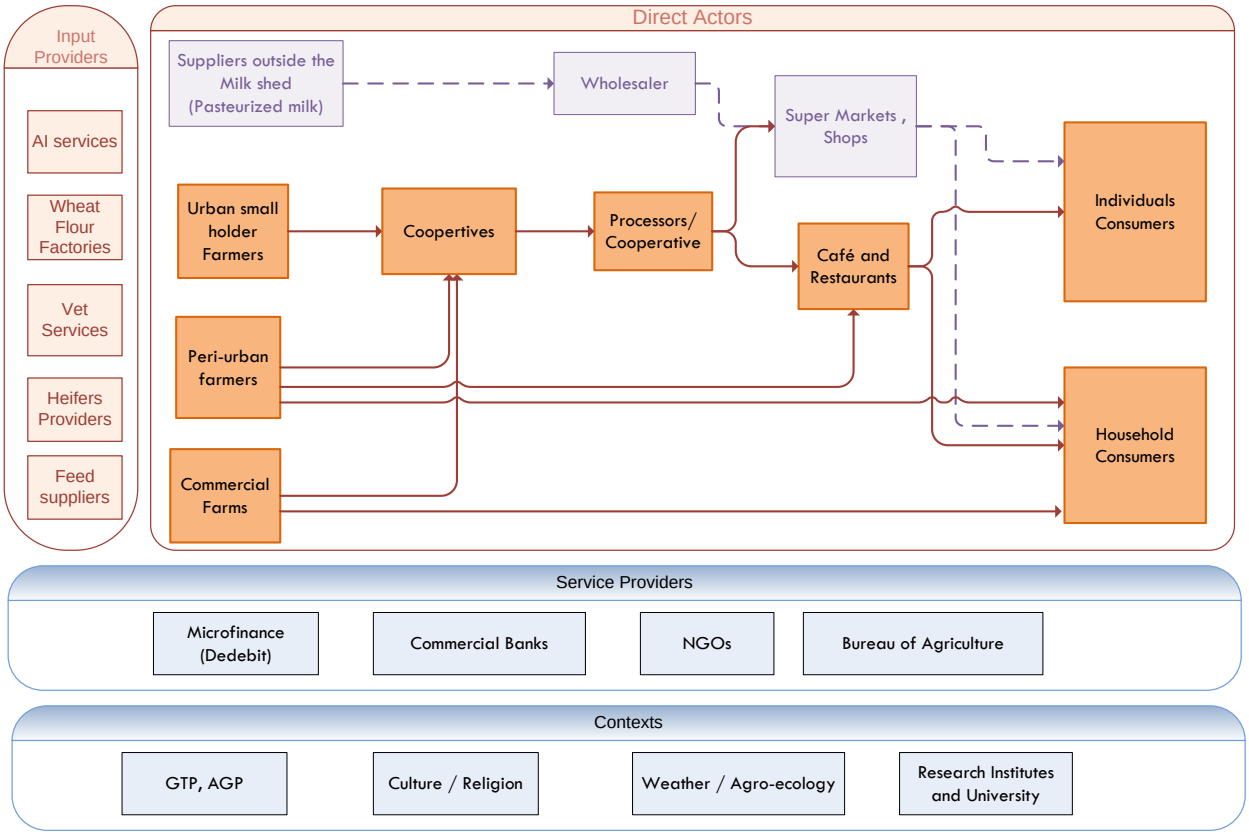


Figure 3 *The dairy value chain in Bahir Dar-Gondar Milkshed (July 2011)* Sketched based on the survey

2.4.1 Input Suppliers

- **Vet Services:** VET services are mainly provided by government sector office that is Bureau of agriculture –health department particularly in the rural areas where private health services are not accessible. According to the data obtained from West Gojam livestock office planning department, there are seven health centres (categorized as woreda level and station level) and nine health workers in each woredas. Bure town (woreda) and Finote Selam town do not have health centres and workers. Livestock owners in Bahir Dar town get such service from government health services provider (the vet clinic is of the woreda which provides services for the rural community) which is found on the periphery of Bahir Dar along the road to Tissat Fall. There are VET clinics at Tiss Abay, Zege and Meshenti, and Zenzelima. There are more than five drug vendors.
- **Breeding services:** Delivering breeding service in the form of AI in the rural kebeles of Bahir Dar surrounding, is of bureau of agriculture (BoA) responsibility. In the rural areas, though farmers can afford to pay what costs for a single AI service, the service is not accessible.
  In Bahir Dar, there is one private AI technician who delivers AI service. The technician has his own motor bike by which he moves from place to place including rural areas. This technician uses semen supplied by Bureau of Agriculture. There are also good initiatives to work more on AI by importing superior quality semen from abroad. For example, Jerusalem children centre started using sexed semen for its farm. According to researchers from Andassa livestock research centre, using the sexed semen has high possibility of getting female calves. This would help farmers to increase their stock number in quality and boost the number dairy cows in few years as the semen reduces the

number of male born. Moreover, semen branded as “world Sire” is also being imported and used for breeding in Bahir Dar and its surrounding. The price for single AI service is very expensive as compared to the service provided by the government. For example, it costs about 110 birr and 440 birr to give a single AI by “World Sire” and sexed semen respectively. The challenges with these services are: lack of good heat detection by farmers and accessibility of the services for those farmers who can afford to pay at time of needs. There is no refund for unsuccessful insemination. Therefore farmers should be as perfect as possible in detecting heat period of the cows and getting them served at the right time to increase the success rate of the AI service.

- **Bull services:** In Bahir Dar town and Bahir Dar Zuria woreda, bull service is not available. However, during shortage and unavailability of semen, farmers use local bulls for breeding. In the absence of AI service, farmers often use local breed bulls for breeding purpose (a bull that its history is not known and that was intended for traction purpose).

2.4.2 Chain Actors

2.4.2.1 Smallholders

In Bahir Dar and Bahir Dar Zuria woreda there are enormous smallholders with varying number of herds. Even though there is no accurate figure with regards to number of smallholders; report obtained from the urban agriculture bureau indicated that within the 9 kebeles of Bahir Dar about 8450 heads of cows exist. The distribution of the herd varies from household to household. Some of the smallholders are members of cooperatives. A few of them were contacted by the study team.

- **Shaleka Moges Menberu: (Bahir Dar)**

  Shaleka Moges Menberu: is one of dairy stockholder and chair of Bahir Dar milk development cooperative. He has 17 heads of dairy animals (7 lactating cows, 2 pregnant, 3 heifers and 5 calves). According to him, the lactating cows give a maximum and minimum of 14 and 9 litres of milk per day respectively. He delivers milk to the cooperative (Bahir Dar milk development cooperative). He spends more than 10,000.00 birr per annum for Dagusa straw excluding cost of concentrate and hay. The farm gets medication and other services from the personnel of the cooperatives. The cows dung is sold to chat cultivators in the area.

- **Emahoy Belaynesh Chekol (Gondar):** She has been engaged in dairy farming for the last seven years. She has about 11 heads (5 cows, 2 heifers and 4 calves). Daily milk production is 10 litres per cow per day. During fasting seasons, Emahoy distributes (sells) her milk to households with infants. Her total milk production per day is about 40 litres.

  She proudly says; everybody buys my milk. My product is of high quality and is so pure. She added; I sell yoghurt at home when there is milk left unsold. According to Emahoy, though there are repeated and frequent fasting seasons, she targeted households particularly infants and children to avoid market fluctuation.

  She sells one litre of milk for 10 birr. She allocates more than Birr 1000 to hire land in nearby rural areas for harvesting hay to fill feed shortages during the dry season.

  VET and breeding services: **-** the agriculture office provides both vet and AI services. Two birr is paid for single AI services. Sometimes the AI goes to four repeats for conception. Individual bull owners charges Birr 80 for bull service.

Challenges: Her request to get land for expanding her farm was not successful. She wants to expand the farm and include fattening activity in addition to dairy.

2.4.2.2 Commercial farmers

In Bahir Dar town, there are two sites visited by the survey team. Information was not available as to what the total number of commercial farmers is in the town. The farmers known to the team through the visits made were Cobel farm and the cooperative discussed above. It should be noted that, all farmers (smallholders and commercial ones) are not located in the same site.

a. **Cobel farm:** The farm was established in 2000 (1993 E.C) by the support of Amhara National Democratic Movement (ANDM) with participation of war veterans. Currently, the Amhara Development Association (ADA) provides different support for the farm. Cobel farm has 70 members (64 men and 6 women). The farm has 3.7 hectares land on which the farm is laid down. According to Ato Misbak, the farm produces 90-120 litres/day and 70-80 litres/day of milk during wet and dry season respectively. The farm sells its products to hotels and other individuals, which their number has reached 280. The farm sells remaining milk to their café that is situated in the recreation centre of coble compound. At Coble dairy farm, one litre of milk is sold at a price of Birr 9.

   Formerly, the farm used to get AI service from private service provider (70 birr per single AI). Because of repeated service and low conception rate, the farm has contracted experienced personnel to provide service on AI and health areas for Birr 800 per month. In the year 2009, out of 15 cows served through AI, only four of the cows gave birth to calves. Vaccination and other vet drugs for the consumption (treatment of the cows) of the farm are purchased from private suppliers. The farm is located in the northern part of the town on the way to Gondar.

   One of the challenges of the farm is feed supply. During the wet season, the farm buys feed from different monasteries and from Bahir Dar radio station compound. Concentrate feed is expensive and supply is limited.

   At the time of visit, the farm had the following herd composition.

   - Cows 14
   - Heifers 18
   - Calves 7 (3 male and 4 female)

b. **Bahir Dar dairy village:** This is a place where about 53 herd owners brought their dairy cattle to a centre called Dairy Village. The dairy village is located in kebele 13 special area called Woramit. The village was established in 2005 (1998 E.C). The herd owners have 5 heads (minimum)-31 heads (maximum). All the herd owners supply their milk product to “Bahir Dar milk development primary dairy cooperative” at a price of Birr 6 per litre. In the dairy village, there are about 300 cows, 120 heifers and 300 calves. The farmers get AI service from the AI technician whom they pay. The technician is also a herd owner in the dairy village. The farmers get semen from agricultural office. The farmers pay 18 birr for a single service. They are not happy by the service provided by the town agricultural office.

2.4.2.3 Associations

There are a number of dairy cooperatives in the milkshed. Most of them were organized (or their establishment is facilitated) by the cooperative promotion office in their respective areas.

a. **Jan Tekel Dairy Development and marketing cooperative:** This cooperative is composed of seven primary dairy cooperatives. It is established in 2006 (1999 E.C) by the support of international livestock Development Program (ILDP) which is an Irish government funded project. It plays both production and marketing role creating additional opportunity to other producers.

   The cooperative has been established by seven primary cooperatives. List of member cooperatives, their member size and location is summarized in Table 3.

All the necessary milk-processing equipment was donated by ILDP and Sustainable Natural Resource Management project donated a Bajaj (An India made tri-cycle). ILDP is no more operating currently as it has completed the project period.

Currently, the total capital of the cooperative has reached Birr 641,148.30. The milk-processing unit has a capacity of processing 1500 litres at a time. However, due to problems associated with quality of milk and market, its daily processing range has been limited to 200 litres.

Table 3

Summary of members of Jan Tekel Dairy Development and Marketing Coop

S.No	Name of the primary cooperative	Location (Woreda/Kebele)	Total number of members
1	Tadele Dib Abo	Gondar town	31
2	Arbaba	Gondar town	38
3	Enisra Behibret	Upper Armacheho	38
4	Alem Genet	Upper Armacheho	32
5	Meseret	Dembia woreda	27
6	Abebech Serako	Chilga	34
7	Wogera	-	-
	Total		**200**

This cooperative processes and sells milk with brand name "*Fasil milk*" with shelf life of seven days. Jan Tekel receives raw milk at a price of six birr and resells it at eight birr/litre in the town of Gondar. "Fasil milk" is sold at Birr 8.5 in Bahir Dar. Butter and traditional cheese are sold at prices of 80.00 and 20.00 birr respectively.

The members of the cooperative get AI service from the agricultural bureau. The price for single AI is Birr 4. AI service is always a challenge to rural farmers around town of Gondar. Cows get panicked with the noise from cars when they are taken to AI centres. According to the chairman, the situation will lower the heat of the cow thereby reducing success rate of the service. During unavailability of AI, members use bull as alternative. The bulls are culled as the bulls getting fat (gaining more weight) which makes it difficult to climb on cows during mating. The bulls had been granted by ILDP. According to Gashaw, manager of Jan Tekel, ILDP has put a lot of efforts to change the situation.

The project has done a lot to change the feed status, reduce water problem through roof water harvest system, distribution of heifers to increase the genetic potential and diversity of the area, create marketing possibility through product diversification and extending shelf life of products.

However, some members have raised their concern regarding limited service of the agricultural bureau as the demand for various inputs increases.

The cooperative has four milk collection and distribution centres in the different parts of Gondar (two), Bahir Dar (one) and Metema (one but closed). Even though they are not active due to

facilities, in the different part of Jan Tekel Woreda, there are milk collection centres which are constructed by ILDP.

The cooperative facilitated medical check-up for the dairy stocks of its members by spending 5,500.00 birr for health professional. The cooperative facilitated a system which enables to conduct health check-up for the dairy cattle. This is to oversee the health condition of dairy cows, how the farmers are keeping their cattle, to supervise physical conditions of cows and so on. The arrangement was done in light of prevention of occurrence of diseases.

Challenges encountered:

- Water shortage in some parts of North Gondar Woredas
- Cost and availability of feed, particularly concentrate feed. The volume of feed on the total cost structure is significant. The cooperative spends more than one million birr for feed for one year. This feed is, to be distributed for members of the cooperatives.
- Vaccination and health issues (In upper Armacheho, there is an acute loss of calves). There is shortage of supply of drugs in the area. Formerly, it was ILDP that supplies farmers with drugs. At this time, Farmers should come to Gondar to get VET drugs for their livestock including dairy cows.
- Transportation problem to collect milk from the rural areas to milk processing centre. Some farmers would have spoiled milk by the time they reach collection centre. This significantly challenges the endurance of small producers to further work on the business.
- Lack of equipped/facilitated vehicle to transport packed milk to distribution centres. For example, the Metema milk distribution centre is closed because of hot temperature which shortens the shelf life of packed milk.
- There is high shortage of power. During these time the processing units uses diesel generator which consumes about 395 birr fuel over a night.
- A loan that amounts Birr 59,389.20 representing feed delivered by the cooperative to members on a credit basis are long outstanding. Some of the borrowers disappeared from the area.

b. Abay Zuria Dairy milk development cooperatives: This cooperative was established in 2006 (1998 E.C). The cooperative has 56 members (53 male and 3 female). Each member need to have at least two cows to become member of the cooperative. The total capital of the farm has reached 54,980.82. The cooperative has its own milk-processing unit. It receives about 212 litres of milk per day. The cooperative receives milk at a price of Birr 5.00, however during fasting season; it receives at a price of Birr 2.5-3.00. Ii resells the milk at a price of Birr 6. The cooperative also sell skimmed milk for a price of Birr 3 per litre.

The common challenges of the cooperative are,

- Sustainable market, the cooperative suffer from recurrent market shortage due to different factors. To start with, fasting seasons is one of the challenges. In the area, there are extended and frequent fasting seasons which result in interruption of communication with customers. During these times the consumers (cafes/restaurants/households) will start contracting new suppliers. Transportation problem (both the facility and the road) is the other challenge of the cooperative. It does not have the capacity to buy vehicle. Therefore, it would a must to use public or any other means of transportation to take their products to the town. The poor quality gravel road also contributed to the challenge.

- Old working / processing equipment. Because of the problem with the machine, the coop wastes about 9 litres of extra milk (in addition to the normal 20 litres) to produce one kilo of butter. The effort to replace the machine was not successful. The coop executive learned that the price is expensive and is not often available in the market.
- The cooperative is profitable. So far, dividends have been distributed to members three times. The highest dividend was 1228.50 and the lowest being 7.70 birr. The woreda agriculture bureau provides health and breeding services. However, it is not satisfactory. Land O'Lakes provides technical support such as trainings on quality control and cattle management.

c. Bahir Dar dairy development

Cooperative: Bahir Dar milk development primary cooperative was established in 2006 (1998 E.C) by small-scale dairy stakeholders who live in Bahir Dar. The cooperative has 53 members (Male 46 and Female 7) who hold about 300 dairy cows. This cooperative is organized by the initiative of the members; it has long-term plan to grow in to a big dairy processing industry.

Currently, the cooperative has a milk-processing unit that converts milk in to by-products such as butter, cheese (local ayib) and sometimes cream. The cooperative collects 39,000-42,000 litres of milk per month. Had it not been for transportation and other storage facilities, the cooperative should have collected milk from areas with high milk supply. The areas include Woreta, Hamusit, Meshent and Meraw. The cooperative has 14 workers (4 male and 10 female)

The coop is in a process of dealing with financing of Birr 1.5 million from government. The purpose of the loan is:

- Scale up (expand) the processing unit
- Buy vehicle, which help the cooperative in collecting and distributing milk and by-products within a distant radius including to potential clients such as Bahir Dar University, Bahir Dar textile and Defence institutions and in order to distribute, feed to members of the cooperatives.
- To buy refrigerator for cooling products
- To multiply heifers and distribute to smallholders so that to contribute to the dairy development and to contract large grazing lands for forage production and distribution of feed to herd owners

The cooperative has trained an AI technician who currently serves its members. For AI service, customers pays Birr 18 is paid per service. Birr 8 goes to the cooperative and the remaining Birr 10 goes to cover different costs such as fuel.

During fasting season, the cooperative collects milk at a price of 6 birr and sell it for 7 birr/litre. During non-fasting season price is fixed by the cooperative committee based on the prevailing market price. The coop has six sales outlets in six different parts of Bahr Dar. Its selling prices from the sales outlets are:

- Butter…… 65.00 birr during wet season and 80.00 birr (dry season)
- Traditional cheese (Ayib)……..10.00 birr

The price of products is sometimes affected by milk and butter sellers who deliver their products door to door. For example, when the cooperative sells butter at a price of 65 birr/Kg, farmers from the rural areas may sell it for 60 birr. For this reason, the cooperative would be forced to adjust its selling price. In order to ensure collection of quality milk, the coop undertakes the following tests.

- Alcohol test…….to check the duration which the milk is kept.
- Lacto meter… .to check the fat content of the milk
- Lacto scan…….to analyse the overall nutritional composition of the milk; this equipment is provided by Land O'Lakes. However, currently they did not start using the equipment because of lack of skill to use the equipment.

Challenges faced by the coop:

- The land on which the cooperative is a rented one on a three years. As a result, members and executives are not unsure whether the rent agreement to be renewed or prices to change. According to the chairperson of the cooperative, the land has not yet been granted for the cooperative. Because of this, most of the farmers within the dairy village are not willing and confident to invest their capital to expand farming.
- The processing unit has limited capacity to process all the milk collected.
- Lack of trained personnel for the processing unit

2.4.3.4 Collectors

Cooperatives are playing the collection role. During the survey, the team didn't come across individual collectors other than cooperatives and processor (Fasil milk).

2.4.2.5 Supermarkets, shops and cafés

In Bahir Dar town, the trend of selling fresh milk in supermarkets is not common. Some of the supermarket used to get *Mamma milk* UHT milk. However, it has been a year since supply interrupted. *Fasil milk***,** which is produced in Gondar, is not preferred by retailers because of its short shelf life. There is a misconception of retailers that pasteurised milk is supposed to have a longer shelf life like that of UHT milk.

a. **Flavour supermarket:** This supermarket is situated at the centre of Bahir Dar. "It has been a year since we get Mamma milk," said Tadesse supervisor of the supermarket. Fasil Milk is not preferred because it has short life time. The supermarket sells 400gm powder milk at an average price of 110.00-150.00 birr (All type of milk brand). It sells up to 80 cans of milk per month.
b. **Family Supermarket**: It is situated near the main bus station. In this supermarket, it has been 9 months since Mamma milk is sold. Big size formula milk (powder milk 900-2500 grams) is highly marketed in this shop for children. According to the shop keeper of the supermarket, farmers from the nearby rural areas are selling their milk door to door and competing for customers.
c. Blue Jazz café: This café is situated in the centre of the town. It started functioning in 2006 (1999E.C). The café gets milk from individual supplier. It has been supplying milk since the opening of the café. The café sells seven litres of milk per day. The café buys one litre of milk at a price of six birr. 70% and 30% of the milk is sold for macchiato and milk respectively. During fasting season including Wednesday and Friday, the milk sell sharply drops to 2-3 litres per day. When there is high demand of milk, the café gets milk from distributor shops. Macchiato and milk are sold for the same price that is 4.60 birr.

2.4.2.6 Consumers

a. **Institutional Buyers**

- **Felege Hiwot Hospital:** This is a referral hospital located in the town of Bahir Dar with 350 beds. There are a lot of out-patients and visitors everyday who could be potential consumers for milk. The team couldn't get further information about existing milk consumption in the hospital because of time constraints.
- **Defence Hospital:** if market linkage is systematically designed, defence hospital could be potential client.
- **Bahir Dar University: The technology faculty including other campuses could be potential buyers of milk** for their larger community. The number of students attended including regular, extension and postgraduates; in Bahir Dar University in the year 2010/11 was 17,391.11
- **Gondar University** also could be potential market for communities of the university. According to a key informant at Gondar University, there is a high demand of milk in the campus. "Someone will not get any more milk at the cafes after 3:00 pm local time" said the informant. There is a shortage of milk for the university community. The cafes obtain milk from smallholders and from Fasil pasteurized milk. However, the demand is intact. Within the coming five years, the university is expected to boost its admission capacity to 40,000 students12 which is nearly threefold the current number of the regular students. Expectedly, the demand of milk will also increase simultaneously.

b. **Households:** As to anywhere else in Ethiopia, households are main consumers of milk. According to census of 2007, Bahir Dar city has about 63,000 households. This figure will have a significant change as the city is growing at a fast rate. Gondar city has an estimated household size of more than 21,000 CSA 2007), where 83% of the population is Christian Orthodox. According to estimates of 2010 (CSA), the population of Gondar Zuria and Bahir Dar special Woredas is 205,000 and 257,000 respectively. There are important towns other than Bahir Dar and Gondar such as Woreta, Addis Zemen, Metema which will be potential customers for more milk products.

2.4.3 Service Providers

e. **Bureau of Agriculture (BOA) and the respective agricultural offices:** The bureau of agriculture provides VET and breeding services, feed development for the rural farmers and other technical supports. In Bahir Dar-Gondar milkshed farmers have complaints against the level of service provision by the agricultural bureaus particularly on AI services. In some areas like Sebat Hamit, Yigoma Huletu (Andassa where the livestock research centre exists), Robit and Yinessa, according to the BoA officer, high efforts have been put to develop the dairy resource of the areas. There is also a witness by farmers for the good practice of forage development by the agricultural bureau in Sebat Hamit.

f. **The bureau of Agriculture of Gondar** is again the responsible government structure to provide AI and vet services. Like other milkshed areas, the service provided by Gondar agriculture bureau is also limited. For example, farmers in the rural areas of Jan Tekel woreda and other woredas should come to Gondar in order to get AI service.

g. **Office of Urban Agriculture – Bahir Dar:** Even though the office started operation some seven years ago; it is not delivering satisfactory services so far for dairy herd owners. According to the officer working on dairy development, there are thousands of dairy cattle. Despite the above fact, the urban agriculture bureau does not have a single AI technician. The veterinary service is also weak. Urban farmers depend on private service providers and Bahir Dar Zuria woreda health facilities.

[11] Performance report of Bahir Dar University 2003 EC (2010/11)
[12] As per information from informant at Gondar University

h. **Cooperative Promotion Agency:** The cooperative promotion agency provides the following service to cooperatives organized.
   - Book keeping
   - Auditing services
   - Conflict management
   - Marketing linkage and related

i. **Land O' Lakes:** This organization is one of the partners working in collaboration with government to improve the dairy scenario of the area. Land O'Lakes works on capacity building, forage development and other technical supports to local communities engaged in dairy farming and related activities.
   It has been giving support on the following major areas[13].
   - Dairy cattle management (to cooperatives in Bahir Dar Zuria)
   - Training farmers on milk handling and processing
   - Training on forage development through experience sharing organized at national level (Debre Zeit-Dairy and meat technology)
   - Milk quality control by providing training and the necessary quality control equipment such as lacto meter and lacto scan. Lacto scan is equipment that is used to make an analysis of nutritional composition of milk. With the equipment, one can analyse the calcium level, fat content, ash and so no which gives detail information about milk. Land O'Lakes has been working in Bahir Dar-Gondar milkshed for more than three years. Currently, the project is finalizing its project phase. The organization works almost in all of the milkshed areas of Ethiopia.

   The project is currently phased out

2.5 Chain Context

a. **Policy:** According to Bureau of Agriculture, the existing policy is conducive for private companies to engage in agricultural development in general and dairy development in particular.

b. **Culture and Religion:** According to 2007 Census, more than 87% of the population along Bahir Dar-Gondar milkshed is Orthodox Christian. Fasting season's impact is visible in the milkshed. On the other hand, the fasting seasons contributes for the development of culture and habits for variety of milk products. The long-standing tradition of milk production and availability of wide range of dairy stock will contributes to the rapid development of dairy farming. On the other hand, though milk marketing in the rural area is emerging, further efforts need to be put on marketing of milk with product diversification. In the past, there was a strong cultural barrier of selling milk in the rural community. Butter was the only marketable product in the past. This culture is improved with the emergency of primary cooperatives and cross breed dairy cows. Cross breed cows are basically acquired for commercial purposes not for household milk consumption.

c. **Weather and Ecology: Explained above.**

d. **Research Institutes:**
   - **Amhara Region Agricultural research institute: -** is responsible to undertake agricultural research initiatives in the region to improve the overall agricultural productivity of the region. The institute works in collaboration with the national research institute and other international organizations. Currently, the research institute is undertaking various research activities. The institute is engaged in the following research initiatives in the area of livestock development;
     - In Merawi woreda, forages development by using the irrigation of Koga irrigation development. Forage development is conducted with Farmers who have identified as Farmers Research Groups (FRG) on Napier grass, oat, Sesbania and Desmodium. This is not a commercialized/large scale forage development. However, this initiative has brought new forage development tradition among farmers around Merawi area. In Merawi

[13] http://www.idd.landolakes.com

area, there is access to irrigation for farming activities including forage development. According to Ato Getnet, the Directorate of Animal science research department, there is high potential for forage development. Accordingly, the institute is planning to develop forage on marginal and on crop unfriendly (not suitable) lands by water that could be lost due to evaporation. This initiative will be linked to dairy development in Bahir Dar milkshed particularly Merawi surrounding (30km away from Bahr Dar).

- The research institute is going to launch a five-year developmental type of research, which focus on dairy development particularly feed, breeding and health.
- At Koga, there is plan to train community AI technicians by selecting farmers who have achieved grade and above. The plan includes fulfilling all the necessary packages such as establishing semen collection centre and nitrogen producing plant, providing the technicians the necessary equipment and technical follow up. Currently, the institute gets semen from Kaliti National AI Centre. For external users such as farmers who are not enrolled as FRG (farming Research Groups), the training centre charges 7.00 for single AI service. However, farming research groups (FRG) gets AI free of charge.
- The institute has planned to establish one dairy processing plant at Bahir Dar or Merawi by the support of Finland government with budget of 670,000 Euro.
- The plan to conduct survey on livestock resource in Bahir Dar Zuria woreda could not be achieved due to lack of budget.

- **Andassa livestock research institute:** - this is a livestock research centre which conducts research on livestock such as cattle, poultry and small ruminants (SHOATS-sheep and Goats). The main objective of the centre is genetic conservation and improvement of Fogera cattle and distributing their F1 to farmers. Currently, breeding strategy and working documents have been developed for Fogera breeds. The centre have also plan to import semen from abroad which is called World sir to cross breed with Fogera breeds. The research centre also undertakes socio-economic research and technology adaptation and improvement. The research centre works with farmers group called Farmers Research Groups for trials of research and technology transfer or extension purpose. Further extension is carried out by the agricultural office extension department. Even though the number of heifers released to farmers in not significant, there are initiatives of distributing improved dairy heifers to local farmers. Five years ago, 20 improved heifers had been distributed among farmers. Last year, the centre released five heifers and has planned to distribute 10-15 heifers with in the coming fiscal year.
- **Promising practices**

  Research works undertaken at farmer level with FREG will be the best platform for technology transfer.

  Some farmers have started using the semen for breeding purpose. The World Sir semen is brought and used by a commercial farm which is established at around Andassa Livestock Research centre. The purpose of the farm is multiplication of heifers for commercial use. The semen is expensive as compared to the locally delivered semen by the Bureau of agriculture. The prices of World Sire and Sexed semen are Birr 440 and Birr 110 respectively.

  Some farms have started heifer multiplication and distribution business
- **North Gondar Zone Agricultural bureau:** The North Gondar Agricultural bureau is going to implement the Agricultural Growth Project (AGP). The project will focus on livestock health through progressive control of Diseases with high economic importance (which could result in loss of animals), enhancing production, soil conservation through development of forage trees, development of market centres, enhancement of marketing of livestock and livestock products, development of infrastructures and introduction of new varieties of breeds of cattle. Thus, it would be strategic if the MIDD project is linked with AGP project.

2.6 Collaboration

In the milkshed, governmental and non-governmental organizations work in collaboration towards the dairy development. The collaboration among the newly launched AGP, UNDP and WORLD VISION could be mentioned as an example. The collaboration between the already completed ILDP and government bureau, particularly with the bureau of agriculture had contributed a lot for successful implementation of the project. Accordingly, there is a possibility of integrating activities of interventions in the areas of livestock and related development efforts.

- **ARARI and BoA:** There is collaboration between ARARI and bureau of agriculture. The collaboration is direct and parallel. The BoA undertakes extension works to familiarize new farming systems to local farmers.
- **Andassa livestock research institute and Farmers:** The research centre works with FRG to undertake research activities. This will create learning between the research centre and farmers.
- **Multi-purpose cooperatives and primary cooperatives:** The multipurpose cooperatives give guarantee for the primary cooperatives. On the other hand, union of cooperatives such as Tana Union, saving and credit association provides loan to primary cooperatives with the following working modalities.
    - Tana Union Saving and credit association gave loan of Birr 35,000 to Abay Zuria Dairy development primary cooperative with an interest rate of 9%. Abay Zuria Dairy development primary cooperative distributes the money to the members of the cooperatives with an interest rate of 15%. The purpose of the loan was for varies needs of members including feed purchase and other petty trading.

2.7 Challenges

During the assessment, the team has explored different challenges at different levels, which needs different inputs and efforts.

a. **Cooperatives:** face market shortage at the different seasons of the year. For instance, there is little or no market for milk during the fasting season of the Orthodox Christians which leads to high wastage of whole milk particularly for those cooperatives which do not have good facilities of milk processing. Limited access to financial services could be mentioned as major challenge for hampered growth of cooperatives.
b. **Producers:** some of the challenges which of the producers encounter are quality supply of inputs. Moreover, the limited capacities of traders to deliver the required amount of inputs could also be put at the centre. For example, dairy farmers do not get enough feed; no/little access to quality water, timely vaccine before on set of outbreaks and related vet services. The limited service coverage of AI is also an important issue to consider. Generally, services and inputs, which significantly affect the development of the sector, should be enhanced. For instance, regular access to quality breeding services such as AI, feed supply, easy access to heifers and enhanced vet services would fasten the development of the sector.
c. **Milk Quality:** Quality of milk due to sanitation of handling materials, milking practices, adulteration, storage and related issues are common in *Bahir Dar-Gondar* milkshed. However, this could be avoided with training and creating awareness on the above issues.
d. **Feed Challenge:** In the rural parts of Bahir Dar Gondar milkshed, grazing is common form of feed source for livestock, including dairy cows. There are communal and private grazing lands. However, there is chronic shortage of concentrate feed. Involvement of the private sector on forage development and production with practical application of improved agricultural inputs such as quality forage seeds which could be grown on specific agro ecological zones would reduce the problem. Improving and maintaining qualities of animal feeds through different techniques (e.g. urea treatment, preparation of nutrient blocks and so on) and storing feeds in appropriate locations would reduce the problem.

e. **Limited budget:** Budget shortage and limited financial capacity are faced by both government offices. Government offices such as Cooperative promotion agencies and Agricultural offices are limited in service coverage due to limited budget for manpower, transportation, per diems and supplies purchase.
f. **Fasting season:** As Bahir Dar- Gondar shed area is dominated by Orthodox Christian; the impact of the fasting seasons is highly visible. Producers usually suffer from shortage of market. During these periods, producers convert milk in to different by-products such as butter and traditional cheese. During fasting seasons, price of butter dramatically drops from 80 birr to 45.00-65 birr and milk may not have market at all. Diversification of dairy products will reduce the situation by having products of longer shelf life and changing them in to easily transportable products.
g. **Lack of technician to repair dairy equipment:** Most of the milk processing unit need trained persons to operate and maintain them. Moreover, spares are not easily accessible and not affordable.
h. **Infrastructure:** In some of the rural parts of Bahir Dar Zuria, there are some transportation problems; however the problem is serious in the case of Gondar Jan Tekel woreda where farmers transport milk on donkey. Cooling facilities will reduce time of travel and enhance quality of handling. In the case of Jan Tekel milk cooperative, Unavailability of road is a serious challenge. There are places which could not be accessed by vehicle. Cooling facilities could enhance collection and distribution of milk and milk product.

2.8 Opportunities

a. **Suitable Agro Ecological Zone (AEZ):** Even though the AEZ of the Amhara region is divers, the Bahir Dar-Gondar milkshed AEZ is seems to be convenient for dairy practices. It could be characterized by high grazing/pasture potential. However, continuous efforts should be done to control water born disease and related infections as the area shares some water logged belt and humidified climatic condition.
b. **Research centres and universities:** The availability of the regional agricultural research institute and universities (Bahir Dar and Gondar Universities which both have College of Agriculture and Faculty of Vet Medicines), are of great opportunities for the value chain development. These stakes would play the lion share of the research and innovation part in the chain. Incorporating the development plan (like plans SNV is having) with research initiatives would play pivotal role for the rapid growth of the sector. Scaling out the accessibility of research findings of these institutions in the dairy sector, would reduce duplicated application of resources and unwisely investment of efforts.
c. **Availability of Institutions and big companies:** Institutions such as Bahir Dar textile factory, Defence hospitals, Universities and colleges could be well exploited in terms of marketing for milk and milk by-products. The market problem could be solved by making market arrangements with these potential market outlets. Therefore, it would be wise to exploit further the market opportunities of the area as a mechanism to avoid the chronic market problems particularly during the fasting seasons.
d. **Road access**: though there are some challenges in road to Jan Tekel producers, the overall accessibility and situation of road is good particularly in the case of Bahir Dar
e. **The Agricultural Growth Program (AGP):** which will be implemented in Amhara region particularly in North Gondar (of course there are also other places) is a good opportunity. The AGP has enormous initiative to the. livestock development in general and dairy in particularly.

