Key informant interviews with stakeholders in Addis Ababa and its surroundings:

1.1 Interview #1 Addis

- At the national level four government ministries are involved in the dairy sector: Ministries of livestock and fisheries; health, trade and industry with various roles.
- The sector is guided by the Growth and Transformation Plan (GTP II) and the Livestock Master Plan and focuses on four transformational agendas.
- These include:
    - National animal genetic improvement (improving animal production and productivity)
    - Improving fodder/feed production and availability
    - Enhancing quality and health of animals and production
    - Promoting market – oriented dairy production

- *Challenges and issues in the sector*
    - Lack of data on characteristics of national breeds, for example
    - How many crossbreed cattle in the country?
    - How many commercial farms?
    - How many small dairy farms?
    - What is the average holding?
    - Processors are complaining about lack of milk
    - Producers are complaining about having no market
    - Middle men distort the distribution system affecting milk prices and quality
    - The Ethiopian dairy sector is in paradox because of lack of data for effective policy measures
    - Livestock and livestock owners are not registered
    - Imports need to be regulated
    - And, also no animal breeding policy
    - ILRI's untimely report on aflatoxins also negatively affected the sector –
- *Recent initiatives for genetic improvement*
    - Data collection from dairy farms in a radius of 100 kilometres initiated with a FINNIDA grant; later expanded to Tigray, Amhara, Oromia and SNNPR regions through the a project (with BMGF funding). Data is collected from dairy farms consisting of a minimum of five cows and more
    - The system provides feedback information to dairy farmers
    - This initiative will focus on national animal genetic improvement leading to setting up a unit for national dairy herd and Ethiopian livestock information system.
    - The Livestock Master Plan (LMP) is the result of the livestock sector analysis. The study indicated that feed constitutes 55 to 70% of the cost of dairy farming, since feed (both bales and concentrates) are sourced from outside the farm. On the other hand, the feed cost for a now defunct government nucleus herd farm (with 600 pure bred cows) was only 6 Birr/litre indicating that feed costs can be significantly reduced if land becomes available to dairy owners for own fodder production (however, factors that led to the closure of the nucleus herd farm were not disclosed despite the claimed low feed cost)

- There is a requirement for some US $500,000 to set up and operationalize the Ethiopian Livestock Information System (ELIS) and also for mobilization and changing the attitudes of dairy farmers to support the data collection process. This fund has not been made available yet.
- UNDP has provided 4 milk collection trucks to the sector; planned interventions include: 32 collection and chilling centres by the Government and 56 such centres by the World Bank.
- Four agro-industrial parks are in the process of establishment – these will contribute to feed and genetic improvement

- *Additional information*
  - The national cross-breed herd is estimated between 900,000 and 1.2 million
  - Only 5% of the milk produced by dairy farmers is formally marketed
  - Annual milk consumption has gone up from 19 to 25 kg (this is doubted by others) due to the increase in livestock numbers and genetic improvement
  - However, milk consumption has decreased around Addis
  - The Directorate has been approached to set up a dairy farm consisting of 6,000 cows in Debre Berhan and Afar (the latter probably for feed production)

1.2 Interview #2 Addis

Following the Livestock Master Plan and the request by the Government, a $170 million dollar loan has been approved by the WB Group. The project has two objectives:

1) Support the new Ministry of Livestock and Fisheries (now, no more a ministry);
2) Support the implementation of the LMP in six regions of the country (Tigray, Amhara, SNNPR, Oromia, Gambella and Benishangul) focusing on:
   - Dairy, poultry, fishery and aquaculture (Gambella + Benishangul) and small ruminants
   - In mixed crop/livestock/fishery farming system in central highlands

Component A (dairy) will include 58 woredas in the dairy value chain.