3. Stakeholders Interest and Influence Table

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Phone number
Bahir Dar Zuria cooperative promotion office (Ato Wasse Setarge)	Organize and provide technical support to coops	Bahir Dar Zuria	To organize and create capacities for coops in the area	Enhanced dairy marketing system in the area		P	Bahir Dar town	0918 78 32 79
Andassa livestock research centre • Esubalew Wude • Dr Yeshewas	Genetic conservation of Fogera Breed and breeding	Bahir Dar Zuria woreda and areas surrounding it	Keep the genetic diversity of Fogera breeds, release as diverse productive breeds as possible to the local farmers and contribute to the disease control and eradication efforts	Boost milk productivity of the area currently working with farmers research groups (FRG)	Technology transfer to local farmers in areas of forage development, traditional disease control and so on	P	Adet	0912 19 66 39 0910 15 07 16 (Dr Yeshewas)
Bahir Dar Zuria Woreda livestock office • Ato Solomon Siyoum	Provide service on livestock areas for local farmers	Bahir Dar and areas surrounding it	Enhanced livestock development particularly dairy productivity and overall wellbeing of livestock resources	Increase productivity through better AI service, forage development extension, health protection and other technical supports	Can act and create the platform for dairy research initiatives	P	Bahir Dar	0918 70 69 61
Amhara Region Agricultural Research Institute	Initiates, acts and coordinate research endeavours including dairy	Amhara region	To enhance and develop the regional dairy scenario (forage and genetic development, policy	Act and solve identified problems along milk value chain through	Work with farming groups and relevant stakes to extend improved	P	Bahir Dar	

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Phone number
	at regional level		issue, marketing system…)	research and development	technologies and promote learning			
Bahir Dar milk development primary cooperative	Dairy and dairy by-products marketing	Bahir Dar town	Produce quality and marketable dairy products in the area and provide different services such as feed, AI and so on to coop members	Becomes immediate market source for milk producers when it receives whole milk and supply milk by-products to the local market	Can introduce new dairy processing technologies	P	Bahir Dar	
Abay Zuria dairy development cooperative	Milk and milk by products marketing	Bahir Dar	Produce quality milk by products and deliver to the market.	Can act as milk collectors (market out let for producers) and deliver milk by products for the market.		P	Adet	
Bahir Dar city administration urban agriculture department	Provide technical support and facilitate access to services regarding dairy development	Bahir Dar City	Encourage the dairy sector in the town by providing technical support to herd owners. (improved AI service, facilitate delivery of concentrate feed, expanding VET service, market linkage and so on)	Increase milk yield at farmers' level thereby enhancing milk supply capacity of the area.		P		0918 73 02 81

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Phone number
Shaleka Moges Menberu dairy farm	To produce milk	Bahir Dar	Contribute milk to the market and add to the total dairy livestock population	Ensure herd holder economic capacity thereby encouraging further dairy initiatives		P	Bahir Dar	0918 70 83 52
Blue Jazz café	To sell milk by producing different consumable products (Milk, macchiato, butter…)	Bahir Dar	On marketing	Increase marketability of milk and it by products		P		0918 76 82 70
Jan Tekel milk resources marketing cooperatives union	Milk collector	Gondar and surrounding	Collection and distribution of milk and milk by products in to the market	Can contribute to the advancement of milk processing in the area	Can serve as a partner on research on dairy processing technologies and product development	P		0918 78 88 84
North Gondar Zone agricultural department	Coordinate the overall agricultural activities of the zone	North Gondar zone	Provide and/or facilitate the accessibility of necessary input for dairy development	Can call for different actors in the dairy sector for collaboration and coordination for dairy developments	Facilitate ground for research and innovation with different stakeholders	P		0918 78 67 58

Annexes

Annex 1: Bahir Dar-Gondar milkshed data validation report

Minute
Bahir Dar-Gondar milkshed data validation workshop report

Date of the meeting: - September 01 2011
Time of the meeting: - 4:00 am-7:30 pm local time
Place of the meeting: - Dib Anbessa Hotel, Bahir Dar
Participants of the meeting:

S.No	Name	Organization	Address	Remark
1	Ato Wasse Setarge	Bahir Dar Zuria Cooperative office	0918 78 32 79	
2	Ato Solomon Yeyoum	Bahir Dar Livestock office	0918 70 69 61	
3	Ato Getnet Zeleke	Amhara Region agricultural research institute	0918 71 64 48	
4	Sahleka Moges Menberu	Dairy Farmer	0918 70 83 52	
5	Ato Gashaw Birhanu	Jan Tekel milk cooperative	0918 78 88 84	Absent
6	Ato Tadele Biru	North Gondar Zone agricultural department expert	0918 78 67 58	
7	Shambel Ayalew Admassu	Bahir Dar milk development primary cooperative		
8	Seid AI service		0918 76 88 97	
9	Ato Addisu Bitew	Andassa livestock research centre	0918 70 82 91	

Introduction

The Bahir Dar milksheds data validation workshop was conducted on September 01 2011 at Bahir Dar with relevant and most influential stakeholders at Dib Anbessa Hotel. Stakeholders from research centres, cooperatives, cooperative promotion offices, farmers and private AI technicians were invited from North Gondar and Bahir Dar Zuria woreda including Bahir Dar. All invited stakeholders except Jan Tekel Dairy cooperative participated on the workshop. A lot of lessons and experiences were drawn from the workshop.

Procedure of the workshop

- Introduction about MIDD project was highlighted by Mr Wytze-consultant from SNV Ethiopia. It was briefed, that the main objective of the project is to develop the dairy industry of the country there by diversify the national economic base of the state. In addition, Wytze explained the overall profile of the MIDD project to the participants.
- Debriefing was also given about the assessment on the milkshed areas by TARGET Business consultants. This included the methods of data collection (interview, document review-secondary data, observation…), scope of the study, organizations and people met during the study, challenges during the study and so on.
- Finally, discussion with participants was proceeded

Discussions

Based on the discussion held with major stakeholders, the data validation workshop was found to be crucial as it gave us the opportunity to validate the already obtained data and information, collect additional data and helped participants to institutionally know each other. On the other hand, expectation of participants has risen to be part of the project and to work with SNV Ethiopia.

During the discussion, the following major issues were raised

- Attention given to the dairy industry by the government
- Inconsistency in services such as AI, vet and feed
- Challenges of market on milk and milk by-products
- Definition of the milkshed area in terms of coverage

1. **Attention given to the dairy industry by the government;** According to the participants of the workshop, the attention the government gave to the dairy industry is minimal. This could be testified by the quality and the quantity of services the government is providing to farmers and smallholders in the area. Some of the participants explained that, though they requested to get land from the government for dairy purpose, yet they did not get it. The financial and related areas of the service are not encouraging the sector to develop. According to the participants, they concluded that it is because of lack of attention and prioritization. The government should encourage the dairy sector through different mechanisms such as favourable policy development and proper implementation of plans across the country particularly where the agro-ecological zone (AEZ) is suitable for dairying.
2. **Inconsistent AI, vet and feed services;** services particularly AI and vet are inconsistently delivered to the farmers and hence the service is not reliable. AI service is mainly delivered by the government in the rural areas where private supplier do not reach. In Bahir Dar, there is one private AI technician who delivers the service. However, there are good initiatives to work more on AI by importing superior quality semen from abroad. For example, Jerusalem children centre started using **sexed semen** for its farm. Moreover, semen branded as **"world Sire"** is also being imported and used for breeding in Bahir Dar and its surrounding. However, though these initiatives are there, the price for single AI service is very expensive as compared to the service provided by the government. For example, it costs about 110 birr and 440 birr to give a single AI by "World Sire" and sexed semen respectively. The challenges with these services are, lack of good heat detection by farmers and accessibility of the services for those farmers who can afford to pay. It would be a loss if a farmer fails to successfully inseminate by the above semen, particularly the sexed one, due to different reasons. The vet service in these area is also not satisfactory as explained on the workshop. The Bahir Dar city administration has its own urban agriculture development office. The office is not well organized to provide services to farmers in Bahir Dar. The office neither have vet clinics of its own nor private clinics. Most urban farmers take their dairy animals to Bahir Dar Zuria woreda vet clinic which is situated in the periphery of the town along the road to Tissat Fall. However, currently farmers are getting challenge from the clinic. These days they are getting answers like*…"The clinic is opened to serve the rural farmers and the limited budget will not allow us to give you service".* Some farmers like the dairy village in Bahir Dar has its own vet personnel.
3. **Challenges of market on Milk and Milk by-products**; in Bahir Dar-Gondar milkshed, market problem due to religious and other social variables is prominent. In these areas, where Christianity with long and many fasting seasons is very strong, consumption of milk and milk by-products significantly drops (during the fasting seasons) which severely discourage producers. According to the participants, unless products are diversified and market is predesigned, it will be difficult to survive with the changing environment.

4. **Definition of the milkshed area in terms of coverage;** according to researchers from Amhara Region Agricultural Research Institute (ARARI), the national definition of (geographic scope) milkshed of Bahir Dar- Gondar area extends to one hundred km radius around and Gondar areas. Accordingly, the milkshed includes the following areas
    - Merawi 30 km
    - Dangilla 85 km
    - Bure 150 km
    - Dur Bete 45 km
    - Hamusit 30 km
    - Woreta 60 km
    - D/ Tabor 100 km
5. **Identification and ranking of important stakeholders;** during the discussion and identification of important stakeholders the following offices and organizations were identified to important.

    Government offices
    - ❖ Bahir Dar Zuria Cooperative office
    - ❖ Bahir Dar woreda livestock
    - ❖ Land administration office
    - ❖ Investment office
    - ❖ Industry bureau

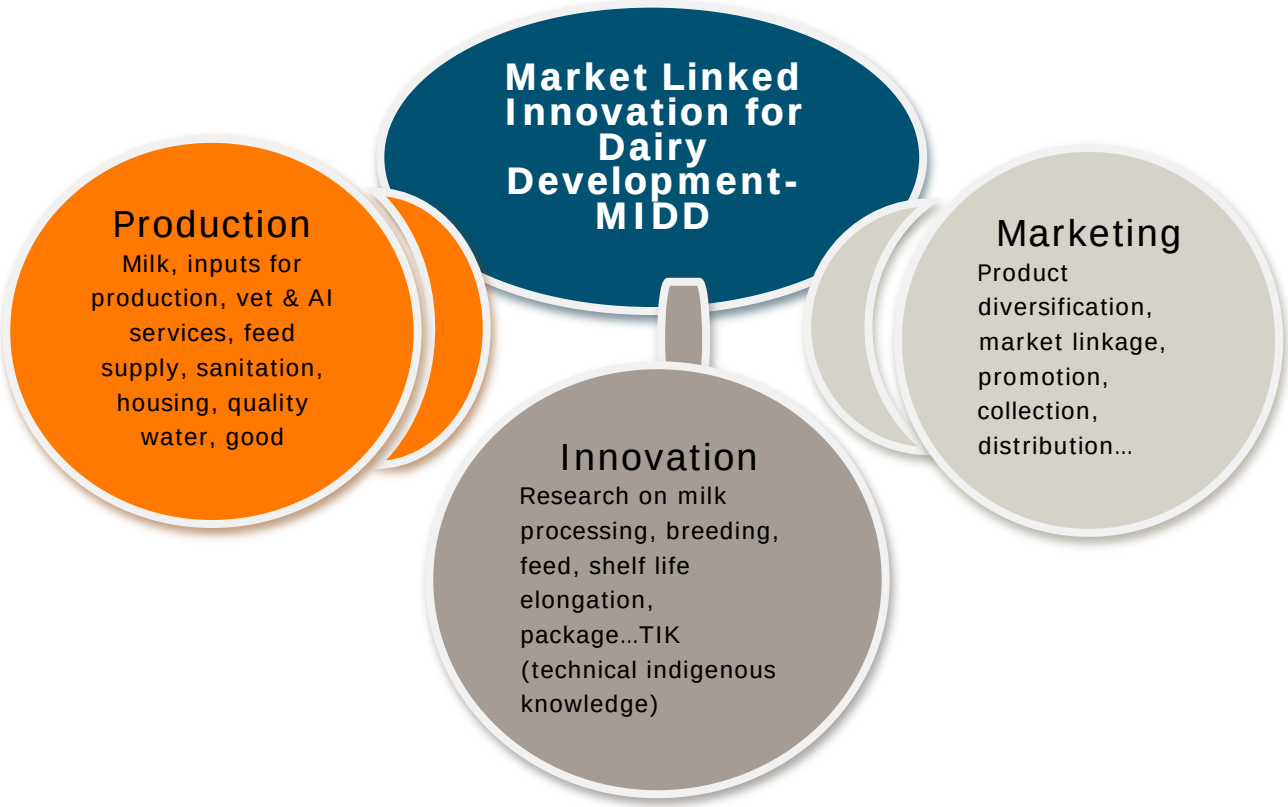
- **Producers**
    - ❖ Bahir Dar milk development primary cooperative
    - ❖ Jan Tekel milk resources development cooperative

Moreover, farm owned by Jerusalem children village is signified as the most important farm for the dairy development of the area. Farm has started introducing and using sexed semen. Aba Wongel, which was mentioned as private feed mixing factory, has a plan to establish a milk processing unit. Guder Flour factory and Dashen Brewery was also mentioned as an important stakes for the dairy development in the milkshed.

6. SWOT analysis the analysis was done by discussing the parameters together. It has helped to understand the parameters clearly and to categorize accordingly to their SWOT column. The result was nearly similar to the Hawassa result. It is stated below.

Parameters	S	W/L	O	T
Market			X	
Vet services		X		
General farm management		X		
Disease				X
Education/literacy/training		X		
Advisory services from government	X			
Feed production due to good climatic condition			X	
Large supply of milk			X	
Climatic condition			X	
Skilled personnel		X		
Milk quality	X			
Large cross breed population	X			
Drug availability		X		
Competition for feed		X		
AI services		X		
Organized through union and cooperative	X			
Traditional cattle farmers	X			
Development of private sectors		X		
Fasting days				X
Processing skill/availability		X		
Use of milk utensils		X		
Pollution because of manure				X
Demand for dairy products	X			
Use of biogas		X		
Information exchange		X		

The MIDD project was presented on the following pictures. The picture depicts that the MIDD is based on three pillars. These are the production, marketing and innovation, which should grow parallel to each other.



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Part II-D

Mekele Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

This study is conducted as a pre-project assessment on eight major milksheds in Ethiopia. The Market-linked Innovation for Dairy Development Program (MIDD) is a Netherland Funded Project implemented by Wageningen University & Research and SNV Netherlands Development Organization. The study covers eight milksheds. The assessment conducted in two teams. This report (1 out of 4) covers the assessment of one of the following milksheds:

- Western Shoa (Ambo, Tullu Bolo and Woliso)
- Hawassa-Shashemene and wider environment (including Dilla, Kofele, Dodola, Alaba and Yirgalem)
- Gondar, Bahir Dar and wider environment
- Mekele and wider environment

1.1 Objective of the study

The objective of the study is to provide preliminary description of eight milksheds of Ethiopia out of which four will eventually be selected by the program for its further planning. The assessment is expected to come up with report, which addresses:

- Characterization of the milksheds, substantiated by data, at area and woreda level
- Overview of the value chain in the area
- Assessment of the stakeholders involved in dairy in the area, and their geographic coverage.

1.2 Methods of data collection

During the study of this project, multiple tools of data collection have been employed. Both qualitative and quantitative data have been collected for the study. In order to get comprehensive and useful information the study team has used the following data collection techniques.

- Review of secondary resources: This includes researches and reports from International organizations, NGOs, government offices, private organizations and cooperatives. Internet resources were also explored.
- Interview: Ranges of persons who are at different position and offices have been interviewed during the study. Government office holders, private business managers (Supermarkets, farms…) cooperatives, International organizations and individuals were interviewed during the study.
- Observation: the study team employed observation as additional key tool to feel gaps that could happen during the data collection. Dairy farms, smallholders' backyards and cafe's are among the visited sites. Pictures were used to retain observed facts.
- Key informants: Key informants were also interviewed.

1.3 Limitation of the study

Because of the limited time allotted for the study, reports and analysis submitted in this study are limited to the availability of information. As a result the depth of data and information presented in this report varies from one milkshed to another.

1.4 Overview of the Ethiopian Dairy Sector

Ethiopian modern dairy development activities date since 1940s soon after the end of the Second World War. Its development over these years was highly influenced by the nature of political system where the

countries were in. The sector registered a relatively better pace in recent years than its majority past. The number of smallholders, commercial farmers, cooperatives, processors and retailers increased significantly.

Category of the Dairy system: The Ethiopian dairy systems can be categorized under five systems of operation; pastoral (traditional pastoral livestock farming), Agro-pastoral (Traditional lowland mixed livestock farming), mixed crop livestock system (traditional highland mixed farming), Urban and peri-urban (the emerging smallholder dairy farming) and Commercial (specialized commercial intensive dairy farming) (Ethiopian Dairy Policy Inventory 2009)

Dairy products: In the Ethiopian context, the type of milk and dairy products that needs to be considered are whole milk (liquid milk, *Ititu,* Ergo, buttermilk etc.) and other dairy products from fermented processing (butter, ghee, Ayib, Metata Ayib etc.),

Production: From the overall Ethiopian milk production, the rural dairy system, which includes Pastoral, Agro-pastoral and Mixed crop livestock system, contributes 98%, while the peri-urban and urban including the commercial dairy farms produce only 2% of the total milk production of the country. Indigenous stock produce 97% of the milk produced from cattle and the remaining 3% from improved exotic crosses and pure grade cattle. Most of the milk produced in the rural dairy system is retained for home consumption and it is non-market oriented (CSA 2008/09).
According to the survey of CSA, the annual net cow milk production for the rural sedentary areas of the country during Nov. 11, 2009 to Nov. 10, 2010 is about 4.06 billion litres. On the other hand, the estimate of camel milk for the same areas of the country is about 262.8 million litres (CSA 2010).

Utilization: Based on CSA survey in 2009/10, the utilization of dairy products in rural Ethiopia reveals that of the total annual milk production, 85% was used for household consumption, 7% was sold, only 0.3% was used for wages in kind and the remaining 8% was used for other purposes (could be for the production of butter, Cheese, and the likes). With respect to the utilization of butter, 61 per cent of the produce was used for household consumption although considerable portion (36%) was sold. Most of the total Cheese produced was used for household consumption that is about 87 per cent, and the rest about 3 % was used for other purposes (CSA 2010).

1.5 Policy environment

There is no consolidated or comprehensive dairy policy in Ethiopia. Nonetheless, based on study conducted by SNV, the existing fragmented policies and strategies at sectoral level and programs developed thereof in Ethiopia had indicated that the overall objective of the policies and strategies are more or less comprehensive in addressing basic principles of development with a the exception of few items. Intuitional capacity, ownership, follow-up, coordination and continuity are among the main challenges which deter the effectiveness of these policies. Livestock policy has been draft in 2002(SNV 2009). Some of the relevant issues on dairy development are summarized and annexed to this report. The study team would like to emphasize on the current three major strategies and programs which have direct relevance to the dairy sector development.

a. **Agricultural Development Led Industrialization (ADLI):** ADLI is the fundamentals of agricultural development in the country's overall economic development policy. Thus, agricultural development is expected to adequately drive the process of industrialization. Firmly anchored on ADLI is the Rural Development Policy and Strategies (RDPS) which is designed to ensure, among others, effective and efficient utilization of resources to promote agricultural growth, integrate agricultural development activities with other sectors, and establish effective agricultural marketing system.

b. **Growth and Transformation Plan (GTP):** GTP is a five-year strategy of the Government of Ethiopia for the period from 2010/11 to 2014/15. The plan indicated that Dairy resource development technology is one of the focuses in livestock resource development strategy.[14] The expansion of infrastructure mainly road and electricity will have a direct link to dairy marketing. Lack of access to road deprived a lot of smallholders to reach collection centres and markets. Frequent interruption or absence of 24 hours electric power supply discourages shops and retailers to distribute dairy products.

c. **Agricultural Growth Program (AGP):** AGP is a multi-donors program designed with the objective of ending poverty and enhancing growth. Its strategic intervention will have some peculiar features. These are:
   i Comprehensive: AGP is a broad based program that attempts to improve the whole range of production, marketing and agro-processing of agricultural products through enhancing productivity, value addition, and market and irrigation infrastructure.
   ii) Value chain: The program will be implemented along the value chain dealing with stakeholders including producers, assemblers/traders, processors, distributors, exporters, retailers and finally consumers.
   iii) Decentralized and demand driven: Bottom-up planning process will be practiced to give greater power to kebele and woreda level development initiatives with particular attention to ensuring equal and active participation of both women and men.
   iv) Program Scope and Target areas: AGP is a five-year program and will operate only in four regions; namely, Amhara, Oromiya, Southern Nations, Nationalities and People's (SNNP) and Tigre. Based on criteria such as suitability for agriculture, potentials for irrigation, access to infrastructure and institutional capacity, 80 woredas are selected; i.e., 34 in Oromiya, 22 woredas in Amhara,19 in SNNPR and 5 in Tigre.

AGP Components: AGP gives a priority to improve the livelihood of small farmers. Inseparably, it supports key public institutions and private business that have multiplier effect on the growth of the agricultural sectors along the value chain. Major components of the program are broadly categorized into two. These are (i) Agricultural Production and Commercialization, (ii) Small-scale Rural infrastructure Development and Management. Three sub-components are identified under the first component. These include: institutional strengthening and development, scaling up of best practices and market and agribusiness development.

Program costs AGP is estimated to cost about USD $ **281.2** million. A number of donors have shown interest to finance the program (World Bank, UNDP, CIDA, REN, USAID and others). The GoE and the beneficiary population will also put in significant resources for the accomplishment of the program.

Program management: AGP is a government program and its implementation will follow government policies and strategies in a way it ensures transparency and local ownership. The MoA at federal and the sector Bureaus at Regional and woreda levels will have the overall responsibility and accountability for execution of the program.

[14] Growth and Transformation Plan, Government of Ethiopia

Out of the 80 AGP Woredas, the following Woredas are within the four milksheds discussed in this report:

- Ambo – Tulu Bolo and Woliso Milkshed: Ambo, Bacho (Tulu bole), Wenchi and Woliso
- Bahir Dar – Gondar Milkshed: Bahir Dar Zuria. Dangla woreda is in close proximity to the milkshed.
- Shashemene – Hawassa – Dilla Milkshed: Wondo Genet
- Mekele Milkshed: Woredas in close proximity to the milkshed are Ofla, Raya Azebo and Endamehoni

The following are outputs of AGP in relation to livestock breed improvement (See Annex 6 for detail information):

- Four semen collection and processing sub centre established i.e. one in each program region;
- NAIC strengthened and delivering quality training and technical assistance services,
- Holetta Bull Calf Rearing Station strengthened;
- The capacity of Seven Liquid Nitrogen Plants built;
- Four AI technician training sub centres of program regions strengthened;
- Capacity of existing AI staffs upgraded;
- 140 additional AI technicians trained;
- 220 farmers trained as Assistant inseminators;
- Technical Assistance to private AI service actors provided;

2 Mekele Milkshed

2.1 Administrative Map of Tigre

Tigre is divided into four zones and 36 Woredas with a total population of 4.8 million. The population density is 116 people per square kilometre (CSA 2010).[15] See Fig.1. The urban population constitutes 19.5 % of the total population, which is higher than the country average (16.1%).

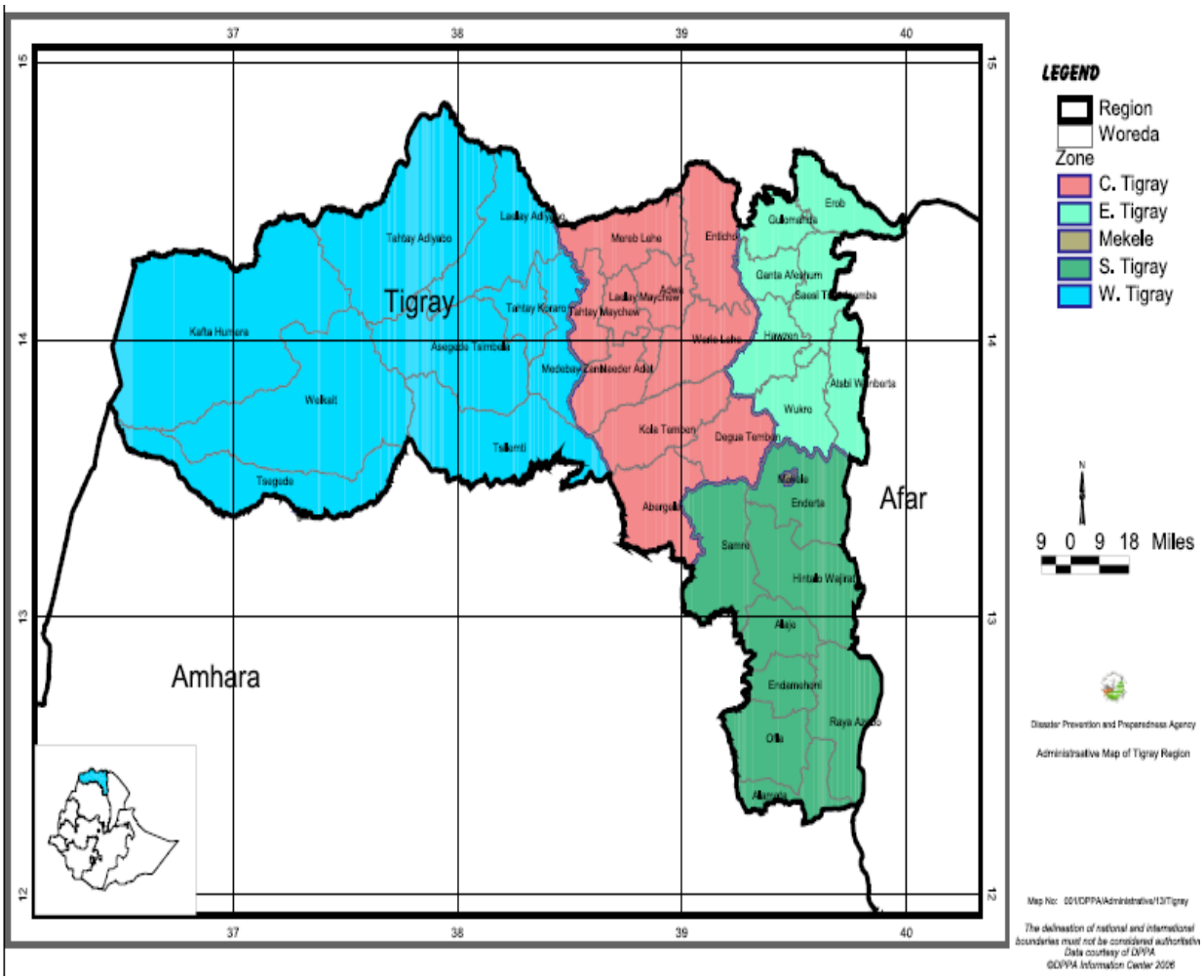

Figure 1 Administrative Region and Woreda Map of Tigre Source: Disaster Prevention and Preparedness Commission

2.2 Mekele Milkshed

Seven Woredas (out of the 36 Woredas in Tigre regional state) are neighbouring Mekele (Table 1). Important towns / Kebele within Mekele Milkshed are Mekele town itself, Kuyiha (administration town of Enderta Woreda), Hgere Selam (Administrative town of Dega Temben Woreda, and Wukro (Administrative town of Kilte Awulalo Woreda), and Didiba Kebele in Enderta Woreda. Urban and peri-

[15] The population projection figures are based on the results of the May 2007 National population and Housing Census of Ethiopia.

urban communities along main roads (Fig. 2) in a radius of 2 -5 kilometres assumed to be part of the milkshed. During the survey, the team learned that no milk collection centres established so far along main roads.

According to Bureau of Agriculture of Tigre Regional State, the total dairy cow population in the town of Mekele is estimated to be around 12,600, which is the largest population within the Mekele milkshed. Out of the 12,000, about 3400 are crossbred cows (see Table 1). In the year 2010, the Office of Urban Agriculture of Mekele registered 23 cooperatives and 32 urban farmers with a holding of about 380 and 315 dairy cows respectively. The total human population of these seven Woredas is about 1 million people with estimated urban population of 330,000 people. According to the Census of 2007, the Orthodox Tewahido Christians constitutes 95.6% of the total population.

Table 1

Human and Dairy cow population data in Mekele and nearby Woredas (2010)

			Distance from	Road	Human Population		
	Woreda name	Town	Mekele	Condition	Woreda	Town	Dairy Cow population
1	Mekele Town	Mekele		Asphalt	261,177	261,177	12,607
2	Enderta	Kuyiha	10km	Asphalt	124,468	12,500*	1,113
3	Samre	Samri			136,514	5,723	N/A
4	Hintalo Wajirat	Adigudom	35km	Asphalt	168,606	9,705	337
5	Degua Temben	Hegere Selam	45km	Gravel **	124,582	8,794	460
6	Kilte Awulalo	Wukro	45 km	Asphalt	109,161	36,545	1,603
7	Atsbi Wonberta	Atsbi Enda Sellassie			123,684	9,657	N/A
					1,048,192	331,601	

Source: CSA 2010 projection and Bureau of Agriculture – Tigre National Regional State

* (CSA 2005)

** Good Condition

N/A: Data not available

The climate of Tigre is generally sub-tropical with an extended dry period of nine to ten months and a maximum effective rainy season of 50 to 60 days. The rainfall pattern is predominantly uni-modal (June to early September). Exceptions to the rainfall pattern are areas in the southern zone and the highlands of the eastern zone, where there is a little shower during the months of March to mid-May[16] (Belg season). Most of the Woredas in the milkshed are getting small showers during the Belg season.

[1616] http://www.ethiodemographyandhealth.org

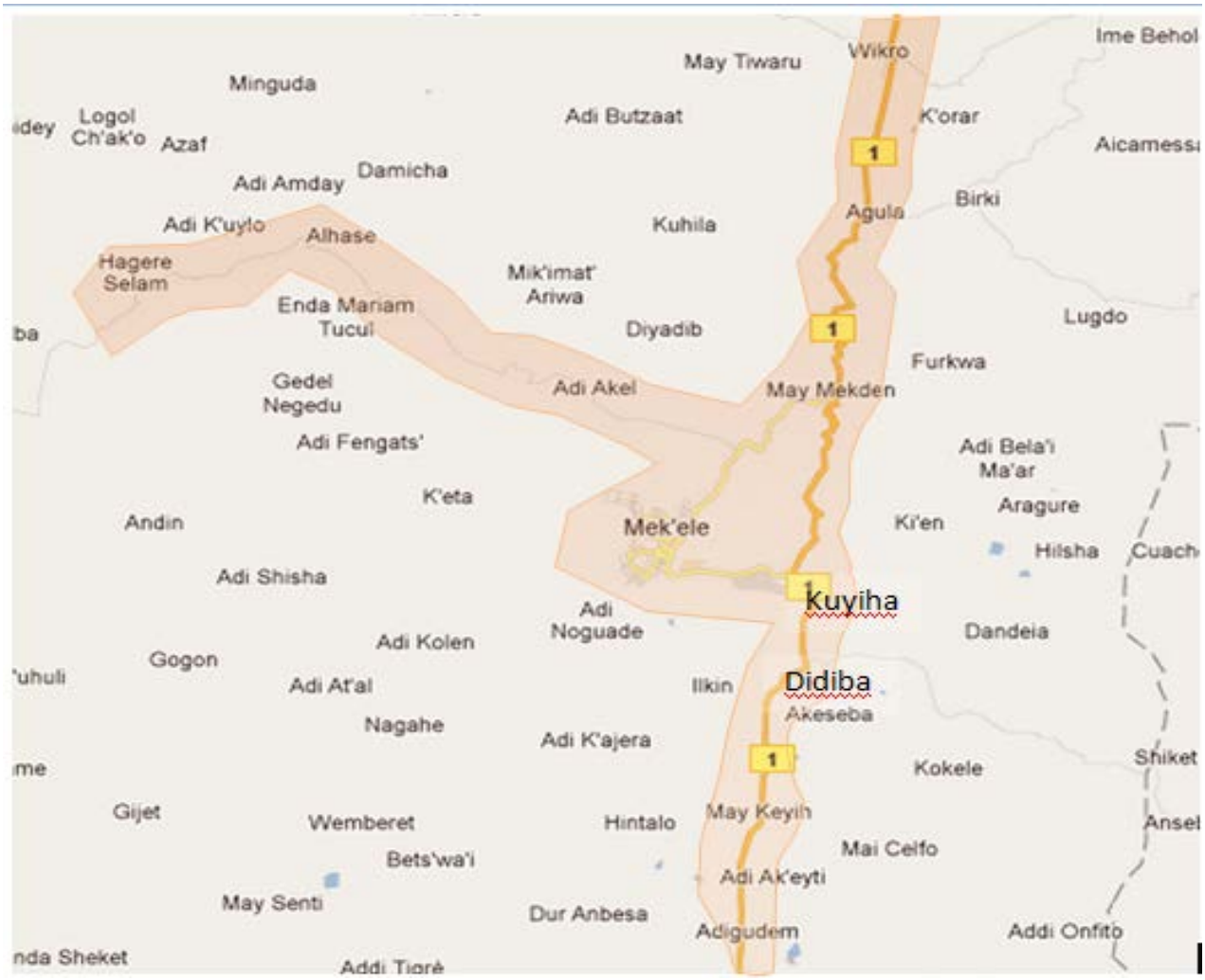

Figure 2 *Mekele Milkshed* *Map: Google earth, milkshed sketch by study team*

According to data collected from the Office of Urban Agriculture in Mekele, the cross breed cow population is increasing at average growth rate of 15% since 2001 as indicated in Figure 3 (Annex 3).

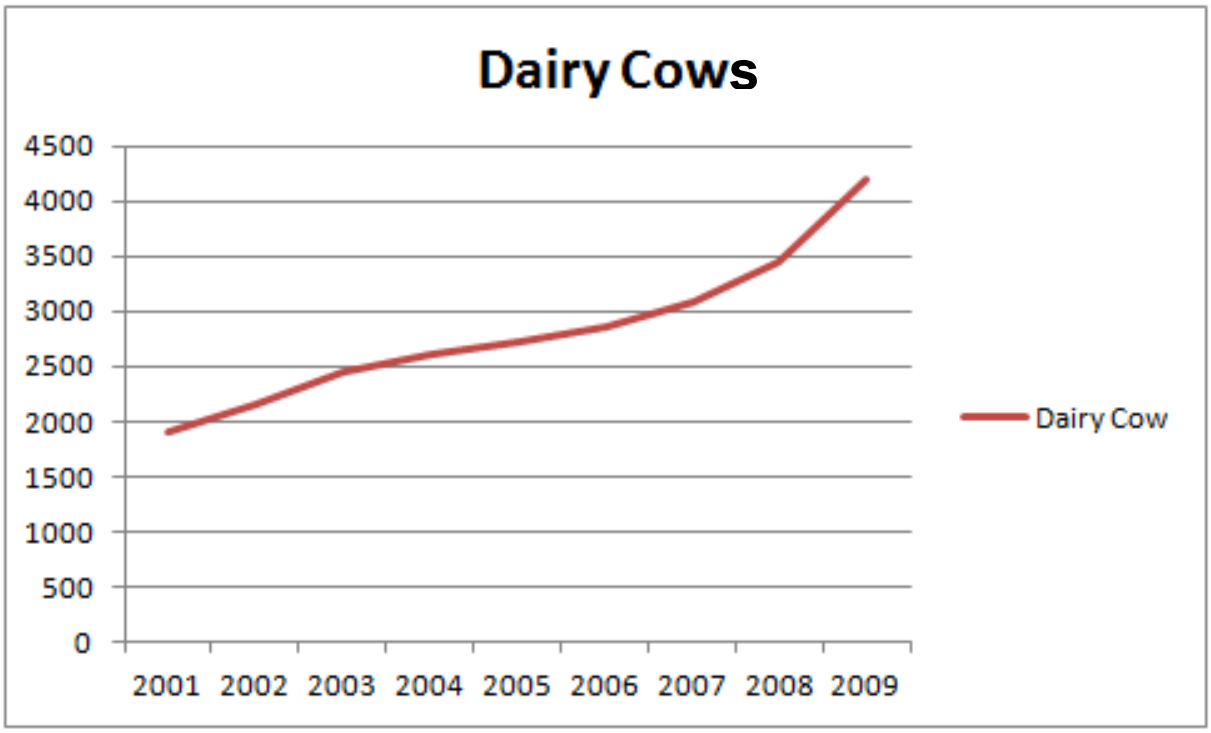

Figure 3 *Cross breed cow population in the town of Mekele for 9 years since 2001*
Source: Adapted from data supplied by Urban Agriculture office of Mekele

2.3 Dairy Value Chain

Mekele Milkshed value chain incorporates input suppliers, direct actors such as the smallholders, commercial farmers, cooperatives, other collectors, processors, retailers and consumers. Figure 4 depicts the value chain of Mekele milkshed.

2.3.1 Input Suppliers

- **Vet Services:** VET services are mainly provided by Government's vet clinics. There is a minimum of 2 vet clinics in each Woreda. Some Woredas including Hintalo Wajirat, Seharti Semri and Kilte Awulalo has more than three clinics.
  There are about three private drug supplies in Mekele. Drug suppliers required to get license/ permit from Drag and Food Control and Administration Agency.
- **Breeding services:** Bureau of Agriculture is the sole provider of breeding services through AI (except Kelemino Dairy farm which has its own AI technician). BOA has two nitrogen machines in the town of Mekele with a capacity of 10 litres per hour. There are about 70 AI technicians throughout Tigre working in 33 Woredas (out of the total 36 Woredas). There are also 50 breeding units. BOA has a plan to open extra 10 units.
  BOA planned to provide 700 AI services per annum per breeding unit. In the year 2004, BOA will have its own semen processing plant. Conceive rate in AI services was 37% in the fiscal year 2010 with slight improvement in the fiscal year 2011, which was 47%.

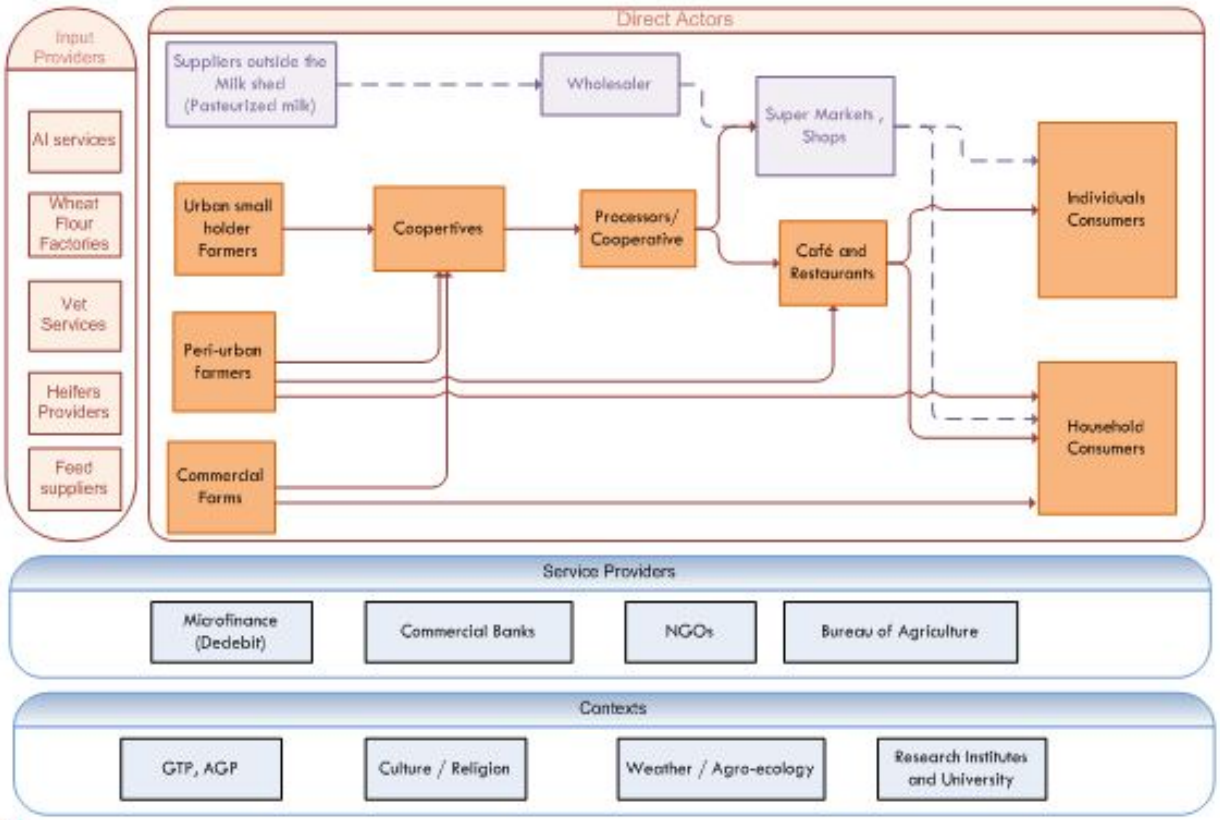

Figure 4 *The Dairy value chain in Mekele Milkshed (July 2011)* Sketched based on the survey

- **Bull services:** Most of the commercial farmers are using AI service for breeding. Some of them are using their own bull. Ato Tilahun of Elila area (Mekele) is among the farmers who use bulls. Commercial farmers are aware of the possible risks of using bull services. Coops members at Didiba Kebele in Enderta Woreda are also use bull for breeding. As a result they do not provide outside bull services to avoid Sexually Transmitted Diseases (STD). Catholic Church also provides support on bull service for breeding in some Woredas.

2.3.2 Chain Actors

2.3.2.1 Smallholders

There are a lot of smallholders in the Mekele milkshed; they keep 2 to 10 cows. According to the officer working at the office of Trade and Industry of Hadinet Sub city (in Mekele), about 500 smallholders were registered in the year 2010. In a Kebele called Aynalem, nearly all households have dairy cows. There are also a number of smallholders in Kuyiha town. The team has interviewed some of them in collaboration with the trade and industry office of the town.

a. **Solomon Gessesse:** He started the business in 2006. He has 28 cows and 11 of them are lactating. Few months ago, his total cow holding was about 64 cows. He destocked because of the problem with space. He is keeping the cows in his own residential compound, which was not originally designed for barn. According to him, most of the cows are blind because of the poor light system. His average milk production per day is about 160 litres. His customers are cafés (about 4) and households. Households pay Birr 8 per litre. During fasting season, they convert the milk into butter. The butter is mainly supplied Kuyiha in a small plastic bucket. They produce butter with traditional system that involves a lot of women. The investment office disappoints him, as his repeated request for land for the dairy farm could not be materialized. He appreciated the role of the agriculture office in AI and Vet service provision.

b. **Aregash Amare:** She started the business in 1991. Because of space problem, her cow holding is limited to 11. She has 4 lactating cows. Her daily production is 45 litres per day. Her customers are

households and hotels. She complained that there is no satisfactory medical service. During fasting season, she doesn't sell the milk, but convert it to butter for household consumption. Her selling price is Birr 6 for cafés and Birr 7 for households. Her attempt for land was not successful.

c. **Abrehet G/Medhin:** She has a total of 6 cows. She has been in this business since 2008. Three of them are lactating. She gets 20 litres of milk per day and distribute to household. She sources feed (mainly hey) from rural areas. She often purchases her annual requirements once in a year. She uses AI service for breeding. She sells milk at birr 7 per litre.

2.3.2.2 Commercial farmers

During the survey we have contacted five commercial farmers, including Kelemino Dairy Farm which is belonging to the one belonging to TDA (Tigre Development Association). According to the report of Urban Agriculture office of Mekele, there are about 28 commercial famers and 22 cooperatives in Mekele area. To understand the features of the various dairy farmers' businesses, brief profile presented here under on some of the farmers and establishments.

a. Ilala Dairy Farm: Ato Are'aya Tilahun established the farm in 2007. The investment is own financing. Currently Ato Are'aya is supplying 120-150 litres of milk per day from his 13 milking cows. His customer is a café called Zemenawi. He sells his milk at Birr 5.5 per litre during fasting seasons and at Birr 7.5 during non-fasting seasons. This price is much lower than those who are selling to house to house, which is Birr 9 per litre. For commercial dairy farmers like him, it is not cost effective to deliver house to house.

Ato Are'aya appreciated the support of BOA in AI services. He receives Vet services from both public (BOA) and private providers. Availability of Feed and concentrates is among his challenges. He has his own farm for forage development (e.g. Alfalfa). He has a plan to have his own processing plant. He secured 4000m2 Plot of land for this purpose.

b. Elala Dairy Farm: The farm was established in 2001. This farm is owned by Ato Tilahun W/Berhan. He has about 20 cows. He had lost 28 cows caused by scrap metals swallowed by the cows. The metal scraps were later detected from purchased feed. He has his own forage and fruit farm in a 3.5 hectares plot of land. His current daily milk production is 78 litres. His customers are cafés in Mekele. He has his own small café for the sales of hot milk and yogurt. He mainly uses private VET services. He also uses his own bull for breeding. Based on his observation, the offspring of the bull provides less milk than their mother used to give. He is challenged by the ever-increasing cultivation cost of forage. Current price ranged from Birr 50 to 60 per day. In addition to dairy cow, he has also oxen (Raya type) for drafting.

c. **Rewina Agro Industry:** Girmay bought the farm from the previous owners a year ago. He has about 38 milking cows and 45 heifers (2 years and above) and 5 female calves. He has also 11 oxen for drafting and 2 bulls for breeding. Breeding is conducted both in AI and bull service. Bull constitutes 30% of the breeding activity, whereas 70% of breeding was taken place through AI services provided by BoA. Employed staff provide vet services. The average milking per day is 300 litres. All of it is supplied to cafés. The selling price of the milk during fasting seasons is Birr 4 per litre whereas during non-fasting seasons; the price is Birr 7 per litre. The total area of the farm is 40,000 square meters. Clinic and administrative office is under construction. The shortage of other feeds like factory by products (frusca and fruscalo) is increasing and sometimes there is acute shortage of such feed.

Mulu Negash Dairy Farm and Processing Enterprise: a female entrepreneur named Mulu Negash owns the business. She used to produce about 200 litres of milk a day. She lost 18 cows in 8 months mainly because of poor attendant. Her attempt to have electricity access for many years was not successful. The fee requested for electrification was not affordable. During raining seasons, it is difficult to reach the farm by car. Lack of feed supply (concentrate) is one of her challenge. The productivity of new offspring is much lower than what their mother used to give at same stage. She has concern on the quality of the semen.

She is undertaking a project for a processing plant. The footing of the factory floor is completed. The site accommodates up to 80 cows and a processing plants (4000m^2). She is looking for a partner for the processing plant.

2.3.2.3 Associations

Cooperatives: In Tigre region, there are about 386 cooperatives with a total of 7970 members out of which 23% of them are women.

Most of the cooperatives in Mekele area have an average member size of 10. Agazi cooperative is formed by former combatants of TPLF, which has a large number of members with average daily milk production of 400 litres. Unlike other cooperatives, cows of the Agazi coop members are maintained in one site. Mekele has the largest number of cooperatives in the milkshed. According to Urban Agriculture Office, 22 cooperatives are registered in the year 2010. There are cooperatives in the towns of Wukro, Hager Selam and Didiba.
At the time when Zemen was functional, cooperatives were supplying their milk to it. But now, cooperatives, including those who are member to Zemen, distribute their milk to cafés and restaurants. The team learned a unique insurance service provided by a cooperative in Adigudom (South of Mekele). When a member lost a cow (because of death), the cooperative provides a cow to the member.

a. **Hiwot Dairy Cooperative (Hagere Selam town):** This coop was established in 2005 with 19 members. Relief Society of Tigre assisted the establishment. Currently, it has 62 members (40 men and 22 women). The total cow holding of members is about 136, with average daily milking of 300 – 350 litres per day. Most of the members are living in the town. The coop is member of Zemen (the union) and used to deliver its milk to the Union. When the Union quits its operation, Hiwot Coop is now supplying to a milk collectors named Halib. The milk collected in the evening will be sold in the town (Hagere Selam). The coop has its own milk shop and about 10 litres of milk is sold as hot milk and the remaining sold (whole milk) to households and cafés.

The coop serves its members by creating market linkage, feed supply and credit services. The credit service terminated when the money intended for revolving fund was paid as a membership fee to the Union. Members are getting AI services from office of Agriculture and use also bull service (owned by a school).

During fasting season, the demand for milk declines sharply, and the coops changes the milk into butter. They have equipment for the preparation of butter. The price of milk in the town of Hagere Selam is Birr 7, whereas the price to collectors is Birr 5.5 per litre. The market price of a pregnant heifer is about Birr 16,000.

b. **Didiba Kebele Dairy Cooperative:** Didiba is located at 28 km south of Mekele. The cooperative was established in 2011 by the support of Land O' Lakes. IT has 21 members (3 of them are women). The total number of cow holdings by members is 74 out of which 27 are lactating. They produce about 200 litres per day and distribute to households and government employees in the town. AI service is provided by AI technicians based in Kuyiha (town of the Enderta Woreda). However, much of the breeding service is provided using bulls. There are also trained farmers who provide AI service. Forage development is well practiced in the area. VOCA has provided seeds for forage development. The challenge for the coop, is the limited time allotted by the management, as most of the members are engaged in different businesses such as irrigation and gravel production.

c. Zemen Union: Most of the cooperatives are members of Zemen Dairy Union. It has 21 member cooperatives in the town of Mekele, Adigudom and Hager Selam. Zemen commenced operation in the year 2011 with the support of BoA. BoA granted the union a processing plant with a capacity of 2000 litres per two shifts. The achieved capacity was between 1700 and 1800 litres per day. The Union also provided with 7 fridges and containers to distribute its product in different parts of Mekele.

The Union operated for few weeks and halted its operation because of declining demand. Some believes that poor marketing was responsible for the decline in demand. Others blame the quality of the milk and the short shelf live. Shops and supermarkets have experience of dealing with UHT milk which has a shelf life of about 6 months. They were expecting that the milk of Zemen would last for some days before reaches customers. This misconception contributes for bad publicity of the product. Some blame the fridge available in the market, that it has a minimum of 6 degree Celsius cooling capacity, whereas the lower degree centigrade for maintaining milk needs 4 degree Celsius. The team didn't verify the claim from relevant professionals. The followings are also additional challenges faced by the union:

- Limited capital. The capital at the time of establishment was Birr 700,000. Currently the union is not working to its full capacity. The union would have scaled up its production had it not been for shortage of fund/capital.

- Limited working capital even to pay salaries. BoA used to pay salaries for the employees of the union.
- There are bottlenecks in the production process, and promised correction in yogurt production was not fulfilled.
- The packing procedure has manual intervention, which compromises the quality of the milk and the efficiency of production. The cost of packing machine was estimated to be Birr 60,000.

d. Tigre Multi-purpose Cooperative Federation: Established in October 2009. It has about 3000 member cooperatives. The total number of members represented in these cooperatives is estimated to be about 513,000. As of June 2010, the capital of the Federation was Birr 298 million. In addition to cooperatives, there are also 41 various unions which are members to the Federation. Zemen Dairy Cooperative Union is one of them.

e. **TDA Kelemino Dairy Farm: Owned by Tigre Development Association (TDA).** The farm is located at 7 kilometres south of Mekele, in a village called Kalamino. The farm established 14 years ago. The farm has 69 cows (57 of them are lactating), 46 heifers, 39 female calves and one bull. During the start of the farm, the blood level was between 50% and 60%. At this time, the blood level reaches 85%-90%.

Average daily milk production is 650 litres. The farm has five shops in different parts of Mekele (including one at the farm gate). All customers are households and they do not sell to cafés. The selling price is Birr 8 per litre. During fasting season, demand for milk declines. They convert it into butter (using the modified Borana butter making unit). Butter and Ayib are sold at a price of Birr 80 and 11 per Kg respectively. Buttermilk is meant for calves, not for sale. Household customers are registered and are required to pay monthly advance payments.

The farm distributes (sells) heifers and cows to the community. According to the manager, the farm sells 15 heifers, 10 cows, 3 calves per annum. Male calves (3 to 5 years old) are often sold to butchery in Mekele town.

The farm has a testing project of new semen provided by organization represented by Dr Emiru. It is expected that the offspring will provide up to 12 litre of milk per first lactation. The result will be seen in one and half year from now (end of December 2012).

Feed supply is a challenge to the farm. Concentrate feed is not available in the market. Because of feed shortage, milk production reduced by more than 250 litres per day. The farm is self-sufficient with green feed from its own farm and purchase 40% of its hay requirement from the market. At farm level, finance is a challenge. Sufficient amount of budget is not allotted to the farm. The two barns could not accommodate the increasing cow population and the budget is not sufficient enough to feed the cows. As a result, they are forced to cull.

The farm has its own fully equipped AI service unit. AI service also provided to nearby farmers. It has also its own VET service unit. In ten years' time, about 35 cows died (sudden death) mainly due to blot.

2.3.4.2 Collectors

There are collectors who buy milk from smallholders and distribute to cafés and households. The team has interviewed two collectors in the town of Mekele. Most of the collectors have their own shops to sell milk in the form of raw milk and other milk products such as yogurt and hot milk.

a. **Halib Milk and Milk product distributer:** 10 university graduates established Halib in October 2010. They collect 300-400 milk per day and distribute to various customers through their outlets they opened in front of Mekele Business College. Hiwot Cooperative is one of their suppliers. They sell milk in the form of yogurt, butter, buttermilk, ayib and boiled and cooled milk. Whole milk sales constitute the largest sales, about 100 litres per day.

Yogurt is sold at a price of Birr 6 (per Juice bottle[17]), cold milk (Birr 4 per juice bottle[18]), and raw milk for Birr 8 per litre, hot milk Birr 3 per cup (six cup = 1 litre). Ayib is sold for Birr 30 per KG, Butter Birr 150 per KG and buttermilk at Birr 5 per litre. Buttermilk is mainly used for making of traditional food sauce called *hilbet*. During wedding ceremony, one family may buy up to 50 litres of buttermilk.
They have butter making equipment and testers. According to the manager (Sahle), the quality of milk decline in the period between March and June. They don't collect milk, which doesn't meet their minimum quality standard. Their challenge is lack of their own transportation vehicle, which could have helped them to save some costs they incur on transportation.

b. **Tesfaye:** Tesfaye's main business is collecting milk and distributing to various users. He has also his own café. His distribution outlet (a container in a road side) has been closed by the order of the municipality. The café is serving as a collection and distributing point. He sells 30 litres of milk in the form of hot milk and yogurts. Most of its customers are cafés (including classic Café) and households. He collects more than 1000 litres per day from about 40 suppliers. During fasting seasons, he keeps buying from its suppliers to maintain them. Once they switched to other collectors, it will be difficult to get them back.

The payment system is depending on the preferences of the suppliers. Some wish to receive on daily basis, some on weekly and some on a monthly basis.

His challenge is lack of appropriate testing equipment and working premises. He has changed four sites. Owners forced him to leave the rented house at time when business grows. Owners tempted to do similar business. He used to test using lacto meter. Currently he is not undertaking the testing process. From his experience, milk quality is good from July to January. The quality declines from

[17] three juice bottle = 1 liter
[18] Six cup = 1 liter

February to June. These could be related to the quality of the feed and adulteration because of competition or decreased production. Butter is prepared manually. He has about 30 cows of his own where 10 of them are lactating.

2.3.2.5 Supermarkets and shops

There are a lot of shops and few supermarkets (estimated 5 -8) in Mekele town. Supermarkets and shops source milk from wholesales of UHT milk. Mama UHT milk, processed and supplied by Sebata Agro Industry, is the only known brand in Mekele. Based on the interview made with some small shops, they often purchase one packet (12 pieces of ½ litre UHT milk) per week or may be in every ten days. This milk was not available in Mekele market for the last six weeks.

a. **Betel supermarket,** located in the central part of Mekele sells 18 litres of UHT milk in 1 to 2 days' time. A wholesaler in Mekele town supplies the supermarket. Most of the customers are individuals who drink on the spot. Other customers are households. Supermarkets earn an average of 0.5 gross margin per litre. According to the supermarket manager, the gross margin is not attractive as a business, but the product (UHT milk) attracts more customers for their other products. As stated above, the supply of UHT milk is discontinued since end of May. According to the supervisor of the supermarket, the demand for milk decline to the extent of 50% during fasting seasons.
Supermarkets used to buy and sell cheese from suppliers who source from Addis Ababa. However, the supply is not consistent. Some of the shops and supermarkets used to sell Zemen's milk. Due to frequent spoilage and complain by consumers, the demand was so low.

b. **Café and Restaurants:** The team's attempt to get the number of café and restaurants in the town of Mekele was not successful. From the observation, the number is huge. Cafés are the main sales outlets of milk products.
Zemanawi is the largest milk product selling café in Mekele, with average milk sales of 700 litres per day. Commercial farmers such as Ilala (Ato Arya) and Ato Tadesse are among the major suppliers of the café. Zemenawi's popular dairy menu is Fatah. It sells also bottled milk (in Ambo bottles).
Classic Café and Snack: Ato Daniel, owner of Classic Café and Classic Snack Bar purchases about 180 litres of milk on a daily basis during non-fasting seasons. During fasting seasons, especially Hudade and Filseta[19], the volume shrinks to 100 litres. His suppliers are five farmers, where one of them is a collector. For him, milk quality is a challenge. He doesn't have lacto meters or other testing equipment. They check the quality visually. Poor quality milk incidence is once in a month.
About 100 litres of milk is dedicated for the snack to be sold in the form of Fetah (served with bread, Yoghurt with some sauces). The remaining 80 litres will be sold in the form of macchiato (55%), hot milk and bottled milk[20] (with Ambo bottle). Most of the consumers for the bottled milk are café customers. Sometime ago, they tried to market pasteurized milk of Zemen Union, which was not popular. No powder milk is used so far in cafés.
There are also few designated (star hotels) hotels in Mekele, namely Abraha Castle Hotel, Axum Hotel, Yordanos Hotel, Hatsey Yohannes Hotel, Hawelti Hotel and Milano Hotel. A milk sale in these hotels is small quantity as compared with cafés.

[19] Hudade (55 days before Ethiopian Easter) and Filseta (15 days - August 7-21)
[20] The milk will first boiled before it is being bottled

2.3.2.6 Consumers

a. **Institutional Buyers**

- **Mesobo Cement Factory:** It is one of the largest cement factories in Ethiopia. The factory has about 1300 employees. The factory purchases and distributes 10,834 tins[21] (4333Kg) of powder milk (NIDO, Milkgrow or Kenny) per quarter, approximately 47 kg per day. NIDO is the most preferred powder milk by the employees as it attracts higher price when they sell it to local shops[22]. They switch to other products when NIDO is not available in the market.

  According to the information from the Tigre Multi-purpose Cooperative Federation, Mosobo Cement Factory management promised to purchase 500 litres of milk per day from the Union. The factory confirmed the quality of the milk by sending samples to Addis Ababa for test. However, the Union failed to deliver the required quantity of milk. According to Personnel head of the factory, there is resistance from employees to switch to liquid milk. The powder milk is expensive and some employees often sell it to shops in Mekele.
  The café of the factory itself consumes up to 50 litres of milk per day. At the time of this assessment, the cafe' was selling about 30 litres of milk per day. They don't buy from coops because of quality concern. They buy the milk from individuals.
- **Mekele Hospital:** Ayder Referral Hospital is the largest hospital in Tigre. The team could not collect information as to the potential for milk demand, because of time constraints. From experience, hospitals are major consumers of milk and especially cafés operating within the hospitals enjoying more guest customers in addition to staffs and students.
- **Cafés in Defence institutions and University**: People who are working and residing in the Defence institutions such as air force are potential users of milk. Some staffs working in the University of Mekele are purchasing milk from the dairy cows owned by the university. Students are major customers in university and colleges cafeterias.

b. **Households**

Households are major consumers of milk within Mekele milkshed. Traditionally, milk is preferred menu at household level. In addition, butter is highly used at household level. As the Orthodox Christian community is substantial, during fasting demands for milk declined. Only mothers at maternity and children are continuing consumption of milk. Most households with children and infant at home prefer a contractual purchase to avoid the risk of supply shortage. Others purchase from shops and cafés on the way back to home.

c. **Individual buyers**

Individuals are consuming milk and other milk products at cafés and supermarkets on the spot. Cafés are meeting place for friends. In addition, Mekele hosts a number of training and workshops. People throughout the region, including from neighbouring Afar region. These people are major customers of snacks and cafés.

[21] One tin weigh 400 gram

[22] The administration of the factory strictly advises its employees to consume the milk that it distributes. However, a lot of employees preferred to sell the powdered milk they collect from the factory to local shops.

2.3.3 Service Providers

a. **Bureau of Agriculture (BOA) and the respective agricultural offices:** Veterinary (=VET) drugs and equipment is purchased centrally by BOA, this is for efficiency and economy purpose. VET budgets are one off, unlike Oromiya where VET budget is used as a revolving fund over the budget year.

b. **Office of Urban Agriculture – Mekele:** The office provides AI and VET services to dairy farmers in the town of Mekele. It consults dairy farmers on feed management, area treatment system, housing and barn assessment. It also provides training on dairy farming including production of other milk products.

c. **Cooperative Promotion Agency:** The cooperative agency has three departments, namely promotion, marketing and a support department (Legal and Audit). The Cooperative Promotion Agency provides supports for the establishment of a number of cooperatives working in dairy business. The office also provides support during the establishment of one Dairy union and one multi-purpose Federation. The agency provides training on coops management and also facilitated projects funded by NGOs such as Land O' Lakes.

d. **Land O' Lakes:** Land O'Lakes has supported many actors, mainly the commercial farmers and cooperatives in the area of marketing and milk quality and productivity. According to the information we get from actors, Land O' Lakes has a project of establishing feed processing plant in Raya area[23]. Land O' Lakes facilitated the establishment of a number of cooperatives (need to be verified from the horse mouth).

e. **Mekele University:** College of Veterinary is working with farmers with a motto of 'one calf per cow per year'. Recently the college provided synchronization service on 25 cows of Tigre Development Association and for smallholder farmers in Mekele town. The intended activities of the college downsized because of budget constraints. Mobility costs such as fuel are beyond our budget. Farmers from various corners of Tigre, including from Adwa and Shire requested for the service of the college.

   The college has its own dairy farm, with 14 cows (8 lactating cows). The milk is sold to the university community at Birr 6 (which is lower than the market price, 8 Birr)

f. **College of Agriculture:** The College has department of Animal Science. The department has its own dairy cows. An attempt to reach the dean and the relevant people was not successful.

g. **Catholic Church:** the team learned that the church provides heifers to farmers and bulls to support breeding. Because of time constraints, the team unable to visit the church.

2.3.4 Chain Context

a. **Policy:** According to Bureau of Agriculture, the existing policy is conducive for private companies to engage in the provision of VET and AI services.

b. **Culture and Religion:** More than 95% of the Tigre population is Christian Orthodox. As a result of these demand falls during major fasting seasons. In the positive side, the attitude of the society to milk is strong. Long tradition of dairy development reflected in the presence of various types of dairy products and menus. Milk is consumed as is, boiled and cooled, hot drink, yogurt, ayib, butter, and buttermilk. Breakfast menu called *fatah* is famous in Mekele and other towns in Tigre. Unlike many places in Ethiopia, buttermilk has better demand.

[23] Raya located about 160km south of Mekele, and presumed to be outside the Mekele Milkshed

c. **Weather and Ecology:** Explained above.
d. **Research Institutes:** Mekele University has a number of colleges and faculties related in one or another way with dairy development. Among them are college of Veterinary medicine, Animal science, Business College and engineering.
e. **Agricultural Research Institutes and TVETS** are also the most important institutions that could play important role in innovation. Because of time constraints these institutions were not visited.

2.4 Collaboration

- **BOA and Mekele University:** VET Department of Mekele University has been providing training for AI technicians of BOA especially on synchronization for the last three years.
- **Mekele University and Farmers:** The College of veterinary medicine has been working with farmers in synchronization.
- **Cooperative and Extension Office with Union and Coops:** the cooperative office supports technically and financially the unions and coops. The Government has granted the milk processing plant, and covers monthly salary of employees working for the union.

2.5 Challenges

a. **Milk Quality:** Milk quality is a concern for collectors and café's especially in the months between February and June. Some of the cafés, even those who purchase substantial quantity of milk do not have testing equipment. In order to reduce challenges on milk collected, quality-testing techniques such as lacto meter and alcohol could be implemented. On the other hand, awareness should be created among producers and producers also should enter in to commitment to supply quality milk, which is not adulterated. *The Tikus Wotet of Arsi Negelle experience, which rejects low quality milk and cancellation from membership of cooperative for repeated adulteration (particularly knowingly) could be a good example to establish norm to deliver quality milk.*
b. **Feed Challenge:** Some of the commercial farmers have their own feed farm and hence are self-sufficient for green feed. Some purchases their hay requirement once in a year from rural areas. The price of feed is escalating. For example, the price of *fruska* escalated from Birr 180 (some six month ago) to Birr 280. There is no supply of concentrates.
c. **Limited budget:** Limited budget and lack of transportation services like motor bikes is one of the limitations of the extension department to reach as far places as possible and on a timely basis up on the request of dairy farmers.
d. **Fasting season:** During fasting season, especially during Hudade and Filseta, the demand for milk falls. Many producers are converting the milk into butter and ayib. The current price of butter and ayib is Birr 80 and 15 respectively per kilogram. Collectors like Tesfaye, keep buying from their suppliers to maintain the business relationship.
e. **Lack of technician to repair dairy equipment.** Most of the cooperatives suffer from breakage of dairy equipment. There are no technicians available in the market to provide maintenance services for such equipment.
f. **Infrastructure:** Some of the farmers have problem with clean water though their farm is established in the town. The water they use risks the health of their cows. Some farmers do not have access to electricity. When request is made for connection to the power grid, the fee is unbearable. The lack of access road is also a challenge to some farmers, in the rainy seasons.
g. **Undeveloped demand:** Some complain that the actual milk consumption level is much lower than it should have been. The demand needs to be developed.

2.6 Opportunities

a. **Active role of BoA and the respective offices and departments:** Strong AI service provision is witnessed by many of the dairy farm owners. Availability of a nitrogen production facility in the town of Mekele, and the future plan for the establishment of semen production are strong prospects for dairy development in the milkshed. It is important platform for the development of expansion of dairy cow population. **High demand and culture:** The challenges of a declining demand for milk products during fasting seasons will be compensated by a strong demand during non-fasting seasons. The culture of consuming milk products in cafés and at household level is strong. However, diversification of milk in to its by-products will add value and help people to have more time for search of competitive price.
b. **Large institutions:** There are large institutions, which could be developed as huge demand base. These are Mekele University, the Defence institutions including air force, the various factors such as Mesobo, Mesfin Engineering, the hospitals such as Ayder and Fistula. The heterogeneity of people working in factories and industries creates opportunities for year round milk consumption. Therefore, it would break the market problem of producers during fasting season if predesigned marketing is done.
c. **Road access**: The road along the milkshed is asphalt except the way to Hagere Selam.

3. Stakeholders Interest and Influence Table

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
BOA of Agriculture, Livestock Health Department (Dr Gebru Legesse)	Input (livestock health), research	Tigre region, in all Woredas	Dairy animal health	To combat diseases which affect productivity of dairy cows	May contribute in locally affordable prevention methods	P			0914 760680
Rewina Agro Industry (Owner Ato Girma, Manager Ato Get chew)	Commercial Dairy farmer	Mekele	Milk productivity, quality and marketing	Actively participate in dairy and feed development	Involvement in any dairy related innovation	P			911 247852
Tigre Cooperative promotion, Marketing Department (W/ro Asegedech, Ato Hailu)	Supporting Coops in marketing of their products	Tigre region	Dairy marketing	Have the influence to organize coops and unions	They have experience in the dairy market	P			0914 721951 0344 404709
Mulu Negash Dairy Farm and processing plant (W/ro Mulu Negash)	Commercial dairy farm and processing plant (new project)	Mekele and surrounding towns	Milk productivity, animal health, marketing and processing	Better understanding of the dairy business and will cooperate in dairy dev' project	Willing to provide its facilities for innovation in milk productivity and processing	P			

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
College of Veterinary Medicine (Mekele University) Dr Gebrehiwot Tadesse	Dean and researcher at the University	Mekele and surrounding Woredas	Breeding and synchronization	Productivity. Currently assisting farmers in this regard	They have a number of innovative ideas to introduce in breeding and milk productivity	P			
Elalal Dairy Farm, Tilahun W/Berhan	Dairy Farm	Mekele	Milk marketing, animal health and milk quality, financing and partnership for processing	Willing to work together with all actors and service providers in feed, breeding, quality and marketing		P			
Areaya Tilahun	Dairy farm	Mekele	Milk productivity and marketing, farming space	Supplying milk and heifers		P			
Hiwot Dairy Cooperative	Milk collection and marketing, feed supply	Hagere Selam and Mekele	Marketing , skill development to members, feed sourcing	Source to collectors at Mekele, and supplying milk to the town of Hagere Selam and source of livelihood to its 20 members		P			

Stakeholders	Function	Geographic Coverage	Interest Stake they have in dairy development	Influence A Contribution they can make in value chain development	Influence B Contribution to innovation and learning	Attitude towards Change	Physical Address	Email Address	Phone number
Tigre Development Association (Ato Teklay : Farm Manager)	Dairy farm	Mekele	Better breeding, milk quality and marketing	Supplies milk targeting households, have its own vet and IA service unit and avails heifers to buyers.	Breeding and marketing.	P			
Abraham	Urban Agriculture (including marketing)	Mekele	Urban dairy development	The office provides all sort of support for dairy farmers within Mekele	Breeding, animal health, forage development and barn management	P			
Tesfaye	Milk collector	Mekele and surrounding	Milk quality and cooling system	He is a market channel for more than 40 smallholder producers	More on marketing and supplier handling	P			
Halib Milk and Milk products (Ato Sahle Gidey)	Milk collector	Mekele , Business college area	Milk quality and more milk product development	Play important role in distribution of milk	Could contribute on innovation related to marketing and product development	P			

Annexes

Annex 1 - Registered Milk marketing cooperatives in Mekele town (2010)

	Name of coop	Location	Milk production per day	Cow population	
				Lactating	Total
1	Chom ‘a	Semen	22	8	12
2	Selamawit	Hawulti			
3	Shishay	Hawulti	18	3	5
4	Maebel	Hawulti	10	2	6
5	Fana Yekatit	Hawulti	36	3	
6	Hashni	Hawulti	18	3	4
7	Alma’	Semen	192	15	40
8	Ag’azi	Semen	370	40	107
9	Semhal	Ayder	26	6	9
10	Fana Yekatit	Koha	30	2	4
11	Mahibere Medhanialem		20	2	2
12	Awot	Hawulti	15	3	5
13	Deldi	Semen	24	6	10
14	Kidist Mariam	Semen	18	4	8
15	Tsada Iga	Semen	21	7	11
16	Samra	Semen	16	4	7
17	Midre Genet	Hawulti	8	2	3
18	Kidusan	Hawulti	12	4	5
19	Selam	Hawulti	30	3	6
20	Kisanet	Ayder	12	3	4
21	Fretsimak	Ayder	16	4	8
22	Meskerem	Ayder	17	5	13
23	TDA - Kalameno	Hadinet	530	53	116
	Total		1461	182	385

Source: Office of Urban Agriculture, Mekele Town.