- Incorporating subsistent and small dairy producers (2-3 cows)
- And will constitute 70% of the total beneficiaries from this loan
- The project will support regional and zonal governments to organize 'common interest groups'
- Training and capacity building in good animal health practices
- FAO will produce the training manual including on feed and fodder production
- The project will set up milk shade centres to supply processors; provide seeds for fodder production; AI services; vet services support and bio-digesters for fuel and fertilizer
- 53% or more of the beneficiaries will be youth groups

At level 2

- Training of dairy extension workers will take place including TVETs (Technical and Vocational Extension Training centres)
- Beneficiaries are expected to reach level 2 in 3-4 years' time owning about 10 cows
- Level 2 will involve training in good animal husbandry practices; provide facilities such as collection centres.

Level 3

- Will engage advanced beneficiaries ready to process milk
- The investment amount at level 3 will be about $250,000 using the hub approach

NB. The decommissioning of the livestock ministry and its incorporation into the Ministry of Agriculture could possibly jeopardize the WB project bringing the parties to the drawing board.

1.3 Interview #3 Addis

The association was established two years ago to facilitate a better environment for the dairy sector and to influence policy. It took one year to register the association.

- In reality, we don't know how to influence policy. Because all policy issues affecting the sector are ratified without our consultation.
- We are not sure as to who is in charge for the dairy sector development, promotion and regulation
- An attempt was made to set up a National Dairy Board, but this has not been followed through
- Most processors operate below 60% capacity because of intense competition due to low milk production; they collect milk on the road side from small farmers; the proportion of milk processors obtain from dairy farms is minimal, at 3%;
- There are 35 milk processors in the country struggling to stay in business
- AI and animal health services are not adequate and take place at the convenience of the service providers rather than on need basis.

From an Amharic document provided to the team

- The dairy and dairy products market is dominated by foreign producers and suppliers despite the potential in the country
- Major problems were listed, as follows:
    - Lack of land for own fodder production
    - High cost of fodder and concentrate feeds, sourced from outside
    - Lack of cold chain facilities at collection centres (evening milk production not collected by processors)
    - Power outage and shortage of water
    - No access to financial services; Development Bank provides loans for only equipment lease-financing and not for cows and heifers

1.4 Interview #4 Addis

This is a BMGF-funded Public/Private partnership for Promoting and Expanding AI servicesThe project has three components:

- Improve the efficiency of AI technicians through training, equipping and also incentives;
- Increase the demand for AI services (modules, posters, video clips including on feeding and management techniques);
- Strengthen the capacity of NAIC and regional semen laboratories (so far, only 1 laboratory at Kaliti, 4 additional ones planned for the regions)

Issues

- The major problem was sustainable supply of liquid nitrogen

- Plus power outage and maintenance problems
- There is no government body that coordinates and controls AI services at national level
- The regions don't even provide data to NAIC
- The total x-bred no is less than 2% of the national herd
- AI service delivery is not efficient
- No central data base for AI system
- No heifer multiplication and/or breeding centres in the country
- Government AI service is subsidized – 4 to 6 Birr per service; farmers in peri-urban areas are willing to pay more
- A strong linkage is required between the regions and NAIC on technical and AI data collection systems

Initiatives undertaken

- Trained liquid nitrogen technicians; an international company (?) supervises the work of the technicians
- In total, 20 liquid nitrogen plants established in the country
- Two BMGF funded projects jointly collect data on:
    - Types of bulls, breed (male and female)
    - Service and calving date
    - AI adoption rate
    - Health management
    - Adoption and application of dairy management systems
    - Production level of LN
    - No of straw distributed to beneficiaries
- And on annual basis
    - Data on quality of semen
    - Value of improved heifer by location
    - Data on the contribution of the private sector (e.g salary)

Regional initiatives

- Four focal persons assigned
- AI technical coordinators and technicians trained

1.5 Interview #5 Addis

This project has been working on the dairy sector for the last 10 years. The project is implemented along the value chain process for developing the formal sector using the voucher system. The project operates in Amhara, Oromia and SNNPR regions.

The project operates through DAs in 51 woredas involving some 65,000 small producers with at least one x-bred cow. The organisation organizes farmers at collection centres, provides training and also equipment through cooperatives. The government guideline stipulates only one specialized cooperative per woreda.