Annex 2: Registered Individual famers in the Town of Mekele (2010)

	Name of farm owners (smallholders)	Location	Milk production per day	Cow population	
				Lactating	Total
1	Tilahun W/Berhan	Semen	84	20	30
2	Araya Tilahun	Semen	60	8	15
3	Belambaras Tesfay G/Yesus	Semen	17	3	7
4	Negus Tesfay Kidanu	Semen	27	4	17
5	Kidane Mariam Abreha (M/R)	Semen	40	6	23
6	Mengistu T/Mariam	Semen	10	2	7
7	Te 'ebe Tadesse	Semen	18	3	10
8	Zemichael Bogale	Semen	18	3	6
9	Hailu Kassa	Semen	35	5	14
10	Tesfay Mebrhatu (Haleqa)	Semen	40	5	25
11	Estiphanos Dawit	Semen	35	5	21
12	Checkos Dawit	Semen	50	7	22
13	Gibre Hawariat Te'amer	Semen	23	7	12
14	Desta Beyene (Haleqa)	Hawulti	20	2	8
15	Mulu Negash	Hawulti	35	7	20
16	H/Mariam Girmay	Ayder	20	4	8
17	Alganesh Mengesha	Hawulti	15	2	3
18	Girmay Tsegaye	Hawulti	40	5	8
19	Gebre Kidan (Haleqa)	Hawulti	30	3	7
20	Hailu Geras	Hawulti	15	2	3
21	Mulu Meresa	Hawulti	14	2	5
22	Abadit Bagale	Hawulti	12	2	3
23	Asmelash Belay	Hawulti	12	2	4
24	G/Medhin Tesfaye (Kes)	Hawulti	20	3	6
25	Haile Sellassie Woldu	Hawulti	15	2	4
26	Girmay Amare	Hawulti	11	2	3
27	Hailu Tsegaye	Hawulti	6	1	3
28	Berhanu G/Michael	Ayder	35	3	5
29	Tesfaye Atsibeha	Ayder	45	5	7
30	Mebrahitom Abadi	Ayder	20	2	3
31	Asfaw G/Abruk	Ayder	15	2	3
32	Solomon (M/r)	Semen	20	2	3
	Total		857	131	315

Source: Office of Urban Agriculture, Mekele Town.

Annex 3: Dairy cow population and milk production in Mekele

Year	Cross Breed			Local Breed			Total Milk production (million litres)
	Total Dairy Cow	Lactating cow	Milk production (million litres)	Total Dairy cow	Lactating Cow	Milk Production (million litres)	
2001	1908	1526	4,578	6,894	4,136	1,489	6,515
2002	2154	1723	5,169	6,384	3,830	1,379	6,979
2003	2453	1962	5,886	5,550	3,330	1,199	7,483
2004	2613	2090	6,270	5,320	3,192	1,149	7,810
2005	2716	2172	6,516	5,200	3,120	1,123	8,028
2006	2849	2279	6,837	5,150	3,090	1,112	8,341
2007	3093	2474	7,422				
2008	3443	2754	8,262				
2009	4200	3359	10,077	4,807	2,884	1,038	11,375

Annex 4: People Met

	Name	Organization	Position	Telephone
1	Dr Gebru Legesse	BOA	Livestock Health Department	+251 914 760680
2	Mulu	Alpha Mini mart (shop)	Shop keeper	
3	Girmay	Commercial Farm	Owner	
4	Getachew	Commercial Farm	Manager	+251 914 701918
5	Tadesse Gugsa	Bureau of Agriculture – Extension Department	AI head	+251 914 726473
6	Dr Gebrehiwot	Mekele University, College of Veterinary	Dean	+251 914 706422
7	W/ro Asegedech			+251 914 721951
8	Ato Hailu			+251 344 404709
9	Mulu Negash	Mulu Negash Dairy Farm and Processing Plant	Owner and Manager	
10	Tilahun W/Berhan	Elala Dairy Farm	Owner and Manager	+251 914 709974
11	Araya Tilahun	Ilala Dairy Farm	Owner and Manager	+251 914 701531 +251 913 515236
12	Haile Sellassie	Tigre Multi-purpose Cooperative Federation		+251 914 731692
13	Amare	Tigre Multi-purpose Cooperative Federation		+251 914 731400
14	Me'uz Kebede	Urban Agriculture Office - Mekele		+251 914 708949 +251 344 409806
15	Legesse	Mesobo Cement Factory	Personnel Officer	+251 914 732858
16	Abeba	Mesobo Cement Factory	Nurse	+251 914 705695
17	Hailu Negassi	Hiwot Dairy Cooperative, Hager Selam	Manager	+251 914 240835
18	Mehari HAgos	Tigre Development Association	D/Executive Director	+251 914 702050
19	Teklay	TDA Dairy Farm	Farm Manager	+251 914 706348
20	Solomon Gesesse	Dairy Farmer	Farm owner	+251 911 809836
21	Abreham	Urban Agriculture Office - Mekele	Head	+251 914 702592
22	Sahele Giday	Halib milk and milk product marketing	Manager	+251 913 384619

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Part II-E

Addis Ababa Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

Market orientation of the Ethiopian dairy sector has been the issue of governmental and nongovernmental organizations in the past few decades. SNV-Ethiopia is one of the stakeholders in this regard. It has been supporting dairy businesses technically and financially for the past six years through its BOAM program. The MIDD program is a new 5-year program that focuses on Market-led Innovation and Learning for dairy development in the country. This study is commissioned by this new program and is meant to describe dairy value chains of selected milksheds, describe stakeholders and intervention areas.

Ethiopians used livestock and their products in their day-to-day life activities. The economy of the country is, therefore, highly dependent on agriculture in general and in livestock agriculture in particular. Agricultural development led industrialization (ADLI) policy of the country is a good example for this. Thus playing an important role in the country's economy, agriculture is estimated to contribute for about 43.8% of national GDP in 2009. In recent census, the share of the livestock sector was about 12-16% of national GDP, 30-35% of agricultural GDP, 15% of export earnings and 30% of agricultural employment (SNV, 2008[24]; Getnet Haile, 2009[25]).
Hence, livestock contributes to the livelihoods of Ethiopians in one-way or the other. Crop-livestock farmers, pastoralists and agro-pastoralists, raise milking animals in all of the farming systems. The rural dairy production system is part of the subsistence farming systems that are mainly concentrated in the highlands, but also in the lowlands. Pastoralism is the major system of milk production in the lowlands. It is estimated that about 30% of the livestock population are found in the pastoral areas. Nevertheless, because of the erratic nature of rainfall that results in shortage of feed availability, milk production is low and highly seasonal. Over the last 30 years, national and per capita production and consumption of livestock products have declined. During 1993-2001, per capita income remained at about USD100. Livestock production increased by much less than the production increase for the agriculture sector as a whole, so relative share of livestock to agricultural GDP declined. Hence, per capita livestock output fell by 5% while crop and agriculture grew by 14 and 6% respectively (SNV, 2008).

Highlands of Ethiopia occupy the central part of the country and covers over 40% (approx. 490.000 km) of the areas of the country being the largest of their kind in Sub- Saharan Africa. In the highland areas, the smallholder agricultural production system is predominantly subsistence mixed crop-livestock farming system. Based on market-orientation, scale, and production intensity the dairy sector can also be categorized into: traditional smallholder, private / state-owned commercial, and urban / peri-urban.

The traditional smallholder system corresponds to the rural milk production system. Both the pastoralists and smallholder farmers produce over 98% of the national milk production. The majority of milking cows are indigenous Zebu breeds with low production performance whose average daily yield is 1.7 L/cow (CSA, 2010).
Although there is increase in number of cattle over years there is a decline in milk production and productivity in the country (Getnet Haile, 2009; CSA, 2008; CSA 2010). Previous reports showed that milk production increased by 16.6% from 637,400 to 743,100 metric tons with an average annual

[24] SNV, 2008. Study on Dairy Investment Opportunities in Ethiopia. TAM Consult, July 2008. Addis Ababa, Ethiopia.
[25] Getnet Haile, 2009. Impacts of global economic crisis on least developed countries' (LDC) productive capacities and trade prospects: threats and opportunities. A case study: the dairy sector in Ethiopia. A paper presented on LDC ministerial conference 3rd-4th December 2009. Vienna international center, Austria.

growth rate of 1.6% between 1961 and 1974. This growth was largely due to the economies of scale in production as well as marketing, subsidies in transport to the formal market, secured land tenure and an active free market for feed and other inputs (SNV, 2008). On a per capita basis, however, milk production declined during this period at an average rate of 0.87% per annum.

To bridge the gap between supply of and demand for dairy products, imports increased significantly beginning from 1978. This was partly due to increased food aid of milk powder imports by WFP, and a level of dairy production development that lagged far behind the demand. Imports reached a peak of 314,700 metric tons in 1986 during the drought period. During the period between 1977 and 1989, dairy imports as a percentage of total consumption increased from 4.1% to 12.8%. Commercial imports grew rapidly at 24.2% per year. Further, it is estimated that imported milk powder accounted for 23% of Addis Ababa market (SNV, 2008, Getnet Haile, 2009). This can symbolize a huge opportunity for livestock ventures and milk and dairy products in particular.

Market orientation of the Ethiopian dairy sector has been the issue of governmental and nongovernmental organizations in the past few decades. SNV-Ethiopia is one of the stakeholders in this regard. It has been supporting dairy businesses technically and financially for the past few years through its BOAM program. MIDD program, a new 5-year program that focuses on Market-led Innovation and Learning for dairy development in the country is screening milksheds for further intervention.

Based on the information from the zonal investment agency[26], North Shao Zone is the most densely populated zone in the regional state of Oromiya. It has 13 administrative districts that are further divided into 267 peasant associations, locally called *kebeles*, and one administrative town of the zone. North Shoa is the most populated zone in the regional state of Oromiya. Fiche town is the seat of the zonal government offices.

The area receives annual rainfall between 800 – 1600 mm on its 9775.3 km^2 land area which is elevated at 1000— 3500 m.a.s.l. Large proportion of the zone (42%) falls under tropical highland resembling that of temperate regions climate and almost a quarter of the land in the zone is typical tropical dry land, the balance experiencing an intermediate climatic condition.

In recent years industries, mostly cement, have been erected creating job opportunity for hundreds, if not thousands, of the inhabitants. However, agriculture is the dominant activity in the zone. Livestock, especially dairying is the dominant agricultural enterprise. The zone has cattle population of 1,780,283 (CSA, 2010[27]) of which only 4.34% are specialized crossbred dairy cattle, which is more than 77000 heads. According to key informants of the dairy sector in Selale, the area is now known for its high milk production potential as the vast land that farmers used cultivate for crop production is left for grazing animals due to its reduction in fertility and the increase in profitability of dairying.

1.1 Objectives

- ⊕ to describe and map milk value chains in Selale area
- ⊕ to list and discuss important stakeholders in Selale milkshed
- ⊕ to identify main intervention areas in Selale milkshed

[26] Oromia National Regional State, North Shewa Zone Administration, Investment Office. Fiche.
[27] CSA, 2010. Central Statistics Authority, Statistical Bulletin 468. Agricultural Sample Survey, Volume II: Livestock and Livestock Characteristics. Addis Abeba, Ethiopia.

2 Methodology

To meet the above-mentioned objectives a rapid appraisal was made using:
1. Secondary data collection: Independent interviews were made with representatives from Ministry of Agriculture (EMDTI), North Shoa zone Investment Promotion Agency, North Shoa zone Cooperatives Promotion Agency, North Shoa zone Zonal and District Livestock Production, Health and Marketing Agency, CSA, NGOs, Selale Dairy Cooperative Union within 4 days of field trip.

2. Desk review of literatures: relevant studies on dairy input and product markets in Ethiopia and the region. Relevant reports on local and international milk supply chains, technology, markets and services and policy were also reviewed as needed.

Value Chain Approach, i.e. input supply, production, collection, processing, marketing and consumption, was followed to describe the milkshed.

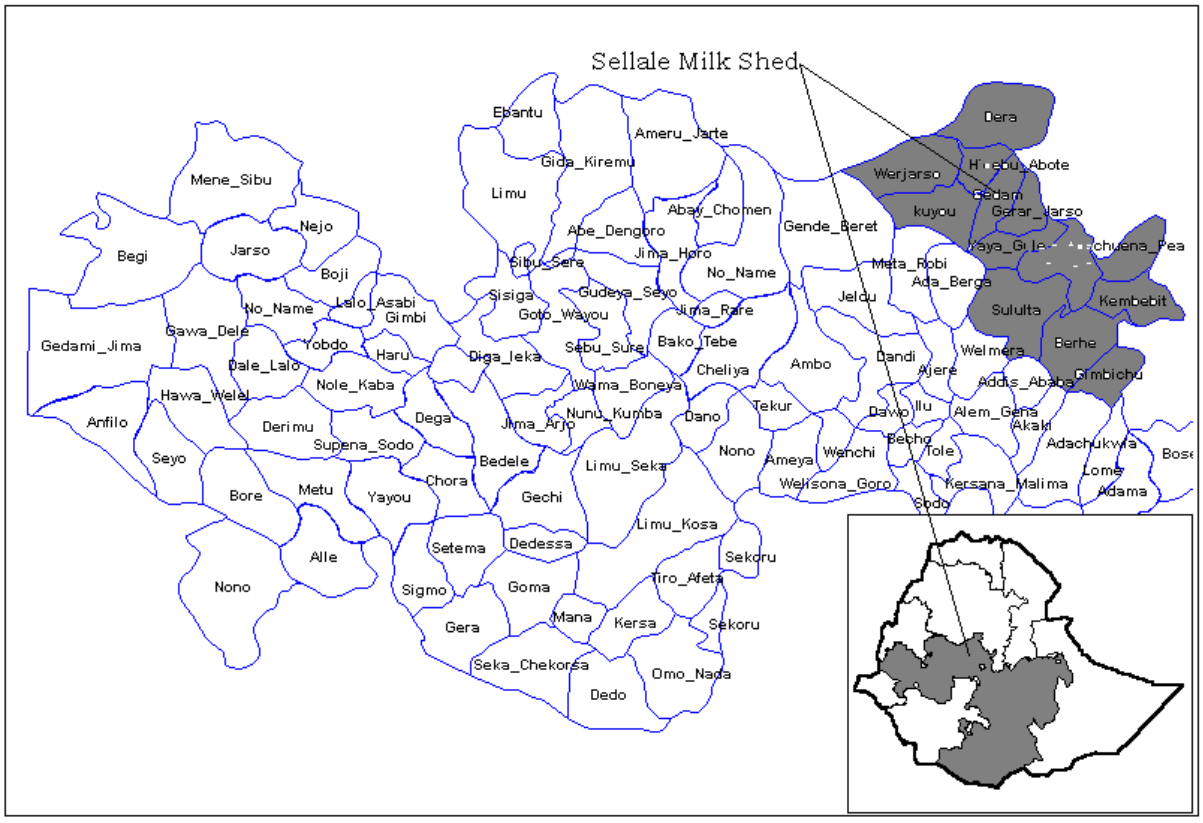


Figure 1 *Geographic map of addis abeba milkshed*

3 Results

3.1 Dairy Value Chain in Selale Area.

The following figure maps the dairy value chain from the production area to the main consumption area in Addis Ababa.

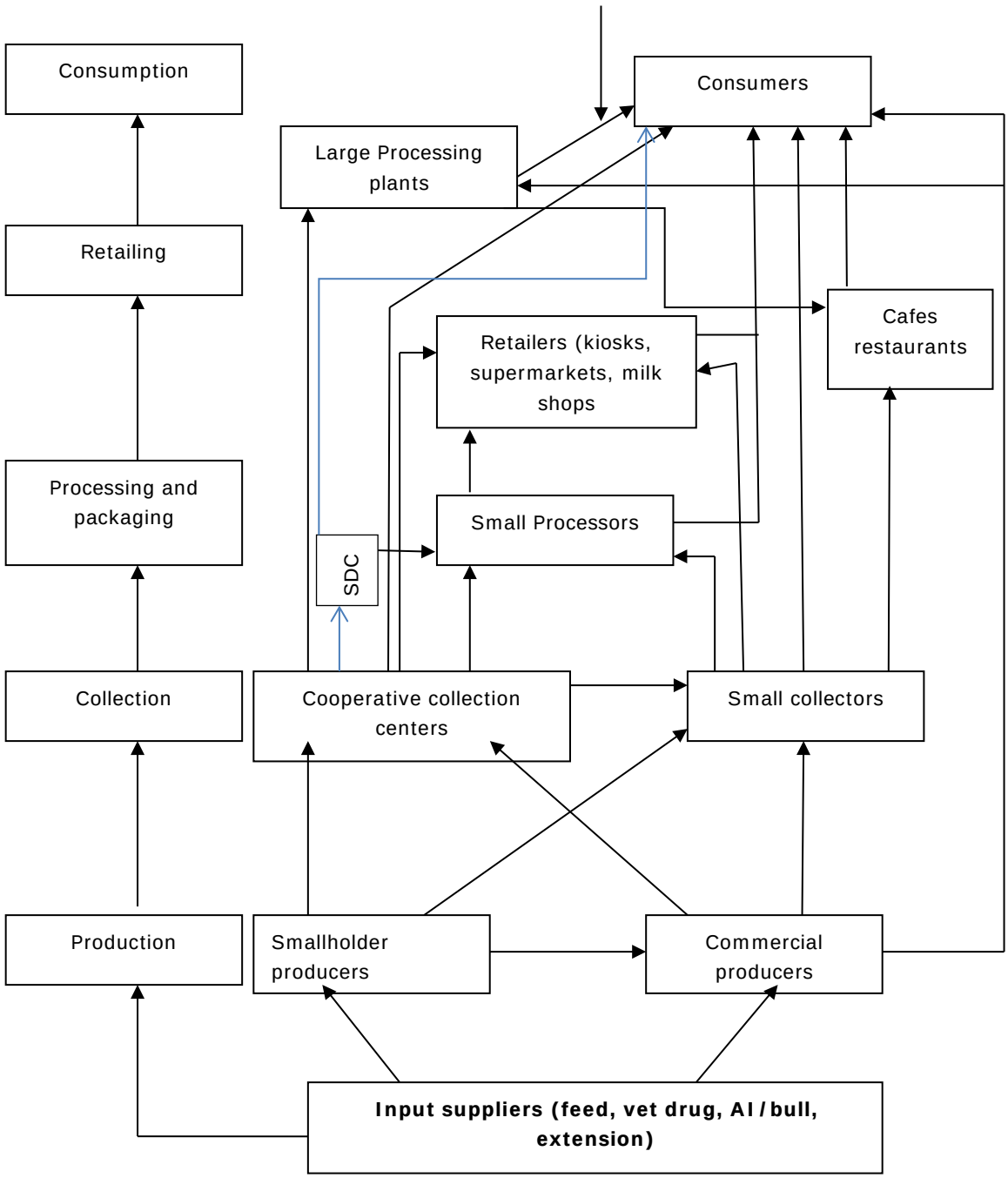


Figure 2 *Dairy value chain Map in and around Addis Ababa*

3.1.1 Input supply system

Inputs for the characteristic smallholder dairy farming in Selale area include feeds, veterinary service, breeds and AI, labour and extension service.

3.1.1.1 Feed

The dominant feed resource for cattle in Selale is natural pasture from communal grazing lands. According to the zonal Livestock agency officials, 49.8% of the basal feed for dairy cattle of smallholder farms comes from grazing. Crop residues account for 26.8%, hay 19.8% and the rest comes from improved fodder production, grain by-products and bushes. Main problems associated with feeds and feeding in the area includes: a) seasonal variation in quality and quantity, b) high prices of agro-industrial by-products.

An international NGO named ACDI-VOCA is trying to solve this problem through supporting the Selale Dairy Cooperatives Union. It has installed feed mill and mixer machines so that the union processes and distributes to members feed at lower cost. It has also organized feed cooperatives where members produce baled hay and market to dairy and other livestock farmers in Selale and other parts of the country. Hay is exported to Djibouti along with beef cattle, camels and goats. This could have negative impact to the dairy sector in the central highlands where seasonal feed shortage in both quality and quantity prevails.

There are small scale concentrate feed retailers that either mix their own recipe or sell concentrate supplements produced by large feed processors in and around Addis as their agent. List of feed processors is given in the Annex. Feed supply system is not efficient in that feed prices, especially concentrate supplements, fluctuate dramatically throughout the year regardless of nutritive values of the mixes. Reducing the costs through

Figure 3 6 *SDCU new feed processing equipment* Courtesy: SDCU 2011

Even though it is constrained with budgetary and human resource shortages, the zonal livestock agency is attempting to assuage feed quality and quantity problems through its farmer training centres by teaching farmers how to conserve feed to bridge the seasonal gap both in quantity and quality. Price of agro-industrial by-products like bran and oil-seed-cakes escalated following the price cap imposed in January 2011 by the government on food items like flour and oil, as flour factories and edible oil extractors tried to compensate their compromised profit from food products on by-products.

3.1.1.2 Veterinary Service

Government supplies of veterinary service and drugs are the sole sources of remedy for sick dairy animals of most of smallholder farmers in Selale regardless of the commercialization of the sector in the area. According to the zonal livestock agency each and every district is beneficiary of subsidized veterinary service and drug supply system. The following table illustrates this fact.

Table 1

Distribution of veterinary clinics by their class in North Shewa Zone of Oromia regional state.

Name of district	Number of clinics			Total
	B	C	D	
Abichu		1	3	4
Aleltu			2	2
Debre Libanos	1		4	5
Degem		1	5	6
Dera		3	3	6
Girar Jarso	1		3	4
Hidhebu Abote		1	4	5
Jida		1	3	4
Kuyu	1	1	3	5
Qimbibit	1		5	6
Were Jarso		1	5	6
Wuchale	1		2	3
Yaya Gulelie		1	2	3
Total	5	10	44	59

Type A veterinary clinics have enough capacity to act as referral clinics where thorough diagnosis and treatment service is rendered to sick animals. However, there is no such type of clinic in Selale and Debre Berhan. The National Animal Health and Disease Investigation Centre (NAHDIC) in Sebeta is the largest clinic that can be considered as type A clinic in Addis Ababa milkshed. Type B and C clinics are installed at district level and have office for veterinarians, drug store, small laboratory, and animal handling and treatment facilities. Type D clinics do not have veterinarians and laboratories but have drug store and assistant animal health workers. These types of clinics are meant to operate at kebeles level.

There are few private vet drug vendors in some districts, but most of them do not provide diagnosis and treatment service. The agency is mandated to give license and control the activities of private veterinary service and drug suppliers. The veterinary service rendered by the government is not dependable because of the basic problems faced by district level vet clinics like higher degree staff turnover and supplies shortage mainly due to inadequate budget allocation. Private veterinary service delivery should be promoted to support the service delivery of livestock production and heath agency vet clinics at district and kebele level.

3.1.1.3 Breeding and AI

Ethiopia has the largest number of cattle of all other African countries but the proportion of specialized dairy breeds is less than 1% (Hailu *et al*. 2010)[28]. According to the zonal livestock agency office the proportion of crossbred dairy cattle is as high as 4.34%. Crossbred dairy cattle are found in towns and rural PAs where previous dairy development projects like the Smallholder Dairy Development Project

[28] Hailu D., Hunduma D., Zewdu E., Tesfaye A., Gemeda D., Tadele M., Tesfaye A., and Chali E., 2010. Indigenous Cattle Breeds Improvement Strategy In Oromia Regional State. Oromia Agricultural Research Institute. Addis Abeba, Ethiopia.

(SDDP) initiated formal market for milk. Thus, the presence of crossbred dairy cows could be taken as one of the indicators for market orientation of dairy farming in a given area.

One of the most expensive start-up inputs, nowadays, is supply of heifers or cows. Farmers have two options of getting crossbred dairy heifers and cows; 1) direct purchase, and 2) crossbreeding their local cows. There used to be a number of state-owned ranches in various locations dedicated to supply smallholder dairy farmers with crossbred dairy heifers and cows. Since the concept of privatization started being realized after the fall of the military regime and most of the ranches got sold out to private investment ventures, scarcity of breeding cows became eminent for the ranches no longer supply subsidized crossbred heifers. Recently a crossbred heifer of unknown breeding value or genetic merit costs from Birr 13,000 to Birr 15,000 and cows up to Birr 20,000 indicating dairying is no longer a smallholder venture.

Government has been providing artificial insemination service through its ministry of agriculture office since few decades back and is apparently the cheapest means of getting improved dairy cattle breeds. In Selale area, all the thirteen districts under the zone are beneficiaries of AI service the source of all semen and most of the liquid nitrogen required to provide the service being the National Artificial Insemination Centre (NAIC). The AI services in Ethiopia are mainly handled by the NAIC, which is located in Akaki-Kality sub-city, Addis Ababa. The major outputs produced by the centre include Holstein and Jersey semen, 50% and 75% crossbred cattle semen. NAIC produced in the year 2009/10, a total of 350000 doses yet managed to distribute only 245000 in the same year. Out of this the share of Addis Ababa city dairy producers was 6360 doses while Oromiya and Amhara national regional states in this year collected 79000 and 46000 doses respectively from the centre. The NAIC also gives training on AI skill upgrading and has contact with private AI technicians who give actual service for the customers. The centre charges 4 ETB per dose at a subsidized rate while the AI technicians charge their customers from Birr 15 – 80 per dose. There are also private semen importers that charge Birr 70 – 150 per dose. This could be one area of intervention for increasing productivity of the dairy sector.

Similar to the veterinary service delivery **AI service of the government** delivered through the livestock agency **is not efficient** where inputs like semen and liquid nitrogen supplies are not dependable from the current suppliers. There is a private AI inputs supplier, Addis Livestock Production and Productivity Improvement Service (ALPPIS), which is established by a group of livestock production and health professionals to fill this gap. Regardless of its young age, ALPPIS aspires to expand its outreach nation-wide supplying quality semen (even sexed semen to target milk production), liquid nitrogen, AI kits and technical support to producers and development workers. Attracting and supporting the private sector to engage in AI service delivery could be seen as a means to tackle crossbred cows and heifer's shortage thereby reducing costs of dairy farm establishment and improving production efficiency of dairy farmers.

3.1.2 Production

North Shoa zone holds the largest crossbred dairy cows population in Ethiopia amounting to 49,738 heads a figure even larger than that of the Southern Nations, Nationalities and Peoples State (CSA, 2011). The area is known for having long history of dairy development ever since the introduction of modern dairy cows some 50 years ago.

Production function in Selale dairy value chain is mainly characterized by subsistence smallholder level, in a typical highland mixed crop-livestock farming system. Farms can be categorized into; urban, peri-urban and rural based on intensity of input use and market availability for the produce.

Urban dairy farmers lack grazing land and enough space but are blessed with ever increasing market demand for milk. High-grade dairy cattle are kept indoors, with some roadside grazing in few cases. Dairy cattle under such systems totally depend on purchased feed mainly in the form of hay as basal diet and agro-industrial by-products like bran and oil-seed-cakes or commercially processed formulated

rations. Other inputs are a bit expensive but all accessible in this labour intensive dairy farming system. High feed costs and lack of waste disposal system is among the headaches of farmers in such system. Under such high input system crossbred and/or pure exotic dairy cows yield up to 30 litres/day/cow, a potential reached while answering market demand through better care and selection of dairy animals.

Peri-urban dairy farmers have a relatively better access to grazing land that enables them reduce production costs. Mixed dairy herd composed of local and crossbred is found in such system even though the later dominates. Agro-industrial by-products are also used to supplement the poor quality basal diet obtained from grazing on communal pastures and own land fodder production. Though farms are close to grazing lands they are farther than their consumers and, as a result faced with milk transportation cost or reduced milk price by collectors. Intermediate yields between those of urban and a rural crossbred dairy cattle is believed to be found under such intermediary dairy farming system.

Rural dairy farmers graze their dairy cattle on communal pastures, crop aftermath, roadsides and under-canopy vegetation of forests. Supplemental feeds include local beer wastes (yeast), spent grain from flourmill houses and kitchen wastes. Supply of clean water, AI and vet services are bottlenecks of milk production in such extensive dairy production systems in the highlands. Milk prices are fixed by collectors or processors and are unsatisfactory for the producers. Low quality milk production aggravates loss of milk or profit when milk is rejected. Under such low input dairying local cows yield on average 1.6 ltr/day/head while crossbred cows yield 5 l/day/head according to (CSA, 2010).

A study by Teferra (2006)[29] indicates that in Addis Ababa milkshed there are about 66,770 cattle of which 46.5% were estimated to be crossbred dairy cows. The peri-urban milk system includes smallholder and commercial dairy farms found in the proximity of Addis Ababa, secondary and other regional towns. In some case intensive production units based on stall-feeding of crossbred and high-grade cows is practiced. This sector controls most of the country's improved dairy stock. The urban and peri-urban dairy farmers produce 2% of the total milk production of the country. The total estimated milk supplied to Addis Ababa annually is 65 million litres.

Production efficiency of smallholder dairy producers in central highlands of Ethiopia, where Addis Ababa milkshed is centrally located, is 79% based on a recent study by Nega and Ehui (2006)[30] indicating room for improvement by 21% to get the best out of the abovementioned production system. Operating under this efficiency level most farmers are profitable compensating costs with free resources like, grazing land, water, household labour whenever they are available. Market-led innovation should consider optimizing this efficiency to improve the sector ultimately.

3.1.3 Milk Collection

Collectors collect milk from smallholder and commercial dairy producers, and sale it to retailers, hotels, restaurants and/or processors. Three types of collectors can be observed if one takes a drive early morning along the road Addis to Gojam in Selale dairy belt; 1) cooperatives collection centres are formal collectors organized by cooperative promotion agencies in their respective districts; 2) large processors who may or may not have collection centre and dedicated truck; and 3) small private milk collectors who use either pick-up trucks or public transportation. Cooperatives have smallholder dairy producer members which daily supply milk that later reaches either the larger processors in Addis Ababa through the formal chain or to consumers through cafés and restaurants through the informal route. These collectors process milk in to butter and ayib when larger processers due to either poor quality reject it

[29] Teferra Abreha. 2006. Dairy production in Addis Ababa. A paper presented at a Regional Workshop organized by ASARECA, Kampala, Uganda.

[30] Nega Wubeneh. 2006. Technical Efficiency of Smallholder Dairy Farmers in the Central Ethiopian Highlands. Poster paper prepared for presentation at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006

revealed under alcohol test or lactometer reading results or seasonal quota placed by the processors at fasting periods of Orthodox Christians. Coops sell these processed products to the local markets, hotels, and individual consumers in their respective vicinities or in Addis. The other groups, individual collectors, however collect milk either from their neighbours or cooperative collection centres and supply to consumers on informal contractual basis, the larger processing plants on formal contract or other customers such as hotels, cafés, restaurants, and dairy shops in Addis Ababa. The price-setting role is solely subjected to larger processers who have financial power over both cooperative collection centres and individual collectors.

In addition to collecting from cooperative and individual collectors, larger processors also collect milk from smallholder farmers giving them additional cents per litre of milk than other collectors. This condition had negative effect on cooperative collection centres and mutual agreement and win-win approach should be followed among all the actors involved dairy supply chain.

Figure 4 *milk handlin equipments queued up at collection center*

Nine primary dairy cooperatives (PDC) in Selale area unified their fragmented collection function to establish the Selale Dairy Cooperatives Union (SDCU) in May 2001 to alleviate market shortage for their produce. SDCU is now a common umbrella for 31 PDCs, 27 of which are active, i.e. engaged in milk collection and input supply to member; a model higher level of association. The union has a small scale feed processing facility established by financial and technical support from ACDI-VOCA, an international NGO, and now on the verge of establishing its own milk processing plant to offset its seasonal market shortage for its collected milk that currently amount to 9,000 l/day on average. It is competing now with processors like Lame Dairy (Shola milk™), Sebeta Agro-industry (mama's milk™) and MB Agro-industry (Family™) for its member PDCs' milk.

3.1.4 Milk Processing

There are two groups of dairy processors, small scale and large-scale processors, which are grouped according to their relative processing capacities. Small processors are limited to small-scale niche markets and few processed products. They directly buy raw milk from unions, cooperatives and individual collectors. Similarly, large-scale processors also source the milk they process from smallholder farms, cooperative collection centres and individual collectors. Although they produce pasteurized milk, butter, cheese and other dairy products, they are operating below their capacities and suffering import competition of similar products with better quality.

According to EDDP (2011)31 there are about 20 private milk processing plants that have either entered or on the process of entering the milk marketing and processing, increasing the amount of milk channelled via the formal markets of Addis. Sebeta Agro Industry established the first UHT dairy processing facility in the country. The new production lines produce 500ml carton pouches and 250ml portion packages. LAMIE Dairy P.L.C, the former Dairy Development Enterprise (DDE), produces pasteurized milk in 500ml plastic pouches. The introduction of UHT dairy products on the market is a great step forward to offset the seasonality in milk production and consumption. However, the share of milk and dairy products sold in the formal market is estimated to be insignificant in Ethiopia, as compared to in Kenya and in Uganda.

The processing function can be characterized as small-scale operation as compared with European milk processors that have reception tank capacities of million litres of fresh milk per day. It can also be characterized as producing few products limited to pasteurized milk, seasonal UHT milk, set yoghurt, table butter, ayib and few European cheeses. These characteristics indicate a room for intervention.

Table 2

List of top 10 milk processors in and around Addis Abeba, products range and operational capacity

Dairy enterprise	Product range*	Installed capacity (litres/day)	Attained capacity (litres/day)
Lame Dairy Processing (former DDE)	PM, Cr, B, Ch,	60,000	30,000
Sebeta Agro Industry (Mama Dairy)	PM, U, Y, Ch, Cr, B	35,000	30,000
MB PLC (Family Milk)	PM, Y, Cr, B, Ch,	15,000	7,000
Yadeni Dairy Farm (Bora Milk)	PM, Cr, B, Ch,	15,000	7,000
Ada'a Dairy Cooperative	PM, Cr, B, Ch,	15,000	3,000
Lema Dairy	PM, Cr, B, Ch,	10,000	3,000
Berta and Family plc	Cr, Ch	9,000	6,000
Genesis Farms	PM, Cr, B, Ch, Y	4,000	4,000
Holland Dairy	PM, Cr, B, Ch, Y	4,000	4,000
Ruth and Hirut Dairy Farm	Cr, B, Ch, Y	4,000	4,000
Total		171,000	98,000

*PM = pasteurized milk, U = UHT milk, Y = yoghurt, Cr = Cream, B = butter, Ch = cheese

3.1.5 Retail

Dairy retailer group includes mainly small milk shops, kiosks and supermarkets. Milk shops obtain milk from individual farms (mostly their own) or collect from smallholder producers around their vicinities. Kiosks and restaurants/hotels source milk from either producers around their neighbourhood or from larger processers. These sell either fresh whole milk or pasteurized milk. They also sell butter and ayib, a traditional cottage cheese. The price of each product varies based on the market demand. Supermarkets on the other hand sell pasteurized milk and other processed dairy products from formal markets. EDDP (2011) listed out 27 supermarkets, 34 butter traders and 104 cafés, hotels and restaurants in Addis as operators of retail function in the dairy value chain. However there are there are 644 supermarkets, registered by the municipal office of which only 98 have dairy corners. There are more than 2500 kiosks who also take part in selling pasteurized milk in pouches of 500 ml. Specialized milk shops and butter shops registered amount to 188 and 326, respectively (personal communication)[32].

[31] EDDP. 2011. Ethiopian Dairy Business Directory. Ethiopia Dairy Development Project-Land O'Lakes Ethiopia. Addis Abeba.
[32] Personal communication with Addis Abeba City Administration's Modern Trade Promotion Office in December 2011. The figures represent only nine of the ten sub-cities.

3.1.6 Consumption

Consumer groups include individual consumers, schools, hospitals, institutes, universities and the like. The larger institutes considered as consumers get milk from formal market either processors or from retailers.

Most of the individual consumers prefer purchasing raw milk than processed milk because of its natural flavour (high fat content), availability and lower price. Specific upper income market segments prefer and afford packaged processed milk.

Ethiopians consume less dairy products than other African countries and far less than the world consumption. The present national average per-capita consumption of milk is 19kg/year as compared to 27 kg for other African countries and 100kg to the world per capita consumption (FAO, 2003)[33]. The recommended per capita milk consumption is 200 litres/year. However, most Ethiopians regularly consume other dairy products such as butter, ayib (traditional cottage cheese) and fermented milk.

According to the Central Statistics Authority (CSA, 2009) only 6.61% of the milk produced is sold in the market where as 82.9% milk produced is consumed at home. The remaining, 10.49% of the milk produced, is processed into butter and cottage cheese (ayib) using traditional processing technologies. It is to be expected that these proportions would start to change as collection-infrastructures improve around the country.

There are differences in the demand for milk between rural and urban population. The demand for milk in rural areas is mainly for fresh whole milk and this demand is partially satisfied by home production and or purchased from neighbouring producers.

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

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

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

[33] FAO.2003. Livestock Brief 2003. Rome. Italy.

Table 3

National dairy products utilization

Type of product used	Total %	Per cent utilized for			
		Household consumption	sale	Wages in kind	Others
Milk	100	82.9	6.61	0.43	10.06
Butter	100	60.69	36.23	0.38	2.7
Cheese	100	85.76	11.02	0.28	2.94
Arera	100	89.76	6.09	0.15	4

Source: CSA, 2009.

3.2 Dairy Sector Situation in Sebeta-Awas Special District

Sebeta is located some 30 km southwest of Addis Ababa along the way to Jimma. It is home for 58,381 people (CSA, 2010) and large factories like Meta-Abo Brewery, Balezaf Alcohol Factory that yield by-products like brewers' grain and distillers' yeast that can be used as source of dairy cattle feed. Administratively the district is divided into 41 rural, 2 peri-urban and 5 urban kebeles. According to the district's livestock agency there is a daily milk production of 20,000 litres in Sebeta-Awas district of which only half is marketed to Addis Ababa, the rest being either consumed or processed to traditional dairy products.

Smallholder producers face problems like poor dairy potential of local cattle, poor service supply of inputs like veterinary and AI that is solely provided by the government livestock agency. The agency suspends AI service provision up to two months when shortage of liquid nitrogen gets severe.

In addition the district has favourable climate for dairy farming. One of the largest dairy processing plants, Sebeta Agro-Industry, is also located there giving its very name. This processor takes up to 8,000 litres per day from this district at ETB 7 per litre. Another processor that collects milk from Sebeta is Family Milk, which is located in Nefassilk-Lafto sub-city strategically located at the gate of Addis Ababa to Sebeta. The amount of milk collected by this processor is not known but the price is ETB 7.25 per litre. There are also other small collectors who, according to the livestock agency, collect up to 2,000 litres daily. According to the district's cooperative promotion agency, there are three dairy cooperatives that are no functional currently, namely Enat Milk, Meta-Abo and Awash Melka cooperatives. Strengthening these cooperatives is imperative to formalize and boost the milk marketing system in the district.

3.3 Dairy Sector Situation in Debre Berhan and Chacha Area

Debre Berhan milkshed stretches from Addis to Debre Sina, which is located 150km from Addis Ababa along the road to Dessie. The area is characterized as a typical Ethiopian highland similar to that of temperate areas of Europe, which is suitable for dairying with specialized dairy cattle. Debre Berhan city is elevated some 2840 meters above sea level and has 180C annual temperature and 946 mm annual rainfall. The milkshed is known for a unique flavour of butter and mutton that, according to some reports, could arise from the vegetation on which the milk and meat animals are kept on.

In 2010, CSA reported a total population of Debre Berhan as 76,977 of which 71,422 live in urban centres. The five largest ethnic groups reported in the town were the Amhara (90.12%), the Oromo (3.94%), the Tigreyan (1.81%), the Gurage (1.6%), and the Argobba (1.2%); all other ethnic groups made up 1.33% of the population. Amharic was spoken as a first language by 93.81%, Oromiffa was spoken by 3.04%, and 1.5% spoke Tigrinya; the remaining 1.65% spoke all other primary languages reported. The majority of the inhabitants follow Ethiopian Orthodox Christianity, with 94.59% reporting that as their religion, while 4.05% were Muslim, and 1.02% Protestant. These religion figures indicate the availability of surplus milk during long fasting seasons of the Orthodox Christians that could be marketed to milk deficit areas of the country after processing it into long life products like powder and UHT milk.

Many reports indicate that smallholders in Debre Berhan milkshed since the beginning of national dairy development endeavours in the middle of the previous century have practiced modern dairying. Unpublished results of baseline surveys by the Holetta Agricultural Research Centre indicate that dairying is one of the main objectives of cattle rearing in this area which as manifested by herd compositions of a typical farming household in this milkshed. Figure 4 below displays this fact, as milking crossbred cows are the dominant ones among the herd.

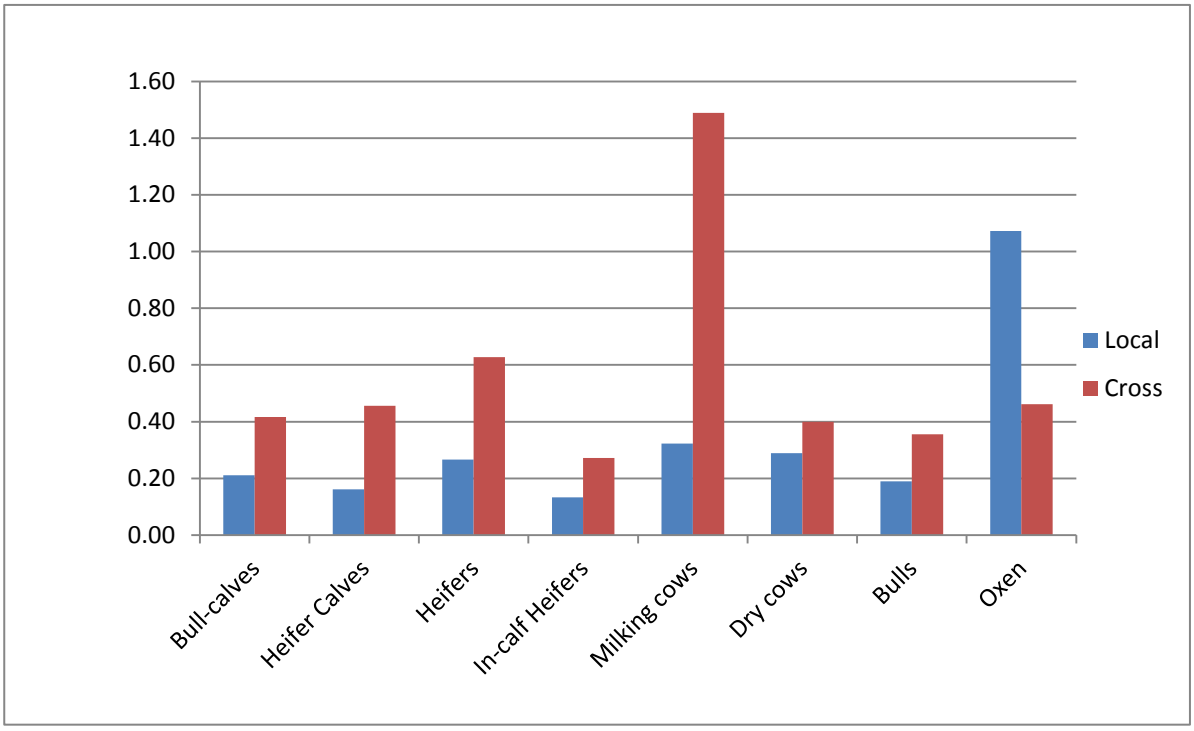


Figure 57 *Dairy Herd Structure of a Typical Household Sampled in Debrebrhan milkshed*

Just like the above-described milksheds smallholder dairy production is similarly challenged by poor input supply and output marketing system. Milk is mostly either sold informally or processed into traditional dairy products like butter and ayib, traditional cottage cheese.

3.4 Stakeholders Interest and Influence on Selale Dairy Value Chain Development

Table 4

Stakeholders analysis

Stakeholder[34]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Oromiya, North Shoa Zone, Investment Office	Enablement: facilitation of investment in dairy farming & processing	13 districts of North Shoa	Facilitation of investment opportunity for dairy producers and processors	Attract investors and facilitate investment in dairy farming, milk collection or processing	No obvious influence	+: promotes investment in the dairy sector	Fiche		0111351697 0911728610
Oromiya, North Shoa Zone, Livestock Production, Health and Marketing Agency	Enablement: facilitation of livestock input supply	13 districts of North Shoa (see annex)	Coordination of extension service provision of district bureaus of LS Agency	Support provision of inputs and extension service in all 13 districts	Bridge research and farmers, adaptive research and support BoP producers, take feedback to researchers	+: dedicated to bring innovations to dairy producers	Fiche		0111352408
Oromiya, North Shoa Zone, Cooperative Promotion Agency	Enablement: cooperative establishment, facilitation	13 districts of North Shoa	Coordination of cooperative development and support service delivery at district level	Initiate and support formal dairy market chain	Capacity building for new and old cooperatives	+: substantial support to farmers to organize and solve marketing problems and use innovative methods	Fiche		0111352215 0111351449 0111350047
SDCU (Selale Dairy Cooperatives Union)	Operation: feed supply, vet drug supply, milk collection and marketing,	Kuyu, Degem, Girar Jarso, Debre Libanos, Wuchale, Sululta districts (Gebreguracha town to Addis Ababa); sometimes Asella for butter marketing	Market facilitation for inputs and outputs, milk processing	Formalizing the dairy sector in the area, unifying small producers	Bridging processors and producers through feedback, modern milk collection	+: thriving milk collection business and looking into the processing function using modern innovations to alleviate market problems	Chancho	Tadesse83337@gmail.com	0111880037

[34] Stakeholders in **bold** are influenctial ones.

Stakeholder[34]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
ACDI-VOCA (Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance)	Enablement: capacity development,	North Shoa, East Shoa, West Shoa, Addis Ababa, & Arsi zones	Facilitation, capacity development, education	Solving critical animal feed challenges by 50%. Beneficiary unions increased their income by 5% and the productivity of dairying increase by 10 %	Introduction of feed processing technology and knowhow to small producers through cooperatives/ unions	+: introduce modern feed processing innovations to smallholder farmers through SDCU and feed cooperative	Addis Ababa, Beklobet area	www.acdivoca.org	0114661997
Ethiopian Meat and Dairy Technology Institute (EMDTI)	Enablement: capacity development, investment facilitation, technology adaptation and market linkage	Nation wide	Whole value chain development with more focus on commercial dairy production	Through capacity building and investment facilitation in the area of commercial milk producers and processors the amount of milk channelled through the formal market chain will be improved and as a result the postharvest loss will be minimized	Introducing market oriented dairy farming, processing and marketing system	+: skill and knowledge transfer as typical training centre; teaching innovation in dairy production, milk processing and marketing	P.O.Box 1573 Bishoftu (Debre Zeit)	emdti2000@gmail.com	0114339566 0916820101 Esayas Assefa (Dairy Technologist)
Ethiopian Dairy Development Project (Land O'Lakes/USAID)	Enablement: capacity development,	Fiche, Addis Ababa, Asella,	Facilitation, capacity development, input supply	Quality milk collection, reduced cost of production, cooperative development	Milk quality analyser and small processing technology dissemination	+: transfer and popularization of modern dairying, cooperative management and quality control system	Addis Ababa, Bole area		0116623850 0911228741
ILRI-IPMS	Enablement: capacity development,	Atsbi, Alamata, Fogera, Metema, Bure womberma, Ad'a Liben, Miesso, Goma, Dale, Alaba	Input & service supply, production intervention, marketing, capacity development, actor linkage	to bring along a market oriented diary production system and commercialization of smallholder dairying	improved knowledge and skill of the public sector towards smallholders commercialization of dairy systems	+: Knowledge management in dairy, technology dissemination, manual dissemination, online resources in local language	Gurd Shola area, Addis Ababa P.O. Box 5689 Addis Ababa, Ethiopia	ILRI-Ethiopia@cgiar.org a.tegegne@cgiar.org	0116172000

Stakeholder[34]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
National Artificial Insemination Centre (NAIC)	Operator: semen and liquid nitrogen supply	Throughout Ethiopia	Input supply,	Availing cheap source of breeding material to increase milk yield from 1.5 litre per day of local cows by >430% from crossbred cows	Reliable source for breed introduction, AI technicians training,	+: engaged in supply of genetic material, plans to improve genetic potential and boost production of smallholder farmers	Akaki-Kaliti Sub-city		0114393232 0114393234 0114390060
Addis Livestock Production and Productivity Improvement Service (ALPPIS)	Operation: artificial insemination inputs supply	Nation wide	Production and productivity enhancement inputs and services supply	Enable producers boost milk production through improving genetic potential of dairy cattle	Introducing high production potential semen and complementing inputs	+: cooperate with other value chain actors and enablers to supply quality service and inputs to help farmers use innovations in genetic improvement	Kirkos sub-city, P.O.Box 102099 Addis Ababa	alppisethiopia@yahoo.com	0114667599 or 0911981239 Dr. Emru (GM)
Lame Dairy P.L.C (Shola milk)	Operation: milk collection, processing, marketing	Addis Ababa and surrounding	Milk collection, processing and marketing	Participate in formal dairy market chain	Use of milk handling and processing technology	+: cooperate in dairy development activities, plans to expand collection radius and install chilling centres	Lam beret area, Addis Ababa		0116462444
Sebeta Agro-industry (Mama milk)	Operation: milk collection, processing, marketing	Addis Ababa and surrounding	Milk collection, processing and marketing	Participate in formal dairy market chain	Use of milk handling and processing technology	Neutral: collects substantial amount of milk from smallholder producers but creates unhealthy competition for raw milk, does not participate in consultative workshops and studies	Sebeta		

Stakeholder[34]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
MB Agro-industry (Family Milk)	Operation: milk collection, processing, marketing	Addis Ababa and surrounding	Milk collection, processing and marketing	Participate in formal dairy market chain	Use of milk handling and processing technology	+: expanding collection radius, cooperative in dairy development issues	Nefas silk-Lafto sub-city, Addis Ababa P.O.Box 2017 code 1215, Addis Ababa		0911 20 62 01 Mechal Aregaw (owner)
Berta and Family Agro-industry	Operation: milk processing and marketing	Addis Ababa and surrounding	Milk processing and marketing	Participate in formal dairy market chain	Use of milk handling and processing technology	+: plans to upgrade capacity sourcing raw material from smallholder producers		bertamylove@yhoo.com	0911129394 09131618 59 0112793826
Ruth and Hirut Milk Production and Processing	Operation: milk processing and marketing	Chacha, Sululta, Addis Ababa	Milk processing and marketing	Cooperative support, milk quality based payment for smallholder producers	Feedback from member farmers on quality based payment, research cooperation	+ : pioneer processor that installed quality based payment	P. O. Box 59358, Addis Ababa	haderare@yahoo.com	0911 54 74 95 011 551 91 54

3.5 Intervention Areas in Selale Dairy Value Chain Development

A number of intervention areas can be identified as we go along the value chain:

1. Input supply: strengthen already existing extension service provided by the government
    a. Support AI service
        i. Oromiya Livestock Improvement Plan through its stakeholders
        ii. Improve breed potential of NAIC to reach out producers indirectly
        iii. Facilitate access to quality AI input supply in the milkshed
    b. Support forage seed supply
        i. Coordinate forage seed producer areas and link markets
        ii. Subsidize or compensate costs of forage production
    c. Support vet supply system
        i. Train para-vets from the community
        ii. Lobby policy makers to exempt vet supplies from taxes
    d. Information exchange to coordinate overall input supply system
2. Production
    a. Capacity building of small producers
        i. Technical knowledge on dairy husbandry clean milk production through training
        ii. Revolving fund and micro-financing system sensitization to enable farmers access to loan for dairy activity
3. Collection
    a. Installation of quality based payment
    b. Capacitate coops' managerial and marketing capacity
    c. Policy support that favours the formal market chain
4. Processing
    a. Technical capacity building (new product development
    b. Policy support that exempts processors from heavy taxes
    c. Market linkage
    d. Smaller packages
5. Retail and consumers
    a. Popularization efforts (advertising benefits of consuming milk)
    b. School milk programs to create demand
    c. Etc.

4 Conclusions and Recommendations

Addis Ababa milkshed is the most developed one in the country for its large number of smallholder producers that have relatively long history of rearing crossbred dairy cattle, existing relatively organized milk collection and closeness to the capital city. Input supply system is predominantly provided by Oromiya region livestock production and health agency offices at zonal and district level. Few private input supply ventures exist in the zone. Selale provides most of the raw material for the known large milk processors in and around Addis but Sebeta and Debre Berhan also produce substantial amounts of milk worth channelling to the formal market chain. Addis Ababa markets for milk and dairy products impose high demand that fluctuates seasonally following fasting days' pattern. Imports are very high when dairy products are considered showing unmet demand for value added dairy products. Market oriented dairying and high production potential of Selale milkshed justify future dairy development activities.

MIDD project could focus on supporting private input supply systems to enhance production and productivity of the dominant smallholder milk producers, promote large scale dairying as future target of learning innovations for smallholder farmers, and create plat form for various stakeholders to plan and execute dairy development activities in an efficient manner.

Annexes

Table 5

List of Districts and Milk Production Potential in North Shewa zone of Oromia National Regional State in July 2010

No.	District	Total Cross Bred Cattle	Cross bred dairy cows	Cross bred milking cows	Average annual milk production	Average Daily Milk Production	Formally Marketed Milk Daily	Milk Retained at Home
1	**Debre Libanos**	18095	6678	5321	19474860	63852	10070	53782
2	**Wuchale**	11311	4890	3629	13282140	43548	11300	32248
3	**Girar Jarso**	12419	8106	7740	28328400	92880	11483	81397
4	**Degem**	9983	3337	3036	11111760	36432	11654	24778
5	**Aleltu**	7458	2259	1939	7096740	23268	4420	18848
6	**Kuyu**	6699	2982	2694	9860040	32328	3300	29028
7	**Were Jarso**	6304	3156	1530	5599800	18360	5875	12485
8	**Abichu**	6214	621	510	1866600	6120	1958	4162
9	**Qimbibit**	5090	1768	1364	4992240	16360	3272	13088
10	**Yaya Gulelie**	2326	746	546	1998360	6552		6552
11	**Jida**	1397	968	939	3436740	11268		11268
12	Hidebu Abote	283	78	48	175680	576		576
13	Dera	148	93	71	259860	852		852
Total		87727	35682	29367	**107480720**	352396	63332	289064
	Sululta*	29786	10471	1465	**6694750**	21950	16462	5488

* Sululta District is part of the Oromiya Regional State administration of special districts around Addis Ababa, not part of North Shoa Zone and the data represents the year 2010-2011. Source: Sululta District Livestock Production, Marketing and Health Agency office.

Names in **bold** represent districts with high dairy potential, or the 'dairy belt' in the zone.

Table 6

List of Districts and Milk Production Potential of Local Cows in North Shewa zone of Oromia National Regional State in July 2010

No.	District	Total Local Cows	Total Lactating local cows	Average annual milk production	Average Daily Milk Production	Formally Marketed Milk Daily	Milk Retained at Home
1	Debre Libanos	13817	10217	3439042	19106	1910	17196
2	Wuchale	36022	18638	9636550	53553	5355	48198
3	Girar Jarso	15678	10704	3602966	20016	2001	18015
4	Degem	18435	16223	5460662	30337	1516	28820
5	Aleltu	15330	14728	4957444	27541		27541
6	Kuyu	38193	19094	6427040	35706	3570	32136
7	Were Jarso	17930	16680	5614488	31192		31192
8	Abichu	42883	30923	10408682	57826		57826
9	Qimbibit	50983	36910	12423906	69022	3451	65571
10	Yaya Gulelie	51025	37260	12541716	69676		69676
11	Jida	20739	16667	5610112	31167		31167
12	Hidhebu Abote	20107	15258	5135843	28532		28532
13	Dera	60445	45461	15302172	85012		85012
Total		401587	298763	100563623	558686	17803	540882

Source: Oromiya, North Shoa Zone Livestock Production and Health Agency.

Table 7

Large farms in Selale Area

#	Name of the farm/owner	Location	Herd size	Tel.
1	Selale Dairy	Wuchale	308	911252202
2	Mikael Seyifu	Wuchale	110	911228902
3	Prime Dairy	Wuchale	97	911227291
4	Abey Mamo	Wuchale	62	911239325
5	Radia Hasen	Sululta	60	911627090
6	Seyifu Malka	Wuchale	60	913094329
7	Tsehay Kebede	Wuchale	50	911656737
8	Birhanu Abebe	Wuchale	45	912042222
9	D/r Fisha Asfaw	Wuchale	40	911228338
10	Mekonin Mangesh	Wuchale	40	911406615
11	Ayaew Desalegn	Wuchale	37	911456235
12	Zeni Alemayeu	Wuchale	30	911868744
13	Bekele Mangesh	Wuchale	25	911196466
14	Silesh Aboye	Wuchale	25	911685779
15	Asegd Alemu	Wuchale	20	911458436
16	Abdulahi Hidris	Wuchale	15	911762736
17	Ribta Hidris	Wuchale	13	911880936
18	Eden Dairy	Sululta	11	911560390
19	Desita Tadesse	Wuchale	11	911636488
20	Tessema Lema	Wuchale	11	911247005

Table 8

List of some milk processors in Addis Abeba Milkshed

#	Name of Processor	Location	Telephone
1	Ad'a Dairy Cooperative	Bishoftu	0912 228700 011 4 33 11 14 011 4 33 10 86
2	Genesis Farms	Bishoftu,	0911 21 04 70 011 433 3768
3	Holland Dairy	Bishoftu	0911 198902 011 433 0581/82
4	Lema Milk	Bishoftu	0911-22 23 08 0911-811357 011 433 4635
5	Life Agro-Industry	Selale	0911 40 82 18
6	Yanedi Dairy (Bora Milk)	Bishoftu	0911-44 44 90
7	BAZ-KAM Agro-Industry	Sheno	0911406765
8	Timret Agro-industry	Sendafa	0911 12 27 04 011 661 03 39
9	Beral Creamery	Holeta	0911204810

Table 9

List of some Feed Processors in addis abeba milkshed

#	Name	Location	Tel.
1	Alema-Koudijs	Bishoftu	0911 56 7161 0912 23 0971 011 652 55 92
2	Akaki Animal Feeds	Addis Ababa	0911 21 87 10 011 434 0112/0727 011 652 44 77
3	Alpha Fodder	Bishoftu	0910 27 90 80
4	Gasco General Trading	Addis Ababa	011 5 51 33 37
5	Kaliti Animal Feeds	Addis Ababa	0911 24 72 03 011 4 34 58 30
6	B.S.L.F Animal Feed Processing Enterprise	Addis Ababa	0911 64 67 73
7	Ethio Feed PLC	Addis Ababa	0911 1947 45

Source: Dairy Business Directory, Land O'Lakes 2010.

Table 10

List of Some Veterinary Service Providers in Addis Abeba milkshed

#	Name	Location	Telephone
1	Mulushewa Besah Abawello	Addis Ababa	0911 40 30 68 011 2 59 04 30
2	Tana Veterinary Clinic	Addis Ababa	0911 20 38 49
3	Veterinary Doctors Private Limited Group Enterprise	Addis Ababa	0913 24 87 65 011 114 35 15
4	Yazew Ayele	Addis Abeba	0911 48 51 26 011 1 31 03 87
5	Dr. Getachew Jember	Addis Abeba	0912 40 59 19
6	Dr. Mulualem Ambaw	Addis Abeba	0913 33 48 03
7	Dr. Brihanu	Addis Abeba	0913 217399

Source: Dairy Business Directory, Land O'Lakes 2010.

Table 11

List of Private AI service providers

#	Name	Location	Telephone
1	Amente Hunde	Addis Abeba	0911 41 89 26
2	Tilahun Kopesa	Addis Abeba	0911 40 01 19
3	Workneh Ayele	Addis Abeba	0911 60 29 04
4	Worku Bogale	Addis Abeba	0911 41 94 02
5	Yohaness Legese	Addis Abeba	0911 61 92 89
6	Yohaness Mamo	Addis Abeba	0911 42 83 95

Source: Dairy Business Directory, Land O'Lakes 2010.

Table 12

List of Dairy Cooperatives Currently Supplying Milk to SDCU (June 2011)

#	Name	District	Daily Milk Off-take
1	DebreTsigie	Debre Libanos	1,598
2	Chancho	Sululta	1,489
3	Fiche	Girar Jarso	1,029
4	Goro Haro	Sululta	554
5	Torbenashe	Girar Jarso	451
6	Mukaturi	Wuchale	426
7	Nano Sayo	Sululta	414
8	Selie	Debre Libanos	372
9	Dubar	Sululta	364
10	Anoqere	Degem	328
11	Lelistu	Sululta	269
12	Hunde Gudina	Debre Libanos	238
13	Gende Gudaa	Girar Jarso	224
14	Eko Qdus Giorgis	Sululta	186
15	Alidoro	Degem	153
16	Heveno	Sululta	149
17	Abdiloni	Sululta	147
18	Qasim	Debre Libanos	146
19	Jatie	Wuchale	134
20	Burqa Guda	Degem	91
21	Egdu	Degem	80
22	Anaso Sego	Girar Jarso	33
23	Qaso Legedima	Sululta	0
24	Abdi Jiregna	Kuyu	0
25	Derbe Bacho	Sululltta	0
26	Gudina Boru	Wuchale	0
27	Idoro	Wuchale	0
	Total		*8,886*

Table 13

List of some large dairy farms in and around debrebrehan and sebeta-awas districts

#	Name	District	Location	Telephone
1	Abdosh Dairy Farm	Sebeta Awas	Sebeta	911213370
2	Gete Semane Dairy Farm	Sebeta Awas	Sebeta	911224195
3	Sebeta Agro-industry	Sebeta	Sebeta	911219350
4	Hamlin-Fistula Hospital	Wolmera	Tatek	911174556
5	Enyi Dairy Farm	Kolfe Karaniyo	Walate	911128643
6	Integrated Project Development	Debre Brehan	Genet	911036403
7	Ansas Dairy Farm	Debre Brehan	Debre Brehan	911102965
8	Baressa Integrated Agri-business plc	Debre Brehan	Debre Brehan	911350515
9	Jerusalm Children & Community Development Project	Debre Brehan	Debre Brehan	116812172
10	Yohannes Fekade Livestock Farm	Debre Brehan	Debre Brehan	911103426

Part II-F

Adama-Asella Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

Market orientation of the Ethiopian dairy sector has been the issue of governmental and nongovernmental organizations in the past few decades. SNV-Ethiopia is one of the stakeholders in this regard. It has been supporting dairy businesses technically and financially for the past six years through its BOAM program. The MIDD program is a new 5-year program that focuses on Market-led Innovation and Learning for dairy development in the country. This study is commissioned by this new program and is meant to describe milk value chains of selected milk sheds, describe stakeholders and intervention areas.

Asella town is the capital of Arsi which is one of the 17 zones of the Oromia Region in Ethiopia. Based on the 2007 Census conducted by the CSA, this Zone has a total population of 2,637,657, of whom 1,323,424 are men and 1,314,233 women; with an area of 19,825.22 square kilometers, Arsi has a population density of 133.05. While 305,701 or 11.59% are urban inhabitants, a further 7,098 or 0.27% are pastoralists. A total of 541,959 households were counted in this Zone, which results in an average of 4.87 persons to a household, and 523,342 housing units.

The 1994 national census reported a total population for this Zone of 2,217,245 in 438,561 households, of whom 1,105,439 were men and 1,111,806 women; 216,413 or 9.76% of its population were urban dwellers at the time. The two largest ethnic groups reported in Arsi were the Oromo (82.93%), and the Amhara (15.38%); all other ethnic groups made up 1.69% of the population. Oromiffa was spoken as a first language by 80.01%, and 19.19% spoke Amharic; the remaining 0.8% spoke all other primary languages reported. The majority of the inhabitants were Muslim, with 59.33% of the population having reported they practiced that belief, while 39.95% of the population said they professed Ethiopian Orthodox Christianity. Asella town is home for 67,250 people based on CSA (2007) report.

Asella area has a cold climate suitable for rearing specialized dairy cattle. Former efforts by the government to modernize the dairy sector in the area seem to consider this fact. Chilalo Agricultural Development Unit (CADU), later named Arsi Rural Development Unit (ARDU), was established in the 1970s with the help of Swedish government to operate in Arsi area. The project distributed crossbred heifers to smallholder farmers and provided artificial insemination (AI), animal health services, forage production and marketing. Current milk production either on commercial or subsistence level stemmed from this project's inputs few decades back.

Adama (Nazareth) is the seat of the Oromia National Regional State located in the Great African Rift Valley some 90km east of Addis and 75 km North of Asella. It is home for 243,319 people in its 14 kebeles. Dwellers of Adama are from different ethnic groups, religion and cultural values, not mentioning expats and tourists. As a typical rift valley area, the weather is not as conducive as Asella for rearing specialized dairy cattle unless some technological modifications to barns which accommodate them. As a result Adama is better classified as dairy consumption rather than production area.
There are few documents indicating the dairy potential of Asella area and urbanization potential of Adama city, but lack detailed information about stakeholders in the milk shed and the possible intervention areas for market orientation of the sector. As a result, this study was conducted with the following objecties.

1.1 Objectives

- ⊕ to describe and map milk value chains in Sellale, Jima, Asella and Dire Dawa areas
- ⊕ to list and discuss important stakeholders in the abovementioned milk sheds
- ⊕ to identify main intervention areas in the milk sheds under consideration

2 Methodology

To meet the abovementioned objectives a rapid appraisal was made using;

1. Secondary data collection: from Arsi zone Cooperatives Promotion Agency, North Shewa zone Zonal and District Livestock Production and Health Agency, NGOs and Asella Dairy Cooperative Union.
2. Desk review of literatures: relevant studies on dairy input and product markets in Ethiopia and the region. Relevant reports on local and international milk supply chains, technology, markets and services and policy were also reviewed as needed.

Value Chain Approach, i.e. input supply, production, collection, processing, marketing and consumption, was followed to describe the milk shed.

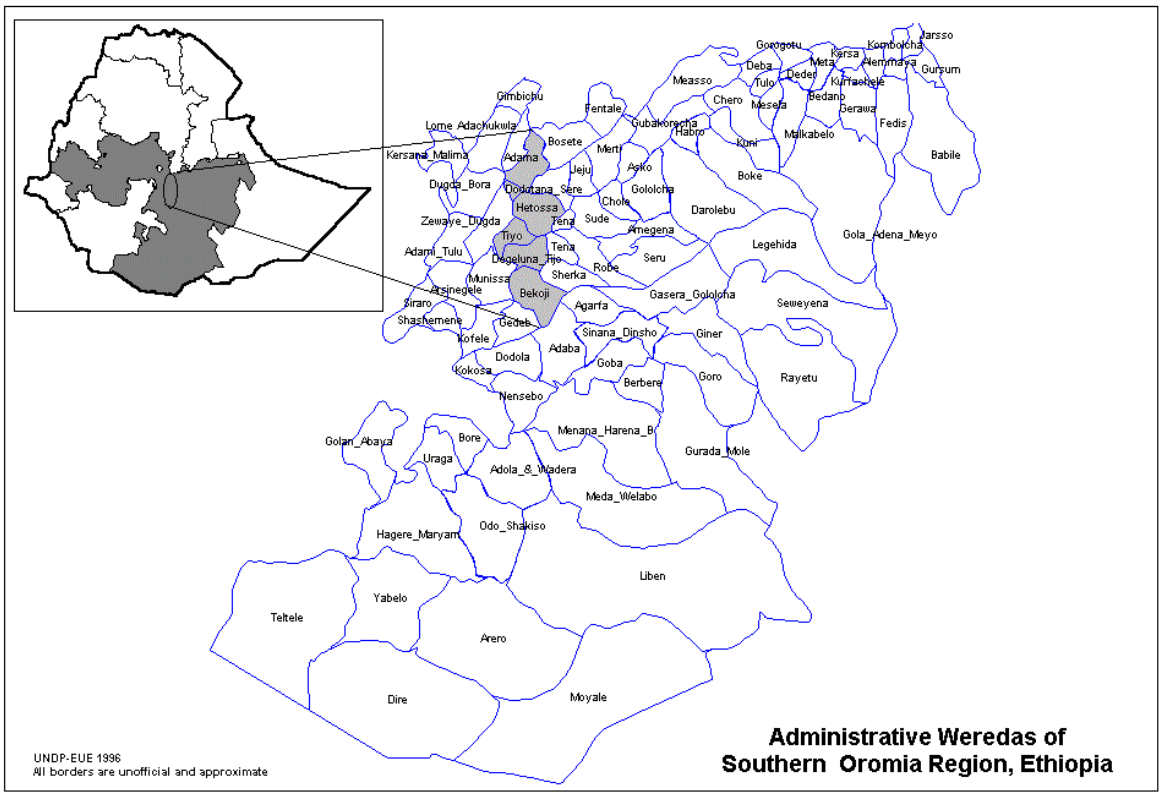


Figure 1 *Administrative districts in Asella milkshed*

3 Results

3.1 Milk shed description

Asella-Adama is one of the milk sheds with high production potential for its climatic condition and high marketing potential being located in the central highlands near to major cities like Adama, Mojo, Bishoftu, Hawassa and Addis Abeba. However, there is poor market linkage between value chain actors and stakeholders. The following figure shows a schematic model of the milk shed in Asella and Adama area. Details of the value chain description are given in subsequent sections.