Outputs include organizing dairy farmers, linking them to markets and supporting agro-input leaders (such as providing shelves and technical training). The project has also exposed farmers to special calf feed starters.

Challenges

- Not enough crossbreed animals
- Feed and forage problem
- Few cooling centres and not enough processors
- Private inseminators charging 100 Birr per service and up to 1,000 Br for sexed semen
- Private processors just collect milk and do not provide support to the producers
- No regulations on the quality of milk

The project will come to an end in July and is preparing to expand into Tigray in the next phase.

1.6 Interview #6 Addis

Comments:

- No national standard on milk quality (Ministry of Industry)
- No market regulations (Ministry of Trade)
- No proper survey on national milk consumption (Ministry of Trade)

1.7 Interview #7 Addis

The organisation catalyzes the transformation agenda. The anchor for livestock is GTP II and the Livestock Master Plan. The approach for dairy is through commodity value chain development.

Four systemic problems have been identified in the dairy sector involving genetics, feed, animal health and marketing problems. Other policy related problems include lack of land for fodder production.
The organisation's role in dealing with the four systemic bottlenecks focuses on:

- Providing implementation support
- Providing technical support
- Tracking reports for the transformation agenda
- Facilitating the planning process
- Breeding policy has been developed but no national strategy, yet

At the request of MoLF, the organisation commissioned a study on the data needs of the livestock sector. The analysis was overseen by an advisory committee of technical experts and validated by stakeholders. A concept note has been subsequently finalized, which was approved by MoLF for the operationalization of the Ethiopian Livestock Information System (ELIS). However, the required funding in the amount of $500,000 has not been yet secured.

1.8 Interview #8 Addis

The project has two major objectives:

- Assessing social risk factor to zoonosis of TB
- Stakeholder analysis for TB control through existing institutional framework
- Identification of actors in the dairy sector (done at end of 2016)

Survey approach and objectives

- Name generation exercise of actors
- Mandates of actors; cooperation and conflict amongst actors
- Scoring of actors (for policy issues)
- Network analysis of actors, degree and nature of relationship
- Social network analysis to gauge the level of cohesion
- Use of social network software for policy network (mainly qualitative)

- Extensive survey was carried out on 480 farms around Addis, Mekelle, Bahir Dar and Hawassa using stratified sample for 2,800 animals conducting TV+ and TV- input and output data
- Some of these farmers have been closely followed for three years through repeated survey

The survey was carried out at national level for highlands. Two meetings were held with stakeholders. The objectives of the surveys are:

- Influencing policy
- Developing a strategy for TB control
- Assessing the economic impact of TB
- Economic implications of various control strategies (e.g. vaccine)

1.9 Interview #9 Addis

Carried out the assessment for data needs on the livestock sector (over a six month period)

Approach

- Institutional landscaping of data needs
- Development of Use Cases
- Experience from other countries
- Focusing on genetics, feed, health, marketing and policy reforms
- The findings focused on what information is to be used by which institutions.

Issues covered

- Mandates of institutions/key decisions
- Information/data needs
- Challenges in making informed decisions

Use cases

- Primary Use – MoLF, regional and zonal bureau
- Other stakeholder users, as appropriate

1.10 Interview #10 Addis

The organisation works on zoonosis and to some extent on Bovine TB tests on farms around Addis, Gondar, Mekelle and Hawassa. Also, did some value chain assessment and stakeholder analysis. High prevalence of bovine TB was observed around farms in Addis with less prevalence in farms around Hawassa. Farmers from Mekelle buying animals from Addis are potentially risking the spread of Bovine TB into their surroundings. The organisation also plans to do tests on Brucella in Afar and Somalia.

1.11 Interview #11 Addis

The initial dairy data collection system was paper based with three copies on each pad, one copy going to the woreda, one to the region and the original to NAHC. The format contained most variables but things like protein content were not included.

The organisation introduced the tablet system for collection of data from farms. The objective is collecting phenotypic and genomic data for genome selection. Data is sent from the tablets to the processing center, although internet problems affect the transmission process at some time. Data is collected from some 2,500 farmers. Data on milk yield is recorded only once a month, as a 'test day milk yield', so as not to encumber farmers with daily recording. The project provides feedback information to farmers after analyzing the data to help them make informed decisions – for example, on the performance of individual animals or for comparison with other farms. Farmers are also provided with free ear tags as incentives to collaborate with the data collection process. Feed

and health issues are not included in the data. One observation is that the dairy value chain is negatively impacted by too many brokers in the sector. The organisation works closely with other organisations and regional agricultural research institutions. The project collects data from Oromia, Amhara, SNNPR and Tigray Regions. AI performance data is reportedly weak.

1.12 Interview #12 Addis

The organisation is primarily responsible for the development of dairy and meat (including honey) industry in Ethiopia through the identification of relevant technologies and by facilitating local and foreign investments, as appropriate. Among other things, Its' duties also include: conducting market research; collecting and analyzing relevant data for use by processors; providing consultancy services to the meat and dairy industry; assessment of investment opportunities; providing practical training on technology, technical matters and management; and providing advice and appropriate support for potential investors in the dairy and meat sectors.

The organisation has three technical sub-sectors:

i) Meat, honey and wax, feed products development and processing sub sector; there are six directorates under this sub-sector – each of which are responsible for a) beef, mutton, chevron and camel meat processing; b) poultry and other birds processing; c) feed products processing; d) honey and wax processing; e) fish and crocodile meat processing; and, f) meat, feed, and honey quality testing laboratory.

ii) Milk and milk products packaging, processing research and development sub-sector under which fall the milk and milk products processing research and development directorate; the milk and milk products quality and safety assurance laboratory directorate; and the milk and milk products packaging technology, research, processing and development directorate.

iii) Investment and technological support sub-sector. There are five directorates under this sub sector responsible for technological transformation and business development; market development; information technology; construction and engineering; investment and food parks expansion; and environmental and industry safety and energy.

On Dairy Matters

- According to the organisation, there are close to 50 milk processors of various capacities in Ethiopia. The biggest one is located in Bahr Dar with a processing capacity of 80,000 liters a day; Shola has a capacity for 60,000 litres per day; and Elemtu, 30,000 litres per day. Because nearly all the processors are not producers, there is a cut-throat competition between the processors in sourcing milk from producers. The institute tried to settle the dispute between the processors by developing a 'Code of Conduct', but this has not brought the intended outcome. Part of the reason for the high milk price in Ethiopia is because of the price competition by processors when buying milk from producers.
- Examples on the lack of information on what is available in Ethiopia: most of the high class hotels and supermarkets import cheese from outside because of having no information about local cheese production. The Institute introduced a cheese processor to such hotels and supermarkets. The cheese processor now supplies some 15 types of cheese products to these customers. Similarly, dairy processors were importing plastic cups for yoghurt and similar products, simply because they were not aware of plastic cups being produced here. The institute established a linkage between these two groups. When a dairy farm (at Debre Zeit) was temporarily closed for some reason, suppliers were at a loss where to sell their milk. The Institute connected them to another processor, 20 kilometres away in Mojo.

Investments on the pipeline

- A French company is in the process of investing in a dairy farm at Alage (Oromia) for which it has received 500 hectares. This is a $25 million investment in production and processing of milk and use of embryo transfer technology to produce calves. The farm will manage up to 6,000 cows.
- A company was in the process of receiving 7,000 ha for fodder production in Afar and 800 ha in Debre Berhan for milk production and processing. Although negotiation started 3 years ago, it appears that the company is dragging its feet for unknown reasons.
- A local investor has received 100 hectares in Bekoji (Oromia) for dairy production and processing.