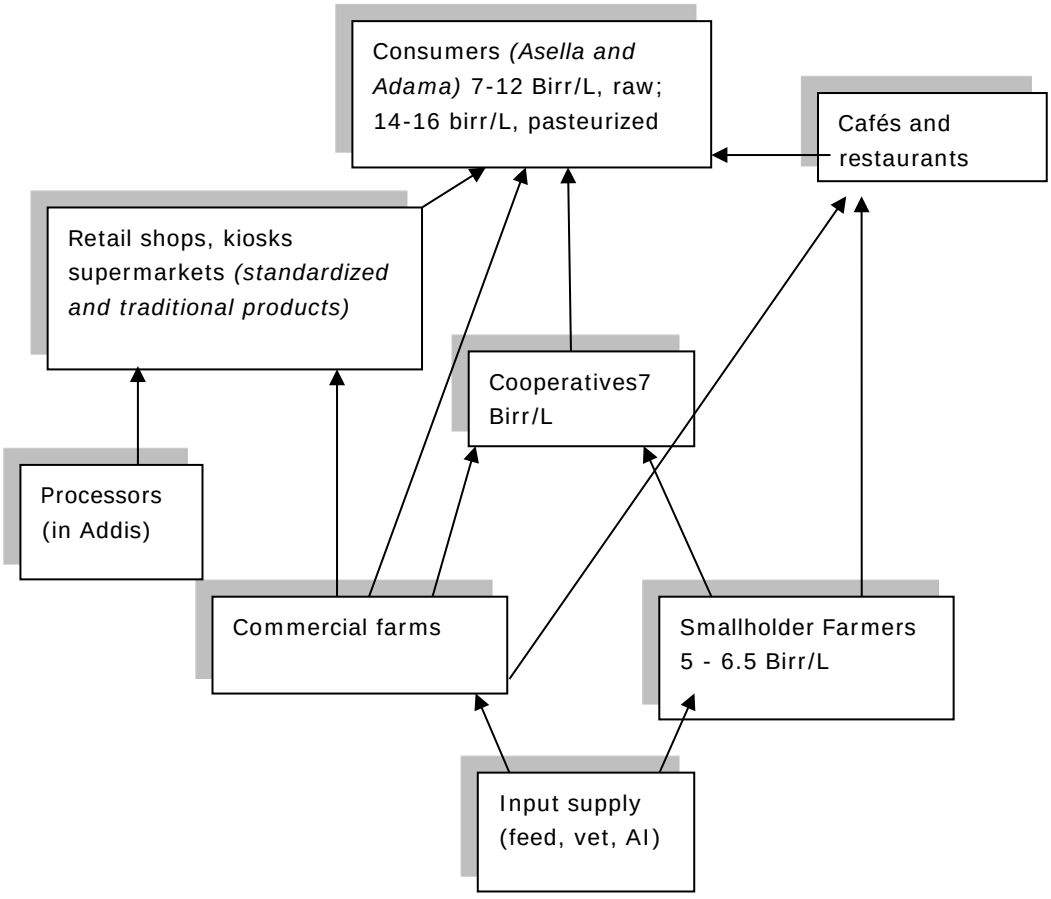


Figure 2 *Milk Value chain in Asella-Adama Milk shed*

3.1.1 Input Supply System

3.1.1.1 Feeds

The existing farming system in Asella area is crop-livestock farming system. Where animals are reared for supplying power to land cultivation and, where market is available, for milk production. According to Asfaw Negassa (2009)[35] dairy farmers in Asella practiced three grazing systems and combinations thereof: communal grazing, private grazing and zero grazing. There is 359,558 ha of land used for grazing in the zone, according to Arsi Zone livestock production and health agency. Straw and crop residues are extensively used and animals are grazed on crop stubble. Basal diet feed resources in the area include both indoor (cut-and-carry) and grazing where milking cows and young stock are mostly kept indoors. The level of indoor feeding is higher in towns where shortage of grazing land is severe. Regarding agro-industrial by products usage as animal feed, most farmers use wheat bran and oil-seed-cake to supplement their dairy animals. Green feed conservation and utilization is practiced by most of the farmers where specialized dairy breeds are available in the herd.

Asella union supplies concentrate feeds to dairy farmers that are members of dairy cooperatives. There are few flour factories where bran can be found for cheaper price as long as there is no middleman involved. There is no commercial feed processing plant in Asella town but the area is close to major feed plants in the country which are concentrated in Bishoftu (Debre Zeit), Mojo and Adama (Nazareth). The Asella Malt Factory is the sources of spent grain and by-products for dairy feed in the area.

Asella milk shed has been beneficiary of most of the dairy development projects in the past. Land O'Lakes (LOL) has recently been working on forage development in Asella. Efforts made by LOL include provision of trainings and inputs for pasture development, backyard fodder production and forage seed production. Farmers have become forage seed suppliers where alfalfa, Napier grass and fodder beat are now-a-days cash crops. There are nine micro-enterprises established by LOL that engage 180 HIV carriers in income generation through dairy concentrate supply activities.

Kulumsa Agricultural Research Center of the Ethiopian Institute of Agricultural Research provides pre-basic and basic forage seeds to smallholder dairy farmers as well as other stakeholders in the area working improving forage supply to dairy producers in the area. Similarly, Adama University - Asella Model Agricultural Enterprise (AMAE) is one source of forage planting materials in Asella.

3.1.1.2 Veterinary Service

Veterinary services (vaccination, diagnosis, treatment) are primarily supplied through the livestock agency offices located in all the districts of the zone. But drug supply is shared by the private sector mostly concentrated in town centers. In Asella town alone, there are four private veterinary drug shops. Dairy farmers are characterized by limited control of dairy cattle diseases and parasites (Asfaw Negassa, 2009). Coverage and quality of dairy veterinary service in Ethiopia is poor and Asella area is no exception. Small commercial farmers are believed to source this service from private vets as their business profit depends on the wellbeing of their animals. Major diseases of dairy cattle in the area are mastitis, FMD, blackleg, internal and external parasites, anthrax and LSD. Most of them have vaccines administered through representative livestock agency in all the districts.

3.1.1.3 Breed/AI

Dairy farmers in Asella practice three breeding methods: crossbred bulls, indigenous bulls and artificial insemination (AI) Asfaw Negassa reported (2009). Breeding objectives of farmers in the area ranges from having pure local oxen for draught power purposes to having specialized dairy breeds where market

[35] Asfaw Negassa. 2009. *Improving smallholder farmers' marketed supply and market access for dairy products in Arsi Zone, Ethiopia.* Research Report 21. ILRI (International Livestock Research Institute), Nairobi, Kenya. 107 pp

for milk is available. Previously, dairy farmers restock their barns buying crossbred heifers from Gobe Ranch which is found in the zone, for subsidized affordable prices. According to key informants interviewed, the privatization of this source made AI the only opportunity for having crossbred cattle in Asella area. However, the farm manager of this ranch claims that they are still providing heifers according to some source.

The sole supplier of AI service is again the Livestock production, health and marketing agency in all the districts. Due to its budget and personnel problems the service is not efficiently provided by the agency to its clients. Adama university Artificial Insemination Institute plans to supplement this service not only in Asella but throughout the country with due focus to Oromia region. The institute plans to provide training to animal production professionals and model farmers from the community to alleviate the severe shortage of skilled AI technicians in the country. Trainings last for thirty days for the former and forty-five for the later groups considering their previous skills and knowledge in the area.

3.1.2 Production

Arsi zone of Oromia regional state is inhabited by 2,455,313 heads of cattle according to CSA (2011) of which 1,224,844 are female including the 368,567 milking cows. The zone has conducive climate for rearing specialized dairy breeds and thus accommodates the second large number of crossbred dairy cows in Oromia regional state amounting to 31,428 heads next to North Shewa zone. However, the zone is reportedly producing 186,800,070 liters of milk annually.

Milk production is predominantly a smallholder activity in the area under the mixed crop-livestock production system. Herd size of smallholders in Asella is 11 heads on average and there is no significant difference between holdings of members and non-members of dairy cooperatives in Asella milk shed (Asfaw Negassa, 2009). Productivity of local and crossbred cows in this area is 5.9 lt/d and 10.3 l/d, respectively according to the same report. This figure is higher than the report by CSA (2011), which is approximately 2 l/d from locals and 7 l/d from crossbred cows in the zone. This production capacity is very low for commercial scale farms and efforts should be exerted to enhance production of milk in the zone through technical and financial capacity building as well as better input supply system.

In Adama milk production is mainly a commercial venture where farmers keep from few cows to up to 200 cows like Mamush Fana Farm. Discouragingly high feed price is the major problem for Adama producers that lack grazing area. More than 360 cows are managed by 63 Awash Dairy Cooperative members.

3.1.3 Collection

From the total milk production of the zone, the amount that reaches the formal markets is negligible, only 3% according to data obtained from the Asella Dairy Cooperatives Union. Collection function is played by the 25 cooperatives that operate in the zone and few private collectors that operate traveling long distances from Adama (Nazareth) and Bishoftu (Debrezeit). Cooperatives pay an average of Birr 5.5 per liter of fresh milk to the member producers and private collects a little bit extra to attract suppliers. Due to its relatively longer distance from locations of large milk processors, milk transportation is costly for collectors especially cooperatives. Even the large processors do not dare to collect milk from Asella area for its long distance from where they are located. The union is planning to procure vehicle for milk transportation to processors around Debrezeit in the short-run. Supports from FAO in the form of cooling centers to the union are planned and the process is underway highlighting better future for dairy producers and their cooperatives in the area.

According to East Shewa zone Livestock Agency there are 3 milk cooperatives in Adama, 2 in Lume (Mojo), 5 in Ad'a (Debre Zeit), 1 in Bora and 4 in Adami Tulu districts. These coops serve as market outlets for smallholder producers and source of fresh raw milk to urban consumers of their respective. The formal milk marketing system is at its infant stage in the country and this is reflected in Asella-Adama milk shed.

3.1.4 Processing

There is no modern milk processing activity going on in Asella-Adama Milk shed area. Most of the milk that reached the collection centers' gates is sold fresh or processed into traditional milk products in the same place. It would be an advantage for investors to establish milk-processing plant of medium size that take into consideration the production facts mentioned earlier. AMAE has planned to establish medium scale milk processing plant for its dairy farm production as well as milk production of the local smallholder farmers. This is expected to partially alleviate market problems of dairy cooperatives and the union in Asella.

3.1.5 Retail

There is no specialized dairy shop in Asella except for the three cooperatives established by the Ethiopia Dairy Development Project to increase income of women living with HIV. These cooperatives collect milk from rural as well as urban producers for retail sale to urban consumers. They are equipped with small-scale processing equipment like churner and cream separator for processing of surplus milk. Cafés and restaurants retail milk for customers in cups with or without coffee. Raw milk, butter and cottage cheese are the popular milk products retailed in Asella town. Standardized products like pasteurized milk, powdered milk and imported butter are present in supermarkets but in limited amounts. Milk retail can be considered as one of the market opportunities in Asella where the tradition of consuming milk and milk products is available. AMAE sells standardized milk at Birr 6 per liter while other retailers sell raw whole milk, from Birr 7 to 8 per liter. In Adama city there are a number of supermarkets retailing standardized dairy products to consumers. Their main sources of these products are processors located in Addis Abeba (Lamie Dairy), Sebeta (Mama's), Bishoftu (Ad'a Dairy cooperative, Bora Milk, Holland Dairy and Genesis farms) and Hawassa (Almi Fresh Milk). According to retailers there are times when dairy products become scarce especially in the dry period and non-fasting season.

Table 1

Collector/Retailors and milk selling prices in Asella

No.	Name of retailor	Volume sold daily (L)	Price of milk (Birr)
1	Edget Besira	120	7
2	Ra'ey	96	7

3.1.6 Consumption

Asella town has a large number of inhabitants. Muslims who do not have fasting culture that discourages consumption of milk and milk products dominate the zone. In addition, Asella is only 76 km from Adama (Nazareth), which is a large metropolis. Processed products like butter and cottage cheese reach Adama, Mojo, Bishoftu and Addis Abeba consumers through traders. Standardized dairy products like pasteurized milk are not available in large amounts in Asella but imported products like powdered milk are available in kiosks and supermarkets. Reports of Asfaw Negassa (2009) show that purchasing standardized milk products is not practiced extensively in Asella with only 10% of the sampled population reporting purchase of these products but the market for raw milk is highest of all milk products available in Asella markets. Six days a week purchase of fluid milk is reported by the same author in Asella, indicating consumption behavior of the local people. Formalizing the dairy value chain is a key objective in developing the sector in this area. Asella has geographical advantage to link large production (Arsi zone) and consumption areas (West Shewa zone).

3.2 Stakeholders in Asella Milk Shed

Table 2
Stakeholders analysis

Stakeholder[36]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Oromia, Arsi Zone Livestock production, health and marketing agency	Enablement: facilitation of livestock input supply	24 districts of Arsi Zone (see annex)	Coordination of extension service provision of district bureaus of LS Agency	Support provision of inputs and extension service in all 24 districts	Bridge research and farmers, adaptive research and support BoP producers, take feedback to researchers	+: support input use and modern production of milk in Arsi zone	Asella		0223317764
Oromia, Arsi Zone Cooperatives promotion agency	Enablement: cooperative establishment, facilitation	17 districts of Arsi zone	Coordination of cooperative development and support service delivery at district level	Initiate and support formal milk market chain	Capacity building for new and old cooperatives	+:support formalization of milk market	Asella		0223312069 0223312070 0911792819 Mekonen Degaga
Adama University-Asella Model Agricultural Enterprise (AMAE)	Operation: milk production, collection, processing, marketing, heifer rearing Enablement: training	Asella and neighboring districts where milk production is commercialized	Production, collection and modern processing of milk and marketing locally and abroad	Create market for local production, capacity building and research and development	Demonstration and training center for modern dairy farm and milk processing	+: serve as model innovation and technology user	Asella	amae@adama-university.net	0916820435 Dr. Nega

[36] Stakeholders in **bold** are influential ones.

Stakeholder[36]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Adama University Artificial Insemination Institute	Enablement: provision of training on AI and supply of semen and liquid nitrogen	Oromia, Ethiopia	Center of AI inputs and skill source	Improvement of dairy cattle breeds, improving productivity	Breed technology source	+: plan to revolutionize breed improvement in the country	Asella	aiia@adama-university.net	0223317827 0911134058 Dr. Hunduma Dinka
UN-FAO Asella	Enablement: support market orientation of dairying, strengthening coop	Hitosa, Tiyo, Messa, Digelo-Tijo, Lemu-bilbilo, Honqolo-wabe districts of Arsi zone	Formalization of dairying in Asella	Support farmers of dairy cooperatives with training and cooling facility	Introduction of cooling technology, feeding options	+: introduction of cooling technology and other supports to actors in the formal milk market	Asella		0910766232 (Jemberu E) 0223311858 0911674691 (Hizkyas)
Asella Dairy Cooperatives Union	Operation: market milk from coops and supply inputs to members	10 districts of the zone (see attached list)	Market linkage	Formalization of milk market in the area, market search for small dairy coops	Not obvious	+: plan to upgrade to chilled milk marketing	Asella		0912239814 Tesfaye Ermias (chairman)
KOICA	Enablement: model village development, dairy input support	Hitossa District, Arsi	All dairy package suply; boran heifer, barns, forage seeds, AI	Triggering commercial dairying in rural areas	Introduction of modern dairy farming system, modern barn, AI, forage development	+: sensitizing modern dairying through crossbred cattle and forage production	Asella Addis Abeba	http://www.koica.go.kr/	0223318104 0911313137 (Yafet) 0113720340/41 (Brook Program Manager)
East Shewa Oromia zone Livestock production, health and marketing agency	Enablement: facilitation of livestock input supply	5 districts of East Shewa Zone (see annex)	Coordination of extension service provision of district bureaus of LS Agency	Support provision of inputs and extension service in all 5 districts	Bridge research and farmers, adaptive research and support BoP producers, take feedback to researchers	+: support modernization of dairy farming in the area	Adama (Nazareth)		022112260

Stakeholder[36]	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
East Shewa Oromia zone cooperatives promotion agency	Enablement: cooperative establishment, facilitation	5 districts of Arsi zone	Coordination of cooperative development and support service delivery at district level	Initiate and support formal milk market chain	Capacity building for new and old cooperatives	+: support formal milk marketing system, thus market orientation	Adama (Nazareth)		0221120526 0911164879 Sileshi
Adama Zuria Livestock production, health and marketing	Enablement: AI, veterinary, extension service supply to urban and peri-urban dairy farmers	Adama (Nazareth City) area	Extension service	Subsidized input supply to urban and peri-urban dairy farmers	Extension of new methods of dairy farming and milk processing to clients	+: support urban dairy production,	Adama (Nazareth)		0912057516 Solomon
Awash Dairy Cooperative	Operation: collection of milk from members, sell milk to processors and consumers, supply feed to member farmers	Adama (Nazareth)	Milk collection	Formalizing dairy markets, market linkage	Uptake of appropriate technology and provide feedback	+: operating under a formal market chain, market oriented system	Adama (Nazareth)		0221115138 0912233547 Tiku Beyene (Chairman)
Yakla milk production and processing	Operation: collection of milk, processing and marketing	Adama (Nazareth)	Milk collection and processing	Formalizing milk marketing	Users of processing innovation	+: plan upgrading milk collection	Adama (Nazareth)		

3.3 Intervention Areas in Asella Milk Shed

1. Input supply:
    a. support AI service
        i. Oromia Livestock Breed Improvement Plan through its stakeholders
        ii. improve breed potential of NAIC to reach out producers indirectly
        iii. support expansion of private AI service delivery
    b. support forage sector
        i. coordinate forage seed producer areas and link markets
        ii. subsidize or compensate costs of forage production
        iii. facilitate establishment of feed processing plants
    c. support vet supply system
        i. train para-vets from the community
        ii. lobby policy makers to exempt vet supplies from taxes
    d. Install knowledge management system to vitalize input supply system
2. Production
    a. capacity building of small producers
        i. technical knowledge on dairy husbandry and clean milk production through training
        ii. facilitate access to micro-financing system and loan for dairy activity
3. Collection
    a. engage Asella Dairy Cooperatives Union in collection activity
    b. sensitization of quality based payment
    c. capacitate coops' managerial and marketing capacity
4. Processing
    a. attract investors to install milk processing plant
    b. capacitate union to engage in cooling and small scale/ seasonal processing
5. Retail and consumers
    a. advocate use of consuming standardized milk products
    b. facilitate establishment of specialized milk shops

4 Conclusions and Recommendations

Asella-Adama milk shed is one of the oldest development project areas. There is an untapped production potential in Arsi zone and an unmet demand in Adama and nearby cities. Production is mostly a smallholder business in Asella area. Multiple options of feed resources are available for dairy producers including the vast natural grazing lands. Vet and AI service is exclusively supplied by government livestock agency at district level, which can be rated as inefficient and of limited coverage. Milk collection and marketing is performed by the thirty-one and fifteen dairy cooperatives in Arsi and west Shewa zones, respectively, in addition to many milk 'hawkers' that play similar role even though it is informal. There is no large processor located in Asella-Adama milk shed to tap this potential milk shed. A number of stakeholders are identified to work with on the development of this milk shed in the near future. As old but developing milk shed intervention areas at each node of the milk value chain are pin pointed which could be starting points for dairy development endeavors in the years to come.

Annex

Table 3

List of districts in Arsi Zone

No.	Name of District	Number of Cattle	Number of Milk Coops	Distance from Asella (km)
1	Aminya	159,912	0	154
2	Asako	80,501	0	170
3	Balee	209,897	0	166
4	Chole	109,359	1	200
5	D/Tijo *	145,203	4	25
6	Diksis	135,791	1	74
7	Dodota	37,370	0	50
8	Gololcha	242,115	0	260
9	Guna	70,712	0	170
10	Hetosa *	126,781	3	25
11	Jaju	123,701	0	130
12	L/bilbillo *	260,780	7	56
13	L/Hetosa	88,590	1	59
14	Marti	98,190	0	140
15	Munesa *	242,915	2	60
16	O/Wabe *	89,906	2	78
17	Robe	153,261	2	108
18	Seru	71,972	0	180
19	Shirka	219,897	2	90
20	Sire	48,126	0	80
21	Sude	201,725	0	97
22	Tena	85,775	0	135
23	Tiyo *	78,289	6	8
24	Z/Dugda	90,498	0	47
Total		3,171,266	31	

Source: Arsi Dairy Cooperatives Union, 2011.

* Districts with high milk production potential and FAO activity.

Part II-G

Dire Dawa Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

Market orientation of the Ethiopian dairy sector has been the issue of governmental and nongovernmental organizations in the past few decades. SNV-Ethiopia is one of the stakeholders in this regard. It has been supporting dairy businesses technically and financially for the past six years through its BOAM program. The MIDD program is a new 5-year program that focuses on Market-led Innovation and Learning for dairy development in the country. This study is commissioned by this new program and is meant to describe dairy value chains of selected milksheds, describe stakeholders and intervention areas.

Dire Dawa is one of two chartered cities in Ethiopia (the other being the capital, Addis Ababa). This chartered city is divided administratively into two districts, the city proper and the non-urban district of Gurgura. The climatic condition of Dire Dawa seems to be greatly influenced by its topography, which lies between 950 – 1250 meter above sea level, and which is characterized by warm and dry climate with a relatively low level of precipitation. The mean annual temperature of Dire Dawa is about 25.4^0C. The average maximum temperature of Dire Dawa is 31.4^0C, while its average minimum temperature is about 18.2^0C. Bimodal rain exists in Dire Dawa; that is, a short rain season from March to April, and a long rain season that extends from August to September. The aggregate average annual rainfall that the region gets from these two seasons is about 604 mm. On the other hand, the region is believed to have an abundant underground water resource.

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), Dire Dawa has a total population of 341,834, of whom 171,461 are men and 170,461 women; 233,224 or 68.23% of the population are urban inhabitants. For all of Dire Dawa 76,815 households were counted living in 72,937 housing units, which results in an average of 4.5 persons to a household, with urban households having on average 4.2 and rural households 4.9 people. Ethnic groups in the region include the Oromo (45.9%), Somali (24.3%), Amhara (20.17%), Gurage (4.55%), Tigre (1.23%), and Harari (1.09%). Languages spoken include Oromiffa (47.95%), Amharic (26.46%), Somali (19.7%), Gurage (2.78%), and Harari (1.04%). The religion with the most believers in Dire Dawa is Muslim with 70.8%, 25.71% are Ethiopian Orthodox, 2.81% Protestant, and 0.43% Catholic.

Dire Dawa and Harrar are one of the tourist attractions and high population centres in the eastern part of the country. Such urban centres have high demand for milk and dairy products. There are few documents indicating the dairy potential of Dire Dawa and Harrar area and urbanization potential of Dire Dawa and Harrar cities, but lack detailed information about stakeholders in the milkshed and the possible intervention areas for market orientation of the sector. This study was conducted with the following objectives:

1.1 Objectives

- ⊕ to describe and map dairy value chains in Selale, Jimma, Asella and Dire Dawa areas
- ⊕ to list and discuss important stakeholders in the milkshed
- ⊕ to identify main intervention areas in the milksheds under consideration

2 Methodology

To meet the abovementioned objectives a rapid appraisal was made using:

1. Secondary data collection: Dire Dawa Agricultural Bureau, Harrari Region Livestock Agency, East Harrarghe Zonal and Babile District Livestock Production, and Health Agency, Investment promotion office of Dire Dawa city administration and few private farms, processing centres, supermarkets and hotels.
2. Desk review of literatures: relevant studies on dairy input and product markets in Ethiopia and the region. Relevant reports on local and international dairy supply chains, technology, markets and services and policy will also be reviewed as needed.

Value Chain Approach, i.e. input supply, production, collection, processing, marketing and consumption, was followed to describe the milkshed.

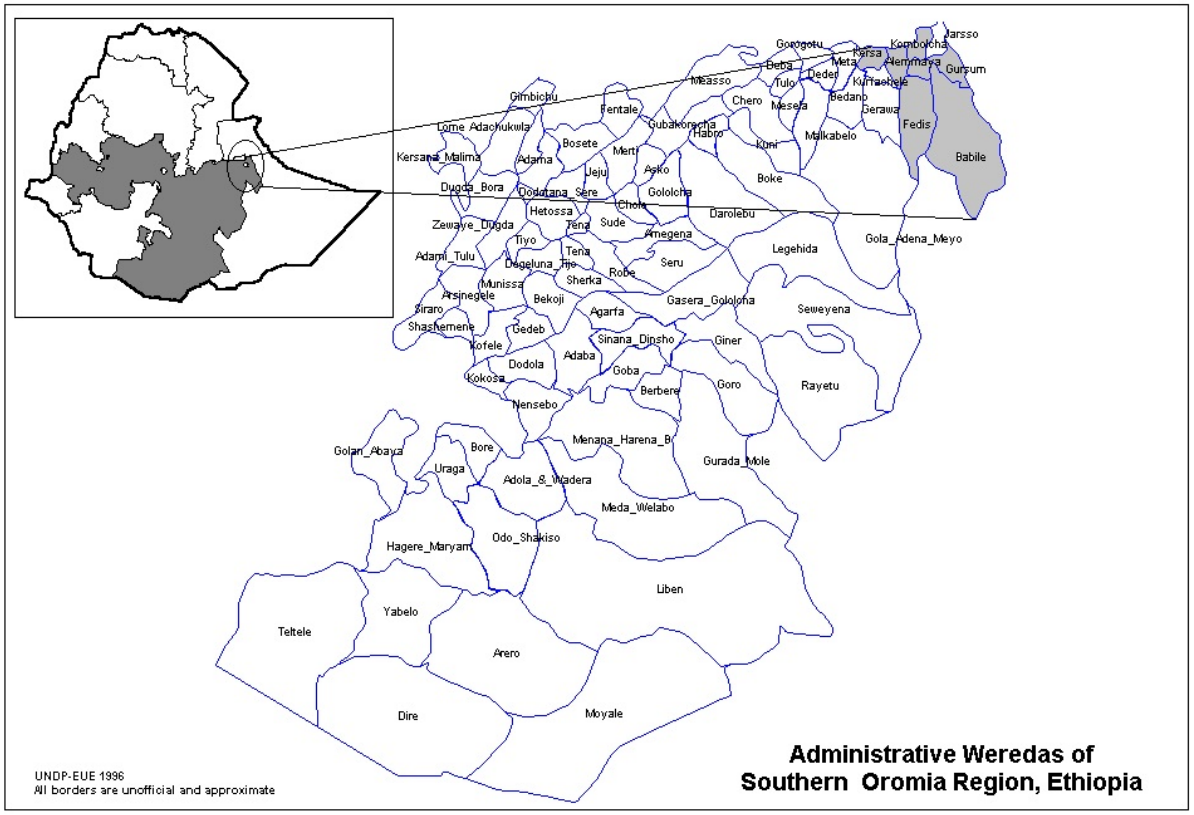


Figure 1 *Administrative districts of East Harrarghe, Dire Dawa – Harrar milkshed*

3 Results

3.1 Milkshed description

Regardless of its hot climate, Dire Dawa city holds vast number of crossbred cows reared in medium to large numbers (see Annex). Characteristically the milkshed has high milk and dairy products price and a diversity of brands from smuggled UHT milk, milk powder and yoghurt. The following model represents dairy value chain prevailing in Dire Dawa-Harrar area.

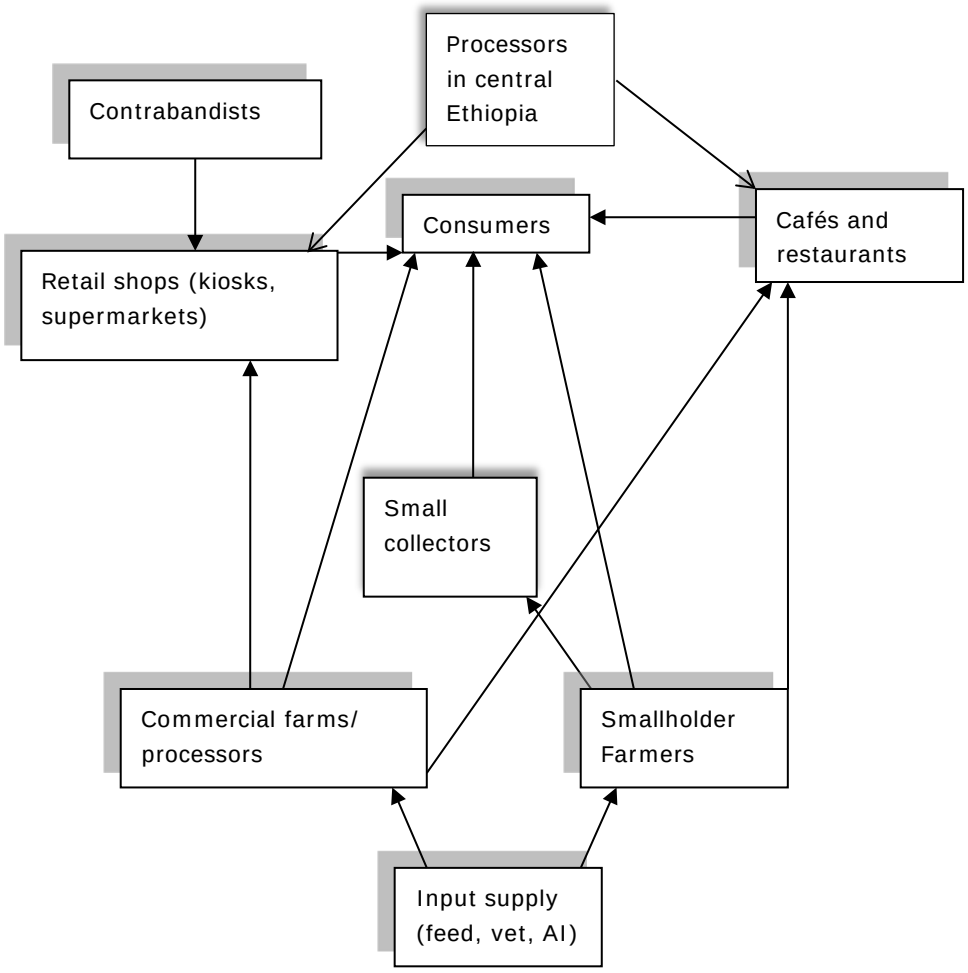


Figure 2 *Dairy Value Chain map of Dire Dawa-Harrar area.*

Consumers have access to milk from a diversity of animals and locations; from raw fresh milk of goats, cows and camels to UHT and powder milk from abroad. Main production areas are Babile, Harrar and Dire Dawa where consumption is high in Dire Dawa and Harrar. Contraband imported dairy products are seen in shelves of supermarkets and kiosks along with few legally imported dairy items, unlike the other milksheds in the central and western parts of the country. The dairy value chain is described from input supply up to end consumer in Dire Dawa-Harrar area.

3.1.1 Input Supply system

3.1.1.1. Feed supply

Feed is one of the costly inputs for dairy producers and the problem gets severe where climatic conditions do not favour crop production. Modern dairying is an input intensive production especially in urban areas where farmers always try to maximize production with the least cost possible. According to Dire Dawa Agricultural Bureau the area is a feed deficit area and as a result a diversity of dairy animals is reared for milk production to utilize whatever feed resources available in the area. Camels and goats can utilize browse species, which are abundant in lowland dry areas. Hay is transported from neighbouring highland districts like Kersa. Some farms have their own land for fodder production like Hamdail and Primo milk where they produce all the feed required for their dairy cattle. Concentrate supplements are expensive in Dire Dawa as in the rest of the country. There are flour factories in Dire Dawa and the Hamaresa Edible Oil Factory is in the proximity for bran and oil-seed-cakes supply, respectively. The agricultural bureau supplies forage seed in small amounts and when they are available. Forage seeds are brought from the central part of the country for those who have land and irrigable water.

In Harrar feed problems are aggravated as farmers shifted from production of cereals and fruits to chat, a highly marketed cash crop that occupied vast area of land that used to be cultivated with food and forage crops or grazing lands. As a result intensive dairy farming in urban and peri-urban areas is facing high purchase and transportation costs of roughage feeds from neighbouring districts where hay is produced. Available feed resources include crop residues like maize and sorghum stover from smallholder farmers, brewers' yeast from Harrar Beer Factory, bran and middling from flour factories in Dire Dawa and oil-seed-cakes from Hamaresa located few kilometres on the way to Dire Dawa.

Farmers in Babile district have relatively better access to grazing lands as compared to Dire Dawa and Harrar farmers but they are faced with bush encroachment and reduced forage productivity problems in their natural grazing lands. As a result feed production is also becoming a bottleneck for dairy producers in the area.

There are few supports on forage development in Harrar and Babile district from projects of NGOs like Menschen fur Menschen and Mercy Corps. Extensive work should be made on the forage production sector to develop the dairy sector in this area.

3.1.1.2 Veterinary Services

Veterinary service in Dire Dawa, Harrar and Babile areas is mandated to their respective agricultural bureaus and livestock agency veterinary service departments where limited service is provided with the limited resource allocated. Sixteen kebeles have assistant animal health workers where vaccination is provided for free and other diagnosis and treatment of sick dairy animals for subsidized fees, i.e. farmers are exposed to costs of drugs only. In Harrar vet service is delivered either in the vet clinics or on the farms in all the 9 districts through the agricultural bureau's assistant veterinarians. It is difficult to say there is adequate veterinary service supply from the government due to budget, transportation and human resource problems according to the officers interviewed. Private veterinary service supply tries to fill this gap in the cities through mostly drug supply and few diagnosis and treatment.

3.1.1.3 Breeding and A1

Specialized dairy breeds are concentrated in the cities and their suburbs. Rural farms mostly keep local cattle, goats and camels for milk production. Farms in Babile keep Harrarge and Boran cattle for multiple purposes of milk, meat and traction. Boran cows are milked up to 4 litres per day according to Babile District Livestock Agency. Producers get crossbred heifers from Harames University and destocking private farms. There is no ranch in the area dedicated to supplying of heifers and cows for dairy production. All districts' governmental agriculture offices under Harrari regional state, West Harrarge

Oromiya and Dire Dawa city administration provide artificial insemination service. Source of semen and liquid nitrogen is NAIC, in addition to the liquid nitrogen plant in Harrar. Efficiency of AI service is questionable considering the number of professionals and the area coverage. Interests were showed by private farms to deliver quality AI service in the near future.