On data requirement:

- On the need to make an inventory of available industrial and associated products that support the dairy industry (such as, factories producing plastic cups, weigh scales, stainless steel products, etc.)
- Cost of inputs for raw milk production;
- Cost of dairy end products (pasteurized milk, yoghurt, cheese, etc.)
- Availability and price of raw milk;
- Availability and price of dairy end products;
- An inventory on potential sources of breeding stock, heifers, x-bred cows, prices, etc

1.13 Interview #13 Addis

They do not have their own information on the total numbers of X-bred cows in the country and they rely on CSA data for this.

There is a new directorate (under formation) in the institute that is mandated to collect information on national dairy herd performance and provide feedback to end users. The data collected from the dairy farms relate to milk yield, health, calving rate, service date, vaccination etc. (full detail available on the card obtained from the organisation).

Collection of data started in 2005 using paper recording on some 660 farms involving 16,000 cows. Some 140,000 records were made when the organisation came in. The paper records were transferred into computers using a small server kept by the Institute. The project, with its tablet system expanded the data collection to 2,600 farms. The two systems are not compatible and we still have problems in transferring the old data to the organisation one, which is kept in Nairobi. The organisation is going to provide us with a server to harmonize the old data with the new one, but we still have to relay data to Nairobi because of the internet problem here.

One major problem the organisation faces is not having measuring instruments for fat and protein content and for somatic cell count and also for weighing animals (only use heart girth measurement for approximation).

On AI services
We have problems in terms of coverage, providing on-time services and also on conception rates because of logistical and infrastructural problems, shortage of spare parts, finance and equipment. For example, there are some 20 AI technicians around Addis (6 of them working for private sector). A technician may be reluctant to go out and serve just one cow; the demand for services are unpredictable. The liquid nitrogen expires because of electricity and cold chain problems, particularly in the regions. As a result, some farms are reverting to having own bulls instead of relying on AI.

On dairy data
Any future project should not only operate at the federal level but has to extend its reach to the woredas to be effective. Otherwise, the woreda extension agents are reluctant to fully engage in such initiatives coming from the federal level, since the woredas have other priorities and do not allocate resources for transport, per diems, equipment, etc.

As a result, any such project has to focus on woredas in terms of training and capacity building, provision of logistics, the necessary equipment and in providing incentives for the technicians and extension agents. This is a long term process and some kind of service has to be provided to farmers as well to get their full consent and cooperation to provide information. One suggestion was to also include beef animals in the data collection process.

1.14 Interview #14 Addis

The organisation was conceived and established in 2009/10 by a group of seven professionals. It imported semen for the first time worth 105,000 Birr. It then received a grant of $100,000 (against a matching fund of $200,000) from a project and began operating as a Plc with 37 shareholders.

Main issues affecting AI service

- The government provides free AI service
- As a result, foreign companies that were interested in investing in AI services have back tracked and no foreign company is interested to work in Ethiopia.
- The government policy is discouraging to private AI service providers
- There is a serious shortage of liquid nitrogen in the country despite the government spending in 20 processing centres.
- There is only one technical who can repair the Government nitrogen plant.
- The government provides AI service for 4-15 Br per straw and a bottle of liquid nitrogen for 7 Birr.
- The organisation encouraged one oxygen bottling company to diversify into processing and bottling liquid nitrogen. That company now sells a bottle of LN for 30 Birr, the only private LN source in the country.
- The organisation charges 300 Birr per straw. In the case of sexed semen, the price can go up to 2,000/3,000 Birr. There are only few farmers who are willing to pay for sexed semen.

The capacity of the organisation is limited and the company does not make that much profit from AI services. Yearly imports of semen amount to some $15,000 USD. Sixty percent of the company's clients are government institutions such as research institutes, universities and also donor-supported cooperatives, which implies that such clients trust the company more than the government service providers. There is a demand from farmers for the organisation's AI services but due to capacity limitations, they are not able to service all the demand. The organisation works closely with a project and works through nine inseminators of the project. Serving far away regions like Amhara and Tigray is difficult because of lack of cold chain facilities to transport semen. The organisation also runs a veterinary drug shop in Addis to complement its income, as it can't fully sustain itself from the income of AI services.

On data issues:

- No of animals inseminated with x genetic material
- No of inseminations per conception rate (insemination performance)
- Cost of liquid nitrogen production
- Available AI equipment per region/country
- No of AI technicians

- He also suggested setting up a proper monitoring system on AI performance and providing incentives for AI inseminators.

1.15 Interview #15 Addis

This project started in 2017 and is to be phased out in 2021. The project combines the activities of the Agricultural Growth Program and the former Livestock Marketing Development project. It has two components: 1) crops – maize, cowpea and chickpeas; and 2) livestock – dairy, meat and live animals and poultry. The project operates through the entire value chain of livestock, although its' entry point is at the marketing level.

The project's major intervention on the dairy sector is in forage production. For example, in Andassa (Bahir Dar), they supported a milk processing co. to provide forage seed to dairy farmers who supply milk to the company. Farmers who used to get 5,000 Br from the same plot of land growing maize are now earning up to 14,000 birr by substituting maize with forage because of the increase in milk production. Some of these farmers are now determined to increase their income to 20,000 Birr by increasing the land under forage production.

The project also introduced hydroponic forage farming on 21 demonstration plots in their operational woredas, using plastic boxes. This involves mainly barley shoots of some seven days old. Farmers have reportedly gained a milk increase of about 1.5 litres/cow through this system.

The project is also continuing where another project has left. The latter brought in 100 milk chilling facilities (of 2,000 litres each) but the project was phased-out before the collection centres were properly set up. This project is now working on market linkages between the chilling facilities and processing centres in close proximity. One issue they are working on is developing quality based payment system for milk producers. The technical intervention involves putting specific bar code on the milk suppliers' cans for traceability after testing.

The project has developed a data collection system for maize marketing and they are in the process of doing same for dairy marketing. They are also looking for an organization which they can work with on the dairy marketing data so that the process can continue in a sustainable way after their project is phased out. Is X organisation a possibility?

On dairy data, the project's major concern is on the input costs of concentrate feed and feed quality.

1.16 Interview #16 Addis

With the major objective of supporting livestock producers through the provision of quality and affordable feed products, the organisation was established in 2008 by a group of livestock professionals who were concerned about shortage of quality commercial feed in the country.

The main products of the organisation include Total Mixed Ration (TMR) for dairy, beef, sheep and goats including for quick recovery of drought-stricken core breeding animals. The organisation also produces dense feed blocks and mineral blocks. With its current production capacity of about 40 tons per day the organisation has also pioneered making use of Sodium Bentonite in its feed products that has a binding effect of aflatoxin. Currently, it is working closely with another organisation to ascertain the impact of this binder for wider use by other feed processors.

Despite maintaining the highest quality standard, the management with support from Board Members provides strategic direction making sure that the feed products maintain the quality and prices are comparatively lower than the average processed feed price in the country to support livestock producers.

As part of its' mission, the organisation on its own and in collaboration with other international development NGO partners has trained hundreds of pastoralist, smallholder farmers and livestock marketing cooperatives in feed production and management using locally available feed sources in different parts of the country. With a grant received from a project ($96,000), the organisation has established three "franchisees business partners" in Oromia and Tigray focusing on "innovative feed solutions" by making use of locally available feed sources. The organisation supplies additional ingredients that are not locally available to these groups for the production and marketing of quality and affordable animal feed products.

Though the organisation has shown significant progress in production and marketing of different types of animal feed products using its "innovative feed solution" model there are some practical challenges facing the company. Major concerns include the rising costs of raw materials, especially of wheat bran and oil seed cakes such as noug and cotton seed cakes. Most of the ingredients required for a complete ration are only available from middle men who operate without official receipts and VAT registration. This is having a negative effect on the company's finances as materials purchased from such sources are not taken into account by the tax authorities. The problem is there are no alternative ways of accessing such ingredients. The second issue is the application of VAT on processed feed, which is principally prepared from value degraded agro -industrial bi-products rather than value added ones. Although processed milk is sold without VAT, this implies that VAT is indirectly applied on milk. In any case, the inclusion of VAT on feed contributes in escalating the input costs of milk and meat production including the cost of emergency feed provision in cases of drought.