3.1.2 Production

Livestock resource base of the area is presented in the table below. In Dire Dawa milk production is a commercial activity and mainly based on high grade specialized dairy cattle. Herd size varies from as few as 2 or 3 milking cows to 300 dairy cattle. The largest farm was Dire Dawa Dairy Processing Enterprise (Hamdail Dairy farm) and currently destocked its previous 300 dairy cows to 60 because of feed shortage and change of business type to real estate. The farm has its own small-scale processing plant where milk is processed into pasteurized milk, yoghurt and ice cream. It had its own fodder production land that is converted to real-estate land by the owners.

There are other farms that are recently established by young entrepreneurs in the city, of which Primo Dairy is good example. Most of them do not have land for fodder production so they buy hay from Kersa area, which is located around 30km on the way to Addis. Primo Dairy has its own land for green fodder production and processes milk into ergo /traditional fermented milk/, and pasteurized milk packed in 300ml sachets, using the owners' innovative

Table 1
Dairy animal population in Dire Dawa-Harrar Milkshed (2011)

Region	Cattle		Goats		Camels	
	Total	Milking cows	Total	Milking goats	Total	Milking Camels
Harari	52245	4910	45256	212	-	-
Dire Dawa	43128	3154	181181	3779	6425	1454
East Hararghe, Oromiya	1395752	163624	1203562	-	29170	-
Total	1491125	171688	1429999	3991	35595	1454

Source: CSA 2011

technology. Production is high (up to 25 litre per cow per day) in such farms and herd size is around 25. Considering the environmental stress this production level is promising for future dairy development. Producers in Harrar keep few crossbred cows and supply to their neighbours and cafés. Extensive dairy production system is practiced in Babile where Boran cows, goats and camels are reared on communal grazing lands.

3.1.3 Collection

This function is the least developed in the Dire Dawa-Harrar milkshed. Rural dairy cooperatives in Dire Dawa, Babile and Harrar are formed informally where women are organized to transport milk in shifts to major consumption areas especially to Dire Dawa city. Such system reduces transportation cost thereby increasing their profit. Urban producers are not organized into cooperatives, as there is always buyer in their farm gate. There is only one dairy cooperative in Harrar city where input is supplied to members and milk collection and marketing is practiced. Establishment of dairy cooperatives and private milk processing plants is the key to formalizing dairy market chains in developing countries.

3.1.4 Processing

Large producers themselves practice modern milk processing in Dire Dawa. Hamdail is the popular brand for pasteurized milk in Dire Dawa owned by Dire Dawa Dairy Processing Enterprise. Currently this company is planning to outsource milk from rural and urban producers to maintain their business of supplying pasteurized milk. Primo Milk is another small processor that markets own production using simple innovative pasteurization and packaging technology. This processor also plans to collect milk and expand his processing business. Smallholder processing of butter and cottage cheese is also practiced by rural as well as urban producers when milk is surplus at times of fasting. No modern processing is practiced in Harrar and Babile areas.

Table 2
Milk and Dairy Product Prices in Dire Dawa

Item	Source	Unit	Price range (Birr/unit)
Pasteurized milk	Local producers	Pouches of 300 ml	5 – 6
Cow milk, raw whole	Local producers	Litre	8 - 12
UHT milk	Contraband	Cartons of 0.5 L	18 – 30
Yoghurt	Local	Cups of 0.125 L	10
Yoghurt	Contraband	Cups of 0.125 L	17
Provolone cheese	Central Ethiopia	Kg	130

3.1.5 Retail

Supermarkets, kiosks, sweet shops and farm gate shops in Dire Dawa-Harrar milkshed play retail function. A number of dairy products are available in the shelves of supermarkets and kiosks including pasteurized milk (local), UHT (both local and contraband), powder milk (imported and contraband), yoghurt (local and contraband imported) and cheeses (local). Brands like Yemany (UHT), Holland (yoghurt), Americana (UHT, yoghurt) are popular contraband imported items in dairy corner shelves and refrigerators of supermarkets and kiosks in Harrar and Dire Dawa. Yoghurt is sold from Birr 80 per litre of local yoghurt up to Birr 136 per litter, in cups of 125ml; UHT milk from Birr 36 – 60 per litre in packs of 500ml and a litre; local pasteurized milk for Birr 18 per litre and local provolone cheese for Birr 130 per kilo gram. These prices for such diverse dairy product indicate potential of the market to uptake modern value added dairy products.

3.1.6 Consumption

Dire Dawa-Harrar milkshed is a Muslim-dominated area where milk and dairy products are year round items in the diet. There is high consumption of chat (*Cata idulis*), a neuro-stimulant plant consumed fresh for excitement, in the area that entails consumption of milk right after the ceremony for body recovery. In addition, Dire Dawa and Harrar have universities and other institutions where thousands of students and staff are found in a compound demanding supply of quality milk and dairy products at close range. So far the major suppliers to such institutions are cafes and restaurants located in or around their compound. This is a good opportunity for dairy producers and processors in the area as well as far from this area to market their produce all year round. Harrar and Dire Dawa cities are one of the tourist attraction centres of the country where thousands of tourists stay for a while, all year round, demanding high quality and safe dairy products in their diet. A lot of marketing opportunities are present in Dire Dawa – Harrar milkshed, even though production of milk is a high-cost activity owing to the harsh climatic condition for specialized dairy breeds.

3.2 Stakeholders of Dire Dawa-Harrar Milkshed

Table 3
Stakeholder Description and Address

Stakeholder	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Dire Dawa Agricultural Office	Enablement: facilitation of livestock input supply	38 kebeles	Provision of extension service in livestock production	Production of crossbred heifers through AI, veterinary service supply, advice	Bridge technology and farmers,	+: support urban dairy producers through technology supply	Dire Dawa		0915732504
School of Agriculture, Haramaya University	Enablement: research, technology transfer, cooperative support	Harrar, Dire Dawa, Jijiga and surrounding areas	Capacity building, research and extension	Support coops, dairy farmers through technology generation and dissemination, (heifers, forage seed, knowledge)	Adapting and generating technology	+: engaged in dairy technology generation, input supply and capacity building	Haramaya	mogesdr@yahoo.com	Dept. animal science 0255530370 0255530371 Research and extension office 0255530385 0915745538 (Moges Dejene)
Oromiya, East Harrarge Livestock production, health and marketing agency	Enablement: facilitation of livestock input supply	East Harrarge Zone	Coordination of extension service provision of district bureaus of LS Agency	Support provision of inputs and extension service	Bridge research and farmers, adaptive research and support BoP producers, take feedback to esearchers	+: support rural and peri-urban dairy producers, promotes modern dairying and supply inputs to smallholder producers	Harrar		0256665765 0915747102 (Dr. Beshah)

Stakeholder	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Babile District Livestock Agency	Enablement: facilitation of livestock input supply	21 kebeles Pas	Provision of extension service	Provision of inputs and extension service at a subsidized payment	Bridge research and farmers, adaptive research and support BoP producers, take feedback to researchers	+: support dry land dairy producers,	Babile town		0256650004 0911939702 Birhanu Tsegaye
Harrari Region Agriculture Bureau, Livestock office	Enablement: facilitation of livestock input supply	Harrari region, 9 districts	Coordination of extension service of district LS Agency	Support provision of inputs and extension service	Bridge research-farmers, adaptive research +support BoP producers, take feedback to researchers	+: support urban milk producers	Harrar		0256660275 0912137237 Dr. Firdawek Tesfaye

3.3 Intervention Areas in Dire Dawa-Harrar Milkshed

1. Input supply
    a. Support AI service
        i. Support private AI service providers and AI input suppliers
        ii. Strengthen government AI service delivery system
    b. Support forage production
        i. Support communal grazing land development
        ii. Support feed processing business flourish
    c. Support vet supply system
        i. Train para-vets from the community
        ii. Support government vet supply system
2. Production
    a. Attract investment large scale dairy production
    b. Capacity building of small producers
        i. Technical knowledge on dry land forage production, dairy husbandry and clean milk production through training
        ii. Water point development for forage land irrigation as well as livestock water consumption
3. Collection
    a. Establish dairy cooperatives
    b. Policy support that favours the formal market chain
4. Processing
    a. Attract new investors to the dairy sector
    b. Strengthen capacity of small scale milk processors
    c. Product diversification
5. Retail and consumers
    a. Advocate formal dairy market chain
    b. Specialized dairy shops

4 Conclusions and Recommendations

Dire Dawa-Harrar milkshed has a number of unique features from other milksheds in the country, among which high cost of dairy products, contraband dairy products in shops, harsh environment to rear crossbred dairy cattle and high demand for dairy products are worth mentioning. Female milk marketing groups in Babile district, East Harrarghe zone of Oromiya regional state transport milk to Harrar and Dire Dawa cities. Even though the area does not have milk production potential there is high demand for standardized dairy products that makes it worth attempting dairy development endeavours. Market linkage between Addis Ababa and Asella milksheds and this milkshed for long shelf-life dairy products looks promising as the current consumption of expensive dairy products in Dire Dawa and Harrar indicates.

Annexes

Table 4

Medium- and large-scale urban dairy farms in Dire Dawa (2011)

Ser. No.	Name/owner of the farm	Number of crossbred/grade cows	Cell
1	Afar	79	0915735164
2	Tsehay	88	0915735813
3	Aynalem Kassaye	47	0915736100
4	Hamdail	46	0915730123
5	Israel	38	0915730107
6	Belette	37	0915733405
7	Abubakar	35	0915737400
8	Facil	28	0915730633
9	Derara	31	0915764275
10	Primo	18	0915750805
11	Haji Mohamed	12	0915148779
Total	459		

Source: Yilma, 2011[37]

Table 5

Number, Production and reproduction performance of local and crossbred/grade cows in Dire Dawa town (2011)

Ser. No.	Variable	Breed of cows	
		Local	Crossbred/Grade
1	Number of cows	37129	730
2	Lactation milk yield, L	300	3217
3	Lactation Length, days	150	195
4	Daily Milk Yield, L	2	16,5
5	Calving Interval, days	912	547

Source: (Yilma, 2011)

[37] Yilma, Zelalem. 2011. Dairy Development in Ethiopia. FAO. Unpublished.

Part II-H

Jimma Milkshed

Milk value chain, stakeholders and intervention areas

1 Introduction

Market orientation of the Ethiopian dairy sector has been the issue of governmental and nongovernmental organizations in the past few decades. SNV-Ethiopia is one of the stakeholders in this regard. It has been supporting dairy businesses technically and financially for the past six years through its BOAM program. The MIDD program is a new 5-year program that focuses on Market-led Innovation and Learning for dairy development in the country. This study is commissioned by this new program and is meant to describe dairy value chains of selected milksheds, describe stakeholders and intervention areas.

Based on the 2007 Census conducted by the CSA, Jimma Zone has a total population of 2,486,155, an increase of 26.76% over the 1994 census, of whom 1,250,527 are men and 1,235,628 women; with an area of 15,568.58 square kilometres, Jimma has a population density of 159.69. While 137,668 or 11.31% are urban inhabitants, a further 858 or 0.03% are pastoralists the rest are rural inhabitants.

A total of 521,506 households were counted in this Zone, which results in an average of 4.77 persons to a household, and 500,374 housing units.

The 1994 national census reported a total population for this Zone of 1,961,262 in 432,101 households, of which 979,708 were men and 981,554 women; 190,395 or 9.71% of its population were urban dwellers at the time. The five largest ethnic groups reported in Jimma were the Oromo (81.57%), the Yem (5.28%), the Amhara (4.95%), the Kullo (2.9%), and the Kafficho (1.78%); all other ethnic groups made up 3.52% of the population. (Based on research performed in the early 1990s, as many as 500,000 inhabitants may be members of the Yem). Oromiffa was spoken as a first language by 85.96%, 7.86% Amharic, 1.95% spoke Kullo, 1.45% spoke Yemsa, and 1.19% spoke Kafa; the remaining 1.59% spoke all other primary languages reported. The majority of the inhabitants were Muslim, with 82.57% of the population having reported they practiced that belief, while 15.78% of the population said they professed Ethiopian Orthodox Christianity, and 1.47% was Protestant.

Jimma zone can be broadly classified, agro-ecologically, into highland which comprises 15% of the area, 68% mid-altitude and the rest lowland. Average annual rainfall ranges from 1200 – 2000 mm and temperature minima 7 – 12^{0}C and 25 -30^{0}C maxima. Rural inhabitants are mostly engaged in coffee production, which is mostly an agro-forestry farming system. The number of cattle kept here (456,893 heads) is the largest from other zones of Oromiya national regional state. However, productivity is very low at 1.146 l/day (CSA 2011). Jimma is one of the large metropolises in the country where a large university and other higher learning institutions are found. Jimma University alone accommodates more than 20,000 students and staff annually. Such high population areas are source of demand for milk and dairy products. Its climatic condition makes Jimma area suitable for modern dairying. No sufficient written document is available about Jimma milkshed characteristics and possible intervention areas of dairy development. The current study was conducted with the following objectives.

1.1 Objectives

- ⊕ to describe and map dairy value chains in Jimma milkshed
- ⊕ to list and discuss important stakeholders in the milkshed
- ⊕ to identify main intervention areas in the milkshed

2 Methodology

To meet the abovementioned objectives a rapid appraisal was made using:

1. Secondary data collection: Jimma zone Livestock Production, health and Marketing Agency, Jimma zone Cooperatives Promotion Agency, Zonal and District Livestock Production and Health Agency, CSA, NGOs,

2. Desk review of literatures: relevant studies on dairy input and product markets in Ethiopia and the region. Relevant reports on local and international dairy supply chains, technology, markets and services and policy were also reviewed as needed.

Value Chain Approach, i.e. input supply, production, collection, processing, marketing and consumption, was followed to describe the milkshed.

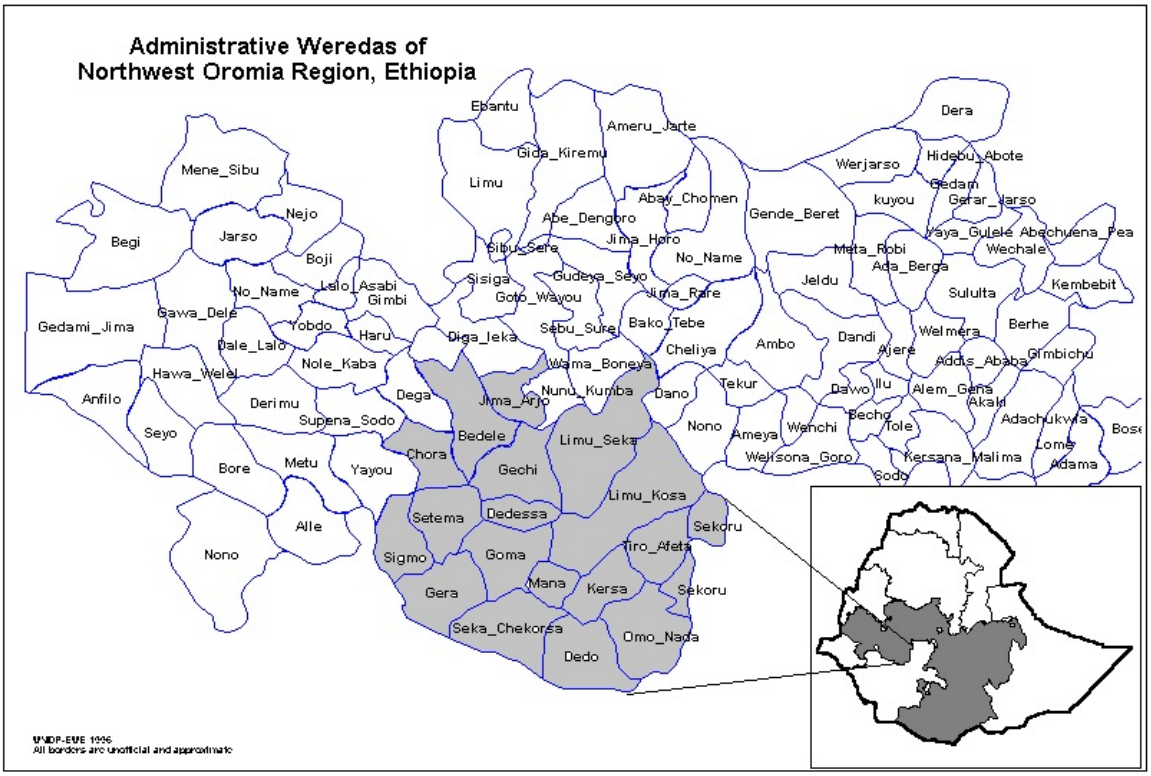


Figure 1 *Administrative map of Jimma and its neighbouring districts*

3 Results

3.1 Milkshed description

The informal chain dominates the milk market where unpasteurized milk reaches the consumers table in Jimma. A simple and short dairy market chain is observed in Jimma where small and commercial dairy farms either sell milk to cafés and restaurants or directly to consumers. Volume of milk supplied to Jimma city is not known and detailed survey should be made to map the volumes of milk transferred along the value chain.

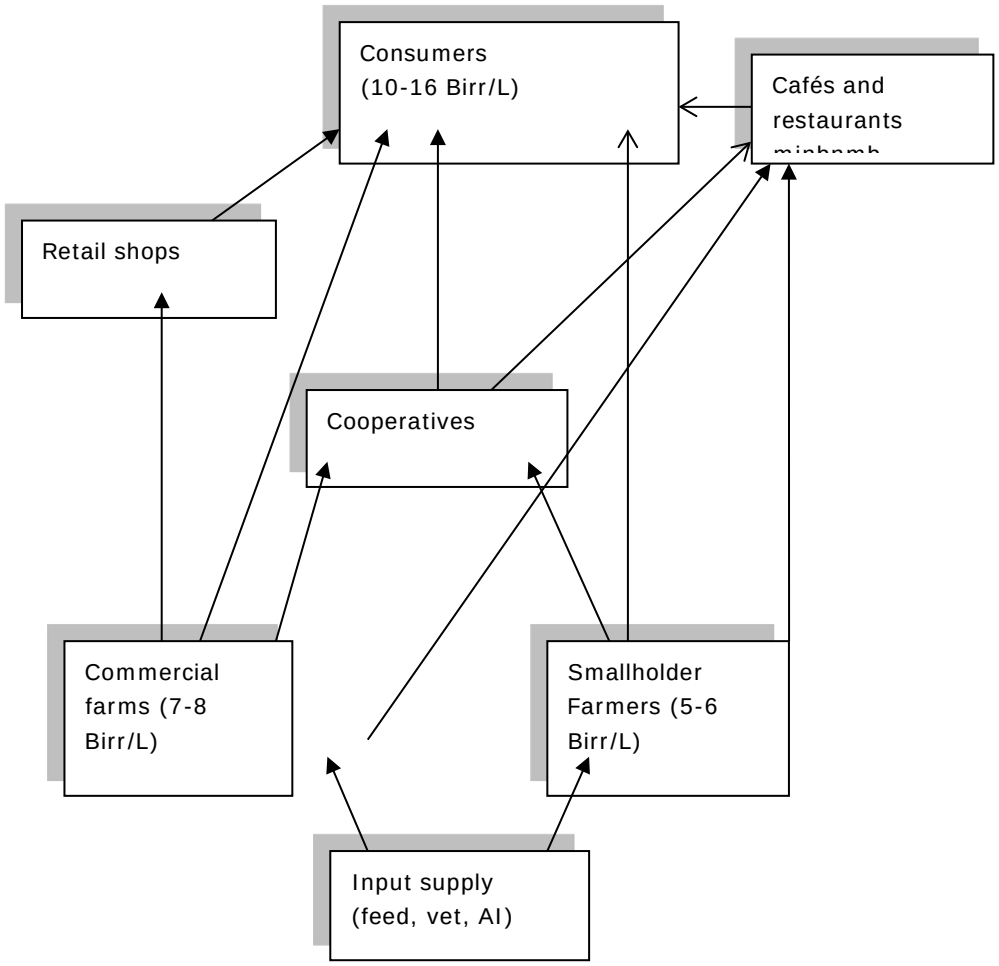


Figure 2 *Map of Dairy Value Chain in Jimma*

3.1.1 Input supply

3.1.1.1 Feed

The most prominent problem for dairy producers in Jimma is supply of feed, both basal roughage feeds and supplemental concentrate feeds. According to the Zonal livestock agency land is scarce for fodder production in the zone. Concentrate supplements are transported from Addis Ababa fuelling up price

increments. It is noted here that feed costs contributed to the higher price of milk prevailing in Jimma as compared to Addis.

Available feed resources include, grass either from grazing lands, backyard or roadside, fodder trees, coffee hulls, brewer's yeast from home or Bedele Brewery, maize Stover, bran and oil-seed-cakes from Addis, and kitchen leftovers.

Intervention on supply of high biomass yielding forage crop technology with feed conservation and forage seed production is required in this area if the milkshed is to be developed. Establishment of feed mills and mixers could also lower costs of concentrate feeds in the area. Jimma University has feed mixers dedicated to supplying concentrate rations to university dairy herd, which are few in number. This facility could be strengthened to expand concentrate feed supply service at least to the urban dairy producers at the same time as generating income for the university.

3.1.1.2 Veterinary service

The livestock agency office operates in all districts of the zone to provide veterinary services like vaccination, disease diagnosis and treatment of sick animals in all the clinics in the 17 rural districts and the two cities Jimma and Agaro. One veterinary clinic is meant to serve 3 kebeles, but this figure is not maintained, according to the zonal livestock agency, owing to high rate of staff turnover. Most prevalent diseases of cattle in the zone include LSD, Pasteurolosis, Black leg, FMD and parasites. Crossbred dairy cattle suffer also from mastitis where poor hygiene and barn handling system prevails.

There are five registered private vet pharmacies and one clinic in Jimma, Agaro, Serbo, Wayu, and Asendabo districts operating under the supervision of the zonal and districts' livestock production, health and marketing agencies.

3.1.1.3 Breeding and AI

There is no farm dedicated to supplying of crossbred dairy heifers in the zone leaving AI service provided by the agency the only option of rearing specialized dairy cattle breeds. The agency brings semen from NAIC and liquid nitrogen from plants in Nekemte and Wolkite. AI inputs supply, esp. liquid nitrogen and quality of the semen is not satisfactory for the service providers according to zonal livestock agency office. Holstein-Friesian semen dominates other breeds' because of its popularity and high milk yield. There was only one private AI service provider in Jimma city during this study period. Heifers and cows are sold for up to Birr 15 – 18 thousand in Jimma according to the information gathered from key informants interviewed. Even though supply of dairy heifers is a national problem it is more pronounced in Jimma and deserves stakeholders' attention.

Bull service used to be accessed from the university but service was stopped due to its own problems including health issues. The university has planned to establish large dairy farm for income generation through sale of milk to the city dwellers and heifers for dairy producers. This project could be supported to address breed supply shortage in and around Jimma city.

Owing to its large cattle population, the zone can be used as source of crossbred heifers if more efforts are exerted in such regards. The Oromiya livestock breeding strategy also identified Jimma as one of strategic crossbreeding site (Hailu *et al.* 2010). Support to implementing bodies of this strategy could lessen shortage of crossbred dairy heifers in the near future.

3.1.2 Production

Dairy production is mainly a smallholder operation in Jimma. There are few large herds owned by commercial ventures in and around Jimma city. The zone is home for 2,317,678 heads of cattle according to CSA (2011). Even though the exact number of specialized dairy cattle in the zone is not yet known, few thousands of them are reputed to be production in the major towns. Local cows, mostly

belonging to Horro type, can produce an average of 1.5 L/day in the zone while the crosses yield from 8 – 10 L/day. Dairy cattle keep on producing milk for an average of six months in the zone (CSA, 2011). Same source has recorded annual milk production of the zone to be 106,713,896 litres. Rural dairy producers sell milk at Birr 5 – 6 per litre to collectors.

Strengthening input supply system will definitely improve production and productivity of small and large dairy farms in Jimma. In addition technical capacity building activities should also focus on forage production, husbandry and clean milk production in order to boost milk production in the area and guide the business into formal market chains.

3.1.3 Collection

In Jimma, mainly cooperatives and some private collection operators collect milk. The 50-member primary dairy cooperative, 'Jimma Town Multi-purpose Dairy Development Cooperative Society', is the largest in the city and has one rental milk collection and selling centre where urban milk production is marketed. This cooperative envisions marketing of processed dairy products in the near future in addition to concentrate feed and AI supply to urban and rural dairy producers. It has milk cooling tank, cream separator and churner for small-scale operation but has not yet engaged in action yet. This cooperative pays its members 11 Birr/litre of milk and retails it at 12.5Birr/litre. Anther cooperative is 'Wendimamachoch Dairy Farm' that sells own farm produced milk to cafés and at its milk shop. This coop plans to collect milk from rural producers.

There are few collectors that travel as far as Agaro town and neighbouring districts to source milk from smallholder producers for Jimma city consumers. Precise information as to how many are they and volume of milk collected daily was hardly found during the study period due to the short time allocated for the survey work and the resulting methodology chosen to collect data. Milk is handled in plastic jerry cans a system cheap to start with compromising milk quality. Milk collection is not developed in Jimma zone, as compared to Selale milkshed mainly due to lack of formalized dairy marketing system and absence of modern processing plant in the area.

3.1.4 Processing

Milk processing is confined to producing traditional fermented and fat-based dairy products like ergo, butter and *Ayib* at artisanal level transported to Jimma city and sold in the market. There is no modern processing plant in Jimma area. It is believed that establishment of milk processing plants of medium scale could sensitize formal milk marketing in the zone and better utilization of the zone's cattle population, eventually.

3.1.5 Retail

Large producers, cooperatives and private collectors that operate in and around Jimma city, play the milk retail role. There are few specialized small milk shops that sell 5 – 120 l/day at Birr 10 – 16 per litre, which is 100 – 200% more from rural Jimma milk price. This indicates the high demand for milk in the city and an opportunity for collection and retail business in the city. Most of the retailers have their own dairy cows and enjoy a collective high margin of profit both from production and retailing. There is no large supermarket in Jimma where one can find processed dairy products like cheese and cream. Informants indicate that the majority of the dwellers do not know such modern dairy products. The demand for such products is very low as compared to raw whole milk and traditionally made butter and *Ayib*.

Table 1
Milk Retailers in Jimma City

No.	Name of Milk Shop	Volume of milk sold daily (L)	Price of milk (Birr/L).
1	Birhan	>160	16
2	Hikma	10-80	10
3	Amen	60	12
4	Chalachew	30	12
5	Almi	<10	11

3.1.6 Consumption

Consumers in Jimma city prefer whole milk consumption as the low demand for processed dairy products indicates. Cafés and restaurants serve hot milk and macchiato in small cups to the large number of consumers in the city. Traditional products like butter and Ayib are popular in Jimma city they are pumped from rural smallholder dairy producers. Consumers are not wary of milk quality issues as long as the milk they are about to buy is whitish in colour. This is manifested in the unhygienic way of handling and retailing raw milk in milk shops. Awareness creation campaigns should be undertaken by relevant stakeholders operating in the area to help consumers become health conscious. The higher proportion of Muslim population in Jimma, around 82% of the total, could be seen as an opportunity for marketing milk and dairy products all year round.

3.1.7 Potential Partners of Change in Jimma Milkshed

There are a number of options to choose from for capacity building endeavours in formalizing the dairy sector in Jimma. The likes of Jimma Zone Livestock Agency, Jimma University, Jimma TVET, Jimma Agricultural Research Centre and NGOs are potential stakeholders for integration of efforts in dairy value chain development activities in Jimma.

Jimma TVET has recently re-engineered its service delivery system in such a way that it became demand driven capacity builder. Requests as to provision of tailor-made trainings to certify operators, for example, in milk production, procurement, processing, marketing and cooperative management are welcomed by the TVETs. This is a good opportunity to create skilled labour force for future dairy value chain development endeavours as these institutions area accredited and mandated by the government to support the private sector through availing skill to potential employees. However, they lack permanent technical staff that specialize in dairy field and thus need monitoring and assistance in their new service delivery.

Plan-Ethiopia, an international NGO, donates dairy development projects of local NGOs. Recently it has approved a set of programs of which value chain development is one. At its Jimma site, livestock products like honey and milk are one of the commodities identified for as value chain development activity for donation. One limitation of this NGO is that it only focuses on donating local projects on dairy and does not address development issues by itself. However, local NGOs can be supported and they can later support the dairy sector in Jimma. Identifying beneficiary local NGOs and assisting them in planning their activities could be one area of collaboration with Plan-Ethiopia. Integrating efforts of such stakeholders is of paramount importance to sensitize formal milk marketing and standardized product production in Jimma area.

3.2 Stakeholders of Dairy Value Chain Development in Jimma Milkshed

Table 2

Stakeholder Analyses[38]

Stakeholder	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Oromiya, Jimma Zone, Livestock Production, Health and Marketing Agency	Enablement: facilitation of livestock input supply	17 districts of Jimma Zone (see annex)	Coordination of extension service provision of district bureaus of LS Agency	Support provision of inputs and extension service in all 17 districts	Bridge research and farmers, adaptive research and support BoP producers, take feedback to researchers	+:regional gov't identified Jimma as one of the dairy corridors, and more efforts will be exerted by the agency in the coming 5 GTP year	Jimma		047112576 0917833317
Oromiya, Jimma Zone, Cooperative Promotion Agency	Enablement: cooperative establishment, facilitation	17 districts of Jimma zone	Coordination of cooperative development and support service delivery at district level	Initiate and support formal milk market chain	Capacity building for new and old cooperatives	+: with the gov't's plan of supporting more coops and unions in the GTP this office is eager towards posit. change in the dairy sector	Jimma		047112576

[38] Names under 'Stakeholder' column written in bold are influential to the dairy sector development in Jimma Milkshed

Stakeholder	Function	Geographic coverage	Interests	Influence on value chain development	Influence on innovation and learning	Attitude towards Change	Physical Address	e-mail	Phone number
Jimma TVET	Enablement: capacity building	Jimma zone	Short-term training and certification	Generating skilled man power	Transferring formal dairy technology knowledge to future employees	+: capacity builder in commercial enterprises, working on need basis	Jimma city		0471117944 (dean off. 0471111019 (metallurgy and construction 0471110922 (dean off. food sc. coll.) 0911916379 Dean Dereje Tefera
School of Agriculture, Jimma University	Enablement: research, technology transfer, cooperative support	Jimma city	Capacity building, research	Support coops and dairy farmers through technology generation and dissemination	Adapting and generating] technology	+: capacity builder, researcher and agent of change in livestock production and product processing	Jimma	abegazebeyene@yahoo.com	Dept. animal science 0471118103 0917765707 Dept. agricultural economics 0471118102 0911963885
Jimma Town Multi-purpose Dairy Development Cooperative Society	Operator: milk collection and marketing, feed supply	Jimma city	Expand collection area, quality based payment, milk processing	Formal milk market chain establishment	Feedback from members	+: model dairy cooperative but need support	Jimma		0471121045 0911576459

Menberu AI service provider	Operator: input supply (AI)	Jimma city	Breed improvement	Commercializing AI service	No obvious influence	+: beneficiary from devel. dairy prod.	Jimma city		0917804081
Jimma Agricultural Research Centre	Enablement: research, training	Jimma zone	Technology adaptation, generation	Support value chain through appropriate technology generation for smallholder farmers	Train farmers on feed production and conservation	+: research on forage development to reduce cost of production	Jimma	tileabetu@gmail.com (Dr. Tilahun) sabahaile21@yahoo.com (Saba Haile)	0471128020 0921547574 0913394434
Plan Ethiopia	Enablement: financing support institutions	Jimma Hawassa Lalibela Addis Ababa	Dairy value chain support institutions	Financing development projects in dairy value chain devel.	Finance innovation projects and monitor progress	+: milk is one commodity in their value chain dev. program	Jimma	Bekele.mulatu@plan-internationa.org	0471123601 0911338743 (Bekele Mulatu)
Wondimamachoch Dairy Farm	Operator: Milk production	Jimma city	Milk production and marketing	Model dairy production unit	No obvious influence	+: group enterprise that thrives to develop dairy business	Jimma city		0911757218 Aemiro Tibebu (chairman) 0917520861 Muluneh Belete (farm manager)

3.3 Intervention Areas in Jimma Milkshed

1. Input supply: strengthen already existing extension service provided by the government
    a. Support AI service
        i. Oromiya Livestock Breed Improvement Plan through its stakeholders
        ii. Improve breed potential of NAIC to reach out producers indirectly
        iii. Support expansion of private semen and AI providers
    b. Support forage development
        i. Awareness creation and sensitization of fodder production
        ii. Support technology generation on forage production suitable for agroforestry
        iii. Facilitate establishment of feed processing plant
    c. Support vet supply system
        i. Train para-vets from the community
        ii. Lobby policy makers to exempt vet supplies from taxes
    d. Facilitate effective knowledge management system in the milkshed to coordinate overall input supply system
2. Production
    a. Capacity building of small producers
        i. Technical knowledge on dairy husbandry and clean milk production through training
        ii. Revolving fund and micro-financing system sensitization to enable farmers access to loan for dairy activities
3. Collection
    a. Market linkage between production potential districts with the consumer metropolitan area
    b. Installation of quality based payment
    c. Capacitate coops' managerial and marketing capacity
    d. Policy support that favours the formal market chain
4. Processing
    a. Attract medium scale processors
    b. Capacitate coops to engage in small scale milk processing business
5. Retail and consumers
    a. Promotion activities
    b. Facilitate establishment of specialized milk shops

4 Conclusions and Recommendations

Jimma is a high population area with high demand for milk and dairy products. Production is a smallholder activity with small herd sizes. A simple dairy value chain is observed in Jimma area where neither formal marketing nor standardized processing exists. Jimma zone is a coffee growing area where land is scarce for fodder production. There are a couple of cooperatives in the city where milk collection and marketing is practiced. No large scale processing of milk prevails leaving traditional artisanal making of butter and Ayib as the dominant value addition activity in the area. Imported dairy products in the form of powdered milk are seen in kiosks and minimarkets in Jimma city. High proportion of Muslims offers the opportunity of all year round milk marketing for large-scale producers and processors. Sensitizing formal milk marketing in Jimma should be given due attention by stakeholders of the dairy value chain.

Part III

Universities and research institutes in Ethiopia and their involvement in dairy

Jan van der Lee

Introduction

To explore potential partnerships of the EDGET program with relevant knowledge institutes in Ethiopia, a survey was carried out among universities and research institutes in those regions most likely targeted by EDGET. This report presents the main information and lists a number of possibilities and implications for cooperation with Universities (chapter I), Agricultural, Technical, and Vocational Education and Training (ATVET) Institutes (chapter II) and Research Institutes (chapter III).

1 Universities

Out of the 30 Universities in Ethiopia, 21 have a focus on agriculture related issues. Table 1 (at the end of this annex) shows that quite a number of universities have an animal science program (usually including a focus on dairy), but that only two of the more established universities, Haramaya and Hawassa universities[39] have the full range of disciplines involved in dairy value chain development: animal science, veterinary science, rural & cooperative development, business & marketing, and food technology. Some other universities have quite a broad range of disciplines, just lacking one: Jimma, Gondar, Mekelle and Wolaita universities have no food processing technology department, Bahir Dar has no veterinary science department, and Addis Ababa has no animal science department. Data were not complete for some universities. Expertise on grassland development could not be gaged from websites.