Other major strategic directions that will add value to the comparative advantage and competency of the company include focusing on new product development other than the conventional ones and harnessing bio-technologies that would improve milk, meat and egg production and simultaneously contribute to the feed industry in particular and the livestock sector in general.

1.17 Interview #17 Addis

The organisation collects livestock data during the annual crop production survey. The livestock data consists of cattle, sheep, goats and draft animals. The data for cattle has three general classifications: exogenous, hybrid and endogenous. There is no specific data collected for dairy animals. The data does not include livestock in urban, peri-urban and pastoral areas.

The organisation's survey focuses on private peasant holdings in rural areas – meaning, peasants with own land. Data is collected from 2,250 enumeration areas, covering 30 HHs in each enumeration area. The enumeration areas are fixed for about 5-6 years but different households are covered in the survey every year.

The organisation in collaboration with another organisation also conducts Ethiopian Socio-Economic years for which detailed analysis is provided for each of the four major regions (Oromia, SNNPR, Amhara and Tigray) and a summary for the rest of the regions. The socio-economic data covers other household parameters such as income and expenditure unlike the annual crop and livestock survey. The organisation has carried out three such socio-economic surveys, so far.

The bottom line is the existing organisation livestock data is not at all applicable for the dairy sector signifying the glaring data gap without which appropriate intervention strategies cannot be formulated, questioning the data sources for the formulation of the LMP and the WB $170 million project.

2. Regional key informant interviews: Tigray

2.1 Interview #1 Tigray

According to an organisation (2009), there are 117,000 cross breeds in Tigray. Most of the dairy farmers are located close to major urban centres. In few woredas, producers sell milk through coops but in most cases individual farmers sell directly to consumers. The price of 1 litre of milk in Mekelle is between 26 and 28 birr (i.e. US$1!), and in rural areas about 20 birr. Producers' selling price ranges from 15 to 20 Br depending on location. As per data collected by extension agents, average daily milk production per crossbred cow is about 12 litres, but this data has not been validated. There are three dairy producers in the region – at Mekelle, Maichew (newly established) and Humera (not yet operational). There are also six feed producing coops in the region including one Union, specializing on dairy feed. The processing units were supported and established by an organisation through USAID funding. On average, these units produce between 8 and 10 tons of feed per day. Feed costs remain the major problem – particularly, of wheat bran and oil cake. The former costs 700 Birr per 100 Kg. Most dairy farmers are also reluctant to use concentrate feed because of awareness problem and cost implications.

There is no heifer breeding centre in the region and cross-breeding is done through AI. Success rate of AI is between 55 – 60%, and so far some 16,000 to 20,000 cross calves have been produced through AI. The success of synchronization, on the other hand, is only about 30%. There are three LN processing centres in the region. The major problem is there is only one technician in the country that services these facilities in cases of breakdowns. In general, the dairy sector is not well developed. The problem is compounded by young stock mortality and calf blindness. Main actors in the dairy sector in the region include several organisations and a University.

2.2 Interview #2 Tigray

The processing centre was established about 14 years ago. Machinery was provided by the MoA on user right basis. Additional chilling tanks with a 2,000 lt capacity. Daily processing capacity is about 6,000 litres but the centre processes, on average, only 500 litres per day. Milk is collected once daily from associated dairy coops. On the other hand, some 15,000 litres of raw milk is supplied to Mekelle town by 750 producers who sell directly to consumers. The processing centre buys raw milk @ 20 Br per litre and sells processed milk @ 24 birr to retailers who then sell for 26-28 birr to consumers.

The centre records daily transactions which is summarized on monthly basis and reported to the regional and woreda coop bureaux. It is not clear what these bureaux do with the data. Major problems were cited to be high cost of wheat bran and oil cake for raw milk production; plus the sharp drop in milk sales during the fasting season and consumers lack of awareness about the benefits of pasteurized milk.

Business during the Lent season is greatly affected due to fasting. The centre has no equipment for processing cheese, ghee, etc. which compounds the problem during the fasting season.

2.3 Interview #3 Tigray

This state farm was handed over to disabled former combatants in 2004. The dairy farm grows irrigated alfalfa on two and half hectares and maize on six and half hectares and employs 21 people. The land adjacent to the dairy shed is reserved for grazing only in the rainy season due to water shortage. In total, the farm owns one hundred cows and heifers. Pregnant and lactating cows and heifers are kept separately. Male calves are sold and only two bulls are kept for breeding. Daily

production is about 500 litres. The major problem was mentioned to be the rising cost of feed, particularly, wheat bran. Sales drop sharply during the Lent season.

The farm keeps individual records of cows using the NAGGI card. The managers stressed that the records help them in making informed decisions on which cows to cull, etc. Surprisingly, the Ilala dairy farm is not a member of the national dairy producers association; they neither know about it.

3. Regional stakeholder interviews: Southern Nations, Nationalities, and Peoples' Region (SNNPR)

3.1 Interview #1 SNNPR

20% of the national cattle population is found in SNNPR Region. Organisational data shows that the proportion of cross-bred cattle is below 2% in the region**.** On the other hand, a survey carried out has established the proportion of cross-bred cows to be 4%. In some woredas, such as Kedida and Gamela 95.7% of the animals are cross-bred and in few woredas the proportion is also as high as 50%. Major actors in the dairy sector are smallholders in urban and peri-urban areas and in private sectors in Hawassa, Hosana and Wolayta. Most of the small farmers own less than half hectare on which they grow forage rather than crops. The income from dairy farming is higher than crops with an average daily yield of 16 litres.

There is one large milk processor in Hawassa, with a capacity of 20,000 litres per day and 2 other processors in Butajira. There are seven feed processors in the region, supported and established by an organisation. There are four LN processing facilities plus two new ones under installation. The problem with LN is servicing and maintenance, as there is only one technician in the country. Productive seasons are missed waiting for this one technical to service the system.

Breeding is carried out by the Government, using semen provided by organisations. Other organisations also support feed and forage production. Logistics problem make synchronization less successful.

One major problem for productivity is the rising cost of feed. Dairy feed from Alema in Debre Zeit currently costs between 1000-1200 birr per 100 kg.

Data needs:

- Success rate of synchronization
- Success rate of AI
- Success rate of Bull service (where such services occur)
- Major problems for failures of the above
- Cow productivity
- Calving period
- Production per season

3.2 Interview #2 SNNPR

Set up with financial and technical support of an organisation in 2015/16. Produces compound feed for dairy, calf, fattening, and sheep and goats. The price for dairy feed is 640 Birr per 100 kg (660 Birr, if with premix); 680 Birr for calf; 660 Birr for fattening and 600 birr for sheep and goats. Alto has a processing capacity of 10 tons per day and employs six people.

The problem is rural dairy farmers do not use concentrate feed due to awareness problem, despite a demonstrated milk increase of 1-2 litres from local cows. There are plans to open outlets in rural

areas but this will take some time. In addition to the rising cost of wheat bran, feed quality is also reported to be compromised by poor quality of ingredients due to improper storage at oil and wheat processing plants.

3.3 Interview #3 SNNPR

Started in 2012 by an enterprising individual who was collecting raw milk from Arsi Negelle and supplying Hawassa town. With a loan from the development bank of Ethiopia, the company has installed a new processing plant with a capacity of 20,000 litres per day. The organisation also processes cheese, ghee and yoghurt. The organisation won a national prize for the best yoghurt.

However, the company is not utilizing its full capacity and processes on average 2,500 litres per day due to shortage of supplies. The company's production cost is affected by its operation much below the installed capacity and also the cost of collecting milk from small producers in scattered locations. During lent, daily sales drop to 1,600 litres.

Market linkage with producers is a major problem for the company and future strategies include installing chillers in appropriate locations. The organisation is a member of the national dairy producers association.