So far members of the program team visited some of the universities with programs in animal science / agribusiness / rural development / food processing technology that are closest to the envisaged target areas, i.e. the Universities in Bahir Dar, Ambo, Adama (Asella SoA) Hawassa, and Haramaya. Although not focussing on agriculture, also the Addis Ababa University may be relevant for the program. Next follows a brief description from these universities. The information comes from face-to-face and email conversations with university staff, from other resource persons, and from the internet. In some cases the information is still incomplete.

1.1 Addis Ababa University (visited June 29, 2011).

Although not focusing on animal science, AAU offers a number of educational & research activities relevant to dairy value chain development, particularly in the fields of food technology, marketing, and veterinary science.

1.2 Bahir Dar University (visited December 1, 2011)

Well-developed curriculum and department structure, including dairy food technology, logistics & supply chain management, and marketing management. Some students are doing assignments in private farms and international organizations. BDU works with Bahir Dar Urban Agriculture department, next to the usual partners – BoA, Coop Agencies, RARI, CG institutes. Planning research on “Mapping the Dairy Value Chain and identification of challenges & opportunities in the milkshed areas of North-western Amhara region”. BDU has VP and 3 senior expert positions on research & community services. Some staff focus more on research (75%) than on education (25%). Cascape and ISSD projects work with this university.

1.3 Hawassa University (visited May 2, 2011)

BSc and MSc level education, starting with PhD with help of Canadian lecturers. Research is mainly carried out by students. Plans exist to establish ‘technology villages’ where students focus their research. This is still to be implemented (will be done through the “Research & Development Office”, which also works with USAID on a breeding program with Boer goats to supply crossbreds (and churners) to farmers. The university has few linkages with value chain operators, government departments, or other research institutes. The Animal and Rangeland Science department education is focussing on feeding,

[39] information about Jimma university is inconclusive

breeding, rangeland management. The research focus of this department is on milk composition, milk handling, animal husbandry, and on-farm feeding experiments. The dairy research is mainly focused on goats (yields & reproduction).

Working with EDGET would match well with a number of Strategic Objectives of the University, e.g. to increase staff time in research; train and mentor junior researchers; link with industry and stakeholder linkages; strengthen extension office for effective outreach; establish Technology Villages for model technology transfer and demonstration sites; develop strategic alliances with national and international universities and organizations. Cascape and ISSD projects work with this university.

1.4 Adama University, Asella School of Agriculture (visited September 17, 2011)

Adama is a new university, which means that it is still building up the quality as well as the level (Masters) of its educational program. It also means that research & outreach capacity is still embryonic. The School of Agriculture is in Asella at the location of the Adama Model Agricultural Enterprise and the Institute for Artificial Insemination (being the site where the Arsi Rural Development project used to be located and later on the Italian and FAO dairy projects). These facilities and associated expertise can be considered an asset.

1.5 Ambo University (visited September 20, 2011)

Building on a previously existing basic level agricultural school, Ambo is a new university, which means that it is still building up the quality as well as the level (Masters) of its educational program. The Dutch NICHE Agribusiness project is assisting in curriculum development and staff training, which will take away some bottlenecks. Once sufficient staff will complete PhD studies, the MSc programs on Animal Production, Agribusiness, and Agronomy can be started. Cattle farm facilities need major investment. Research & outreach capacity is still embryonic and focuses on milk production surveying, crossbreeding and heat synchronization with Bako and Holetta Research Institutes, sheep fattening, and meat quality. New R&E activities could be organized either through the R&E unit at University level or at College of Agriculture level.

1.6 Haramaya University (visited January 30, 2012)

Broadly recognized as the leading university in agriculture, this university is fully developed with all levels of higher education, research and outreach. Situated away from Haramaya town, it is a small town on its own. Campuses in Haramaya, Harar and Chiro have 14,000 on-campus students and 16,000 part-timers. Faculty of Agriculture has 3000 undergraduate students and about 400 MSc students (2 yrs). Plans of the university in dairy include smallholder farmer support with AI & bull centres in a number of locations, start of a camel dairy farm and strengthening of the research farm and laboratory. Chiro campus is dedicated to meat & dairy technology, sericulture and agroforestry. HU works with Cascape and ISSD projects, Hohenheim University and a US university.

The university is eager to work with EDGET, lobbied hard for EDGET to select Dire Dawa milkshed, and named a number of potential contributions. Involvement in Asella is option (students). PhD projects do need to include controlled experiments.

1.7 Gondar University (not yet visited)

As some of the other universities may be important for local education, research or outreach opportunities, it will be important to keep contact with them as well. Moreover, some universities that are further away may prove important for the specific services they could provide, be it disciplinary (e.g. veterinary medicine) or education level (MSc and PhD programs).

For all universities it seems to apply that linkages to the private sector are rather scarce or non-existent. Some services may be provided (e.g. laboratory services), but collaborative research or contract research does not seem to be in vogue for dairy value chain related departments.

2 Agricultural Technical and Vocational Education and Training (ATVET) centres

So far the project team did not have an opportunity to visit ATVETs. Links with research centres are possible, as evidenced in Adami Tullu Research Centre working together with Alaga ATVET and the potential for cooperation with them will be further researched.

3 Research institutes

Potential partners in the research area could be identified among Ethiopian research institutes as well. Candidates are a) the Ethiopian Institute of Agricultural Research, b) the Regional Agricultural Research Institutes (in the main regions), c) a number of other government research institutes, and d) a variety of international and national research groups from the CGIAR system and from private sector/civil society. The information comes from face-to-face and email conversations with staff of research institutes and research centres, from other resource persons, and from the internet. Table 2 (at the end of this annex) includes a listing of the main research station together with their research focus and their distance from Addis Ababa.

3.1 Ethiopian Institute of Agricultural Research

Key contact: Dr Getnet Assefa
EIAR is the federal/national agricultural research organization. While it has little say over the Regional Agricultural Research Institutes (RARIs), a certain degree of cooperation and consultation between the federal and regional level institutes is on-going. A number or federal research programs are carried out on RARI centres and these programs may actually be coordinated by one of the RARI. Next to this, EIAR runs a dozen research centres on its own. Of these, only Holetta, near Addis, seems relevant for dairy.

3.2 Regional Agricultural Research Institutes

The Regional Agricultural Research Institutes fall under the Bureau of Agricultural of each region. Their link with extension to farmers runs through the Extension Departments of the Bureau of Agriculture at Region, Zone and Woreda levels. These links form a potential pathway for farmers and other practitioners to influence research agendas. Some RARIs have the practice of annual research conferences, where they meet other researchers and extension staff while presenting research results.

3.2.1 Oromiya Agricultural Research Institute (OARI)

Key contacts:
- Dr. Aleye Hussein, General Director
- Dr. Tesfaye Alemu Aredo, Dir. Livestock Research (met Dec 2011)
- Dr. Tesfaye Alemu Tucho, Senior Breeder, Adami Tulu (met Sep 2011)

OARI has a total of 17 research centres, of which 4 have a ruminants program and 8 are working on feed resources. There is a dairy + beef program at Adami Tullu, Bako, Sinana, and Bore Guji. Other livestock-related teams work on pastoralism (Yabello), apiculture, or goats. Cattle breeding work is going on with Horo (Bako), Borana (Yabello), Jersey & Friesian (Adami Tulu). While situated in Oromiya region, Holetta falls under EIAR.

Research is organized in multi-disciplinary teams (animal scientist, social economist, veterinarian, dairy expert and agricultural extensionist), so that complete packages can be developed. Contacts with stakeholders are organized via Agricultural Development Partners Linkage Advisory Councils (ARDPLACs), dissemination runs via the Bureaus of Agriculture (BoAs) and their Development Agents (DAs).
Research can be contracted. OARI collaborates with universities, private organizations, processors and international organizations (ASARECA, SNV (apiculture), CRISP and ILRI).

Research programs:

- Cross breeding program :
  - Systematic crossbreeding (community based AI delivery system in 60 districts), crossbreeding of 22.500 cows in the first year;
  - Composite breed development: breeding for stable 50:50 Holstein Friesian-local breed.
  - Breed improvement of Borana and Horo by systematic selection
- Feed resources:
  - Research on improved use of by products (urea treatment, molasses-urea blocks)
  - Forage species : on farm research on promotion of grasses, legumes , community based seed production at Farmer Training Centres (FTCs) or on-farm
  - OARI has multi-disciplinary Feed resource and ranch teams (forage agronomist, animal nutritionist, socio-economist, ranch ecologist, extension specialist, and plant breeder).

3.2.2 Amhara Region Agricultural Research Institute (ARARI)

Key contacts (for details see address list):

- Dr. Fentahun
- Dr. Kerealem - Andassa Research Centre

ARARI has research centres in a number of dairy producing areas: Bahir Dar (Andassa), Sirinka, Gondar. The Andassa Research Centre (RC) originated from the Imperial Fogera Cattle Ranch. Goals include combined crossbreeding of Fogera X Holstein Friesian/Jersey, and maintenance of a Fogera nucleus herd. Staff at the station include 17 scientist (ruminant, non-ruminant, apiculture & sericulture teams) numbering 95 scientific and supporting staff in total, while facilities include 500 cattle on 350 hectares. Staff capacity seems to be available, but budget constraints are a major limitation. Links with farmers are organised through Framer Research & Extension Groups (FREG), no links with private sector. In case the program would like to work with Andassa, significant investments in capacity will be inevitable.

3.2.3 SNNP Region Agricultural Research Institute (SARI)

Key contacts (for details see address list):

- Dr. Negussie Dana, General director
- Dr. Asrat Tere, Livestock Director

SARI is working on technology generation and technology transfer. The livestock section is restarting with Dr. Asrat Tere as director. SARI is working with Land O' Lakes (LoL, the Improving Productivity and Market Success (IPMS) project of ILRI, and ACDI-VOCA on a plan to develop dairy value chains in the Awassa-Dilla milkshed, following a joint planning workshop. Planned activities include breeding (synchronization & sexed semen), feeding, fodder development, health care, cooperative development, processing and marketing.

3.3 Other government research institutes

A number of other research institutes may be relevant for particular engagements:

3.3.1 Ethiopian Development Research Institute (EDRI) http://www.edri.org.et

EDRI is a semi-autonomous research think-tank under the Prime Minister's Office. It is engaged in economic research and policy analysis, bridging research and policy, capacity building, knowledge dissemination & exchange and consultancy services.

3.3.2 National Soil Research Centre

P. O. Box 147, Addis Ababa, Tel: 01-508300, Fax: 01-515288, nsl@telecom.net.et
The National Soil Research Centre falls under the Ministry of Agriculture.

3.3.3 Institute of Biodiversity Conservation (Biotechnology & Bio-safety Department)

P. O. B. 30726, Addis Ababa Tel: 612244, Fax 627730/613722, bioresearch@ telecom.net.et, www.telecom.net.et/~ibcr

3.3.4 National Veterinary Institute

POBox 19, Debre-Zeyet Town, Tel. 338411, Fax 339300, nvi-rt@telecom.net.et
The National Veterinary Institute is part of Addis Ababa University.

3.3.5 Ethiopian Health and Nutrition Research Institute (EHNRI)

P. O. Box 1242, Addis Ababa, Tel: 0112754647 ehnri@ethionet.et, www.ehnrc.org
EHNRI is under Ministry of Health and may be relevant for nutrition related matters.

3.3.6 Armauer Hansen Research Institute (AHRI)

AHRI falls under the Ministry of Health and may be relevant for its research on bovine TB
P. O. Box: 1005, Addis Ababa, Tel: 0113211334 www. telecom.net.et/ahri

3.4 CGIAR institutes

The CG International Agricultural Research system is changing from a centre-based set-up to a Program-based model, across Institutes. Hence right now it is still good to look at Institutes active on dairy related matters in Ethiopia, and to CGIAR Research Programs that may have an impact.

i. Institutes

- **ILRI** – working on livestock related issues, ILRI and its predecessor ILCA have a long research history in Ethiopia. Current activities include a range of research projects, a more implementation focused project (first IPMS, then LIVES), and capacity building activities.
- **IFPRI** - works on food and nutrition related issues
- **IWMI** – works on water management issues, possible link to fodder production
- **CIAT** – works with ILRI on forages www.ciat.cgiar.org/work/Africa/Documents/highlight28.pdf

ii. Relevant CGIAR Research Programs

CRP 2. Policies, Institutions, and Markets to Strengthen Food Security and Incomes for the Rural Poor

This program will identify policies and institutions necessary for smallholder producers in rural communities, particularly women, to increase their income through improved access to and utilization of markets. Insufficient attention to agriculture markets and the policies and institutions that support them have been identified as major impediments to alleviating poverty in the developing world, where in most areas farming is the principal source of livelihood / income. This CRP seeks to produce a body of new knowledge that can be used by decision makers to shape effective policies and institutions that can reduce poverty and promote sustainable rural development. Under the leadership of IFPRI, which is headquartered in the US, the program has an approved initial 3-year budget of US$266 million.

CRP 3.7. More Meat, Milk and Fish by and for the Poor

The overarching goal of this CRP is to increase productivity of small-scale livestock and fish systems in order to increase the availability and affordability of meat, milk and fish for poor consumers and, in doing so, to reduce poverty through greater participation by the poor along animal source food value chains. To help these value chains perform better, the program will identify and address key constraints and opportunities, improve institutional arrangements and capacities, and support the establishment of enabling pro-poor policy and institutional environments. Four CGIAR Centres are involved, namely, International Livestock Research Institute (ILRI), which is headquartered in Kenya as the Lead Centre, CIAT, ICARDA, and World Fish Centre. The CRP has a 3-year budget of US$99.6 million.

CRP 4. Agriculture for Improved Nutrition and Health

This research program aims to accelerate progress in improving the nutrition and health of poor people by exploiting and enhancing the synergies between agriculture, nutrition, and health through four key research components: value chains, bio-fortification, control of agriculture-associated diseases, and integrated agriculture, nutrition, and health development programs and policies. With IFPRI and ILRI as co-Lead Centres, this program will also involve 10 other CGIAR Centres. It has an initial 3-year budget of US$191.4 million.

3.5 Other research capacity

3.5.1 Consultancy firms

Consultancy firms involved in dairy value chain related research activities in Ethiopia include:

Local - Target, FFARM, BK Agro consult, Adabai, Other consultants

International - Fair & Sustainable (connected to ICCO), Triodos Facet, Scope Insight

3.5.2 IOs and NGOs

IOs and NGOs involved in research activities include:

- Agri Services Ethiopia
- FAO

4 Conclusions

Geographic matching

Assuming that EDGET will indeed focus on the milksheds of North Shoa/Addis, Hawassa-Shashemene, Adama-Asella-Ada, and Bahir Dar-Gondar, one can conclude that in most cases a range of universities and research institutes may need to play a role. To get a complete set of facilitation, brokering, research and education services near by the milkshed, usually a combination of institutes will be required. As some of the other universities may be important for local education, research or outreach opportunities, it will be important to keep track of them as well. Moreover, universities that are further away may prove important for the specific services they could provide, be it disciplinary (e.g. veterinary medicine) or education level (MSc and PhD programs).

For the targeted milksheds, the following picture emerges:

North Shoa / Addis

- Ambo University for facilitation and brokering of best practice development support/action research
- Augmented with Haramaya for MSc/PhD level education and research services (all subjects), maybe Addis Ababa University for research and education services in food technology and veterinary science (Debre Zeyet), and Holetta research station for additional research
- New Amhara Region universities in Debre Berhan, Debre Markos could possibly provide some additional services.

Adama-Asella-Ada

- Adama University, School of Agriculture in Asella, for facilitation and brokering of best practice development support/action research
- Augmented with Haramaya University for MSc/PhD level education and research services, may be Addis Ababa University for research and education services in food technology and veterinary science (Debre Zeyet), and Holetta research station for additional research.

Hawassa-Shashemene

- Hawassa University seems to be a candidate for facilitation and brokering as well as for research and student input at different levels.
- Augmented with research capacity from SARI (may be Jinka, Yabello, Awassa, Arek centres) and OARI (Adami Tulu research centre).
- New Amhara Region universities in Arba Minch and Dilla could possibly provide some additional services.

Bahir Dar-Gondar

- Bahir Dar University seems to be a capable and interested partner for facilitation and brokering as well as for research and student input at different levels.
- Augmented with Gondar University (Veterinary Science and other), ARARI for research (Andassa and other centres).
- New universities in Debre Berhan, Debre Markos could possibly provide some additional services for North Shoa milkshed.

For all milksheds additional outreach capacity may be engaged from private and civil society groups and consultants.

National level partners

Next to these geographical links, partnerships with knowledge institutes will be beneficial at national level, including EIAR, EMDTI, CGIAR institutes like ILRI and IFPRI, and possibly some non-agricultural institutes like EDRI, NVI and ENDHI. This would require further assessment.

Possible contributions to EDGET

Research & Outreach – All universities and research centres seem to be eager to engage in action research activities more than they are able to do right now. Research and outreach / community services are seen as integral part of universities' missions. The longer established universities and the research centres do engage in research, mostly on-station. On-station research is often seen as a potentially attractive budget supporting opportunity. Impact at community level is often rather limited, as here a combination of staff number and capacity shortages, network, and limited operating budget is most severely felt.

Engaging knowledge institutes in practice-oriented research & outreach activities will require investment in staff time, staff capacities, transportation means, etc. On station research generally will require investment in facilities as well. Staff of new universities may be very eager to engage in project directed research themselves. Absence of university implemented research results in less of a set agenda, but less capacity as well.

Student involvement – Student engagement in project directed research is seen as a relevant opportunity for students. BSc research generally takes place in the final semester, starting from February. MSc students seem to be more flexible. A special category of students are the university staff engaged in further studies (MSc and PhD). In terms of costs involved with student research, precedents are set by ILRI and by the ISSD program. Supervision by the Ethiopian supervisor is usually factored in.

Newer universities like Adama and Ambo generally are still in the process of starting MSc curricula as well as research & outreach activities. Subsequently their ability to offer MSc students for research is limited. A relevant, established PhD program basically only exists in Haramaya University

Annexes

Annex 1

Details on Ethiopian universities with agricultural programs

Region and University	Established as Univ.	No. of faculties/ schools/colleges	Master program	PhD-program	Veterinary science	Animal Science	Rural development/ cooperatives/extension	Business & marketing / logistics & supply chain	Food technology	Research & Outreach
Oromiya Region										
Addis Ababa University	Since long	29	+		+	-	+	+	+	+
Adama University	2008	7	-	-	-	+	+	+	-	-
Ambo University	2008	8	+/-	-	-	+	+	+	-	+/-
Haramaya University	Since long	13	+	+	+	+	CD-BSc RD-MSc	+	+	+
Jimma University	Since long	8	+	+/-	+	+	+	+	-	+
Madawalabu University	2007	10	-	-	-	+	+	-	-	-
Wollega University	2008	6	-	-	+/-	+		+/-	-	+/-
Amhara Region										
Bahir Dar University	Since long	16	+	-	-	+	+	+	+	+
Debre Berhan University	2007	9	-	-	-	+	+	+	-	-
Debre Markos University	2007	7	-	-	-	+		+	-	-
Gondar University	Since long	16	+/-	-	+	+	+	+	-	+
Wollo University	2008	7	-	-	+	+		+	-	+
SNNP Region										
Hawassa University	Since long	8	+	+/-	+	+	+	+	+	+
Arba Minch University	2007	6	-	-	-	+	+	?	-	-
Dilla University	2004	2	-	-	-	-	-	-	-	-
Wolaita Soddo University	2007	8	-	-	+	+	+	+	-	-
Tigray Region										
Mekelle University	1993	11	-	-	+	+	+	+	-	-
Somali Region										
Jigjiga University	2005	4	-	-	-	-	?	+	-	-
Afar Region										
Samara University	2007	7	-	-	+	+	-	+	-	-

N.B. *1. When there is no Master's program, the educational program is limited to BSc or BA level.*
2. A number of new universities actually have not yet started the relevant programs.

Annex 2

EIAR & RARI LIVESTOCK RESEARCH FACILITIES NEAR EACH MILKSHED

Milkshed	Research Institute	Focus	AI & breeding	fodder&feed	veterinary / health	Production systems	grass/rangeland	Year established	Distance to Addis
National	Addis EIAR								0
	Holetta Agricultural RC (EIAR/OARI)		x	X		x		1977	34
North Shoa	Debre Zeyet Veterinary Institute				x			1964	20
Oromiya region	Sebata Animal Health RI				x			1995	25
	Holetta RC (EIAR)		x	x				1977	40
	Adami Tulu RC (OARI)		x	x					165
	Debre Berhan Agricultural RC (ARARI)	Sheep		x					130
East Shoa	Sinana RC (OARI)		x	x					426
Oromiya region	Bore Guji RC (OARI)		x	x					
Gondar/Bahir Dar	Andassa Livestock RC (ARARI)		x	x	x		x	2000	587
Amhara region	Bahir Dar Agricultural Mech.RC (ARARI)							1978	568
	Sirinka Agricultural RC (ARARI)								488
	Gondar Agricultural RC (ARARI)							2004	734
	Adet Agricultural RC (ARARI)								440
	Sekota Dryland Agricultural RC (ARARI)								693
Hawassa/	Jinka RC (SARI)	pastoral					x		270
Shashemene	Awassa Agricultural RC (SARI)							1966	270
SNNP and Oromiya	Areka Agricultural RC (SARI)							1986	385
Regions	Adami-Tulu RC (OARI) see above								165
	Yabello Pastoral & Dryland Agr.RC (OARI)	pastoral		X			x		785
Mekelle Tigray region	Tigray Agricultural Research Institute (TARI)								
Dire Dawa	Fedis / Harar RC	feed		X					500
Oromiya /Somali R	Mechara RC (Harar)			X					500
Jimma	Jimma Agricultural RC (OARI)								250
Oromiya region									
West Shoa	Bako RC (OARI)		x	X				1952	250
Oromiya region	*Holetta - See above*								

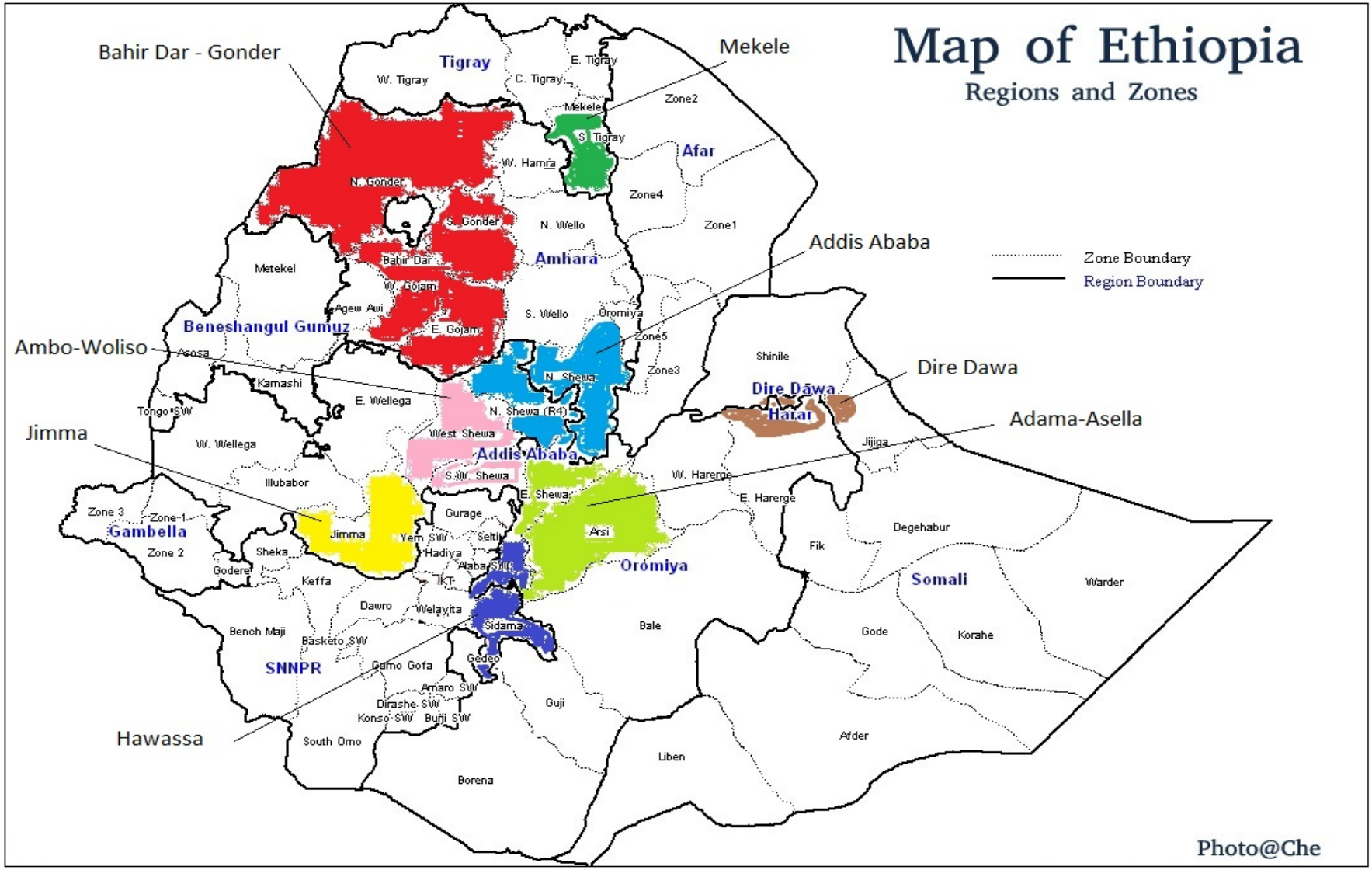
N.B. Needs additional detail

Appendices

Appendices

1. Map with major milksheds
2. Terms of Reference

Appendix 1


Map of Ethiopia
Regions and Zones
Bahir Dar - Gonder
Mekele
Addis Ababa
Dire Dawa
Adama-Asella
Ambo-Woliso
Jimma
Hawassa
Zone Boundary
Region Boundary
Tigray
Afar
Amhara
Oromiya
Somali
SNNPR
Gambella
Beneshangul Gumuz
Dire Dāwa
Hārar
Addis Ababa
W. Tigray
E. Tigray
C. Tigray
Mekele
Zone2
S. Tigray
W. Hamra
N. Gonder
Zone4
Zone1
S. Gonder
N. Wello
Bahir Dar
Metekel
W. Gojam
Agew Awi
S. Wello
Oromiya
Zone5
E. Gojam
Zone3
Shinile
Kamashi
N. Shewa
E. Wellega
N. Shewa (R4)
Tongo SW
West Shewa
W. Wellega
Jijiga
Illubabor
S.W. Shewa
W. Harerge
E. Shewa
E. Harerge
Zone 3
Zone 1
Gurage
Degehabur
Jimma
Yem SW
Seltin
Arsi
Zone 2
Sheka
Hadiya
Alaba SW
Fik
Godere
Keffa
IKT
Warder
Dawro
Welayita
Bale
Bench Maji
Sidama
Gode
Basketo SW
Korahe
Gamo Gofa
Gedeo
Amaro SW
Dirashe SW
Guji
Konso SW
Buri SW
Afder
South Omo
Liben
Borena
Photo@Che

Appendix 2 - Terms of Reference for a preliminary milkshed description

MIDD project

Background

The Market-linked Innovation for Dairy Development program (MIDD) is a Netherlands Embassy funded project implemented by Wageningen University & Research and SNV Netherlands Development Organization. In the pre-program phase (2011) it is carrying out a number of preparatory steps for the definition of activities in the main phase (2012-2016).

Objective

This consultancy is to provide a preliminary description of milksheds (dairy areas) of Ethiopia out of which four will eventually be selected by the program for its further planning.
The selected areas include:

- Northern Shoa (Selale, Sebata, Chancho and wider environment)
- Eastern Shoa (Asella and wider environment)
- Western Shoa (Ambo, Tulu Bolo and Woliso)
- Hawassa-Shashemene and wider environment (including Dilla, Kofele, Dodola, Alaba, Yirgalem)
- Gondar-Bahir Dar and wider environment
- Harrar-Dire Dawa and wider environment
- Jimma and wider environment
- Mekele and wider environment

For each area, woredas with substantial dairy production should be included.

Expected outputs:

An English language report on each of the eight milksheds should be submitted by June 15, including:

1. A characterization of the milksheds, substantiated by data, at area and woreda level (see Annex A)
2. An overview of the value chains in the area (see Annex B)
3. An assessment of the stakeholders involved in dairy in the area, and their geographic coverage (see Annex D)

Activities

A. Collect and collate secondary data from reports (see Annex C for a list of some reports already available)
B. Interview (by phone) government agencies (MoA, Investment Agency/Cooperative Promotion Agency, EIAR), international organizations and NGOs in Addis to complement A and to get indications for the stakeholder list (Annex D). This would include visit to major donors (USAID, CIDA, WB) and development organizations (FAO, LOL, ILRI-IPMS, and local NGOs) to identify programs and plans of these actors in the different milksheds/woredas under survey.
C. Field assessment in each area to complement activity A, considering activity B for key contact types; also Universities, RARI's, ATVETs etc.
D. Report writing.

Time allotment: Total of 30 days, could be divided between 2 persons.

Annex A - Data on dairy in each area

Actual indicators will depend on the way government agencies and development organizations do structure their data. Hence we indicate the subjects that we would like to get data on:

- A (sketch) map showing population centres, dairy production areas, woredas, roads, distances and travel times between places
- Demography per woreda - total population, names and population of towns and cities use information from zone and woreda offices with some cross checks from central statistics offices
- Agriculture & livestock - numbers and types of farmers, farm sizes, number of farmers with livestock, livestock numbers per type, breed, per farmer use information from zone and woreda offices with some cross checks from central statistics offices
- Dairy products - Types and amounts of dairy products ***produced*** and ***marketed*** with distinct classification between urban and rural systems
- Opportunities – what additional opportunities can be identified that are currently not realized, both in terms of marketing/demand, production/supply and transportation/collection? (e.g. what non-dairy area are suitable for dairy?, additional type of dairy products/diversification, possibilities for packaging) with distinction between rural and urban systems, possibilities for import substitution)
- Include actor constellation or actor mapping, indicating who is who and the relationship to other actors in the sector; indicate programs and plans of government agencies, donors, and development organizations on dairy in woredas under survey
- Interventions – what development initiatives by private, public or civil society actors around dairy are being planned or implemented? This would include (plans for) feed or processing plants, AI services, veterinary services, credit, AGP / LGP inclusion and programming, NGO programs etc.
- Qualitative data – please report on any qualitative data on attitudes, perceptions, traditions etc. around dairy production, marketing and consumption that you come across. Include data on milk quality determined through research (if available in literature related to the area in question)
- Give special attention to interviews and visits to regional and national government structures

Annex B - Value chain identification

Describe any value chains identified in the various milksheds, other than direct sale by producers to neighbours. Describe the following characteristics:

- Actors in the chain - specify number of actors and names of input suppliers, cooperatives, processors, market outlets both including supermarkets formal and informal etc.
- Volume of milk / litres per day (current/low and high extremes) classified by production, consumption, processing(by product) and consumption
- Products being sold at end of chain and their distribution channels (including products from other areas / countries)consider home consumption, and direct producers consumer sales
- Issues in the value chain as identified by value chain operators and enablers.

Annex C - List of available reports

- Recent FAO dairy sector review by Zelalem
- IPMS publications - Bahir Dar
- Feasibility study Selale dairy business hub
- Mapping of collection centres by SNV
- Investment study SNV
- UNIDO REPORT The impact of Global Economic & Financial Crises on the Ethiopian Dairy Industry, 2009
- Livestock Development Master Plan Volume I Dairy, 2007, GRM International BV for MoA
- Mohamed A.M. Ahmed, Simeon Ehui and Yemesrach Assefa, Dairy development in Ethiopia, ILRI, Conference Paper No.6
- Dairy production, processing and marketing systems of Shashemene–Dilla area, South Ethiopia, by Sintayehu Yigrem, Fekadu Beyene, Azage Tegegne, and Berhanu Gebremedhin
- FAO statistical database. http://apps.fao.org/faostat
- Dairy Inventory, Land O'Lakes, 2011
- AGP regional selection documents.

Annex D - Stakeholder interest & influence table

Stake-holders	Function - what functions do they perform in value chain operation or facilitation	Geographic coverage - in which woreda a/o kebele are they active?	Interests - define stakes they have in dairy development	Influence A - describe the contribution they can make to value chain development	Influence B - -describe the contribution they can make to innovation & learning	Attitude towards change Identify attitude of stakeholders met	Physical address	Email address	Phone number
1. ...									
2. ...									
3. ...									

Explanation

Column 1: List of stakeholders

- Make a list of stakeholders involved in dairy value chain operation (i.e. input supply, service supply, production, collection, processing, retail) or enablement (policy maker, research, education, extension, capacity development (specify), stakeholder coordination, facilitation, etc.). At production level, identify the producer organizations and the number of large farms. Specify foreign investments.
- Sort stakeholders according to role after filling in column 2

Column 2: Function in value chain operation or enablement

- Include the functions that each stakeholder plays in value chain operation (i.e. input supply, service supply, production, collection, processing, retail) or enablement (policy maker, research, education, capacity development (specify), stakeholder coordination, facilitation, etc.).

Column 3: Geographic coverage

- Specify in what woreda (or woredas) the activities (/functions) mentioned in column 2 are carried out.
- Where appropriate, list the name of the kebele or the number of kebeles where the stakeholder is active.

Column 4: Interest/stakes in dairy development

- List the interests that each stakeholder would have in development of dairy in the area. Only as far as identified.

Column 5: Describe the impact of each stakeholder on successful development of value chain development.

- Keep in mind: If you do not involve the stakeholder what implications will this have?
- Describe the type and magnitude of the impact that each stakeholder is expected to have on value chain development. Think about organizational capacity, vision, investments, role in the value chain etc.

Column 6: Describe the impact of each stakeholder on success of innovation and learning

- Keep in mind: If you do not involve the stakeholder what implications will this have?
- Describe the type and magnitude of the impact that each stakeholder is expected to have on effective innovation & learning.

Columns 7: Attitude towards change

- Score each stakeholder on their perceived attitude towards change / dairy development. Do this primarily for those stakeholders met, but also include opinions from others about stakeholders not met.

  P = positive attitude, promoting change
  N = negative attitude, resisting change
  O = neutral (give this score if you don't have enough information to score P or R)

Columns 8-10: Address details

- Include description of physical address, email and phone numbers as available. This is important for inviting selected stakeholders to a workshop.

N.B. Adjust table format and size as necessary

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Together with our clients, we integrate scientific know-how and practical experience to develop livestock concepts for the 21st century. With our expertise on innovative livestock systems, nutrition, welfare, genetics and environmental impact of livestock farming and our state-of-the art research facilities, such as Dairy Campus and Swine Innovation Centre Sterksel, we support our customers to find solutions for current and future challenges.

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