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SECTOR ASSESSMENT AND IDENTIFICATION KILTE AWLAELO

INCORPORATING SECTOR ASSESSMENT/IDENTIFICATION INTO A GRADUATION PILOT FOR
SAFETY NET BENEFICIARIES IN KILTE AWLAELO

DRAFT

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PART I. EXECUTIVE SUMMARY

This report details the results of a value chain analysis undertaken by Emerging Markets Group, Ltd. (EMG) for the beekeeping, dairy, vegetables (tomatoes), and shoats (sheep and goats) sectors in Kilte Awlaleo/Wukro Wereda, Tigray, Ethiopia. The analysis was undertaken to support a pilot program that combines safety net assistance with microfinance to help very poor people establish sustainable livelihood activities in order to graduate from safety net support. The goal is to identify a model that (1) effectively moves very poor people out of dependency on safety net assistance, (2) can be replicated widely, and (3) can be scaled up. The aim in Kilte Awlaleo is to incorporate sector assessment/selection and enterprise development components into the model. This will facilitate identification of a viable market and plug pilot participants (and possibly non-participant community members as well) into the opportunities that such a viable market presents, in order to expand participants' livelihood options; introduce activities relevant for landless people (including youth); and increase the value participants generate and return they receive for their efforts.

Kilte Awlaleo is one of the 36 Weredas in the Tigray Region of Ethiopia. The Wereda is made up of 17 Tabias and has a total population of approximately 118,153 people. There are 28,928 households in the Wereda, of which more than 20% are headed by women. A predominately agricultural based area, farmers in the Wereda grow a wide range of crops and keep livestock. Most of their income comes from the sale of crops, livestock and animal products. However the very poor households rarely produce crops with the intention of selling them. In fact, most of these households do not produce enough for their consumption, resulting in a food gap. The Productive Safety Net Programme (PSNP) was established as one of the ways to address this gap. Land inaccessibility for a subset of the population (primarily those aged under 40 due to land distribution policies), soil infertility, and drought are considered to be some of the major constraint to agricultural productivity. Other sources of income are from day laboring and the PSNP, which provides cash and food through its Public Works and Direct Support programs.

The value chain assessment detailed in this report was as a result of both primary and secondary research undertaken by two international consultants, with assistance from REST staff. The primary research included a value chain selection activity involving Mekelle-based stakeholders who assisted the consultants in identifying and prioritizing the sectors. The selection process involved initial brainstorming to develop a raw list of sectors; application of an initial filter through an attractiveness matrix; and selection of final sectors through evaluation and scoring. This process identified beekeeping, dairy, vegetables (tomatoes), and shoats sectors as having high potential for both growth as well as outreach.

Each of the sectors examined showed significant potential to increase incomes among PSNP participants as well as non participants. Beekeeping, for example, has a long-standing tradition in the Tigray Region, dating back to ancient times during the kingdom of Abyssinia. It currently has strong growing end markets: two newly formed industrial-scale honey processors and exporters are operating within close proximity to Kilte Awlaleo and have expressed interest in the establishment of dedicated collection centers that provide bulking facilities and a guaranteed market for farmers. Beekeeping is also a viable enterprise for Women and Landless Youth, and it can have a heavy multiplier effect on support services industry. The unique quality of the White Wukro honey is well known in Ethiopia, and it commands a premium price in the domestic market. To fully exploit opportunities in this sector, interventions to address constraints such as honey adulteration; lack of quality control system; weak outgrower schemes; non-businesslike approach of producers; and lack of modern bee-keeping equipment and handling techniques need to be explored by the graduation pilot.

Dairy farming also presents an opportunity for PSNP participants to increase their income and move towards self sufficiency. Farmers in Kilte Awlaleo have a tradition of cattle rearing, which provides a platform to upgrade to more modern practices. Modern dairy farming can be practised in back yards by



men or women-headed households or even cooperatives made up of landless youth in enclosure areas provided by the government. The dairy sector requires various inputs which can jumpstart private support businesses. Strong cooperatives can ensure that farmers have a stronger link with the market and possibly lower their production costs through bulk purchases of feeds and collective transportation. Despite these potential opportunities, it should be noted that dairy farming requires what would be considered a large initial investment for PSNP participants unless effective credit programs are in place. In addition, limited and high cost of feeds; a limited market for milk and other dairy products; and a lack of reliable sources of high breed cattle must be addressed if farmer uptake or productivity are to be improved.

The longstanding tradition of meat consumption in Tigray (particularly during holidays) provides shoat farmers with a steady demand in the domestic market. With the advent of a state-of-the-art slaughterhouse based in Mekelle town that will process 960 shoats in one shift, farmers will have access to alternative market outlets. The expansion of Sheba Tannery, located in the Wereda, is an immediate incentive for farmers to invest in this sector. The sector also possesses a significant potential for a multiplier effect from support industries, and a strong outreach among target beneficiaries since almost all households own shoats. Intervention to address the current feed shortage; widespread livestock diseases; poor body conditions and “lost opportunities” for skin; among other constraints need to be addressed. These constraints present an opportunity for the graduation pilot to develop interventions that can lead to more benefits for the PSNP participants and non participants.

Among vegetables, tomatoes are the most widely produced in Kilte Awlalo, with a current outreach of 3,031 farmers and an annual production 1,990 Kgs. A significant percentage of tomato farmers are safety net beneficiaries. Many of these farmers are landless youth, who cover their own costs associated with land and motorized pump rental. The short-cycle nature of crop presents opportunities for landless farmers who rent land on a seasonal basis. These landless farmers exhibit a true entrepreneurial spirit that should be encouraged in all sectors. The short-cycle nature of tomatoes is attractive, and may be complimented with other crops such as pepper, onion, or cabbage to diversify revenue streams. Despite these opportunities, market uncertainty and heavy price fluctuations present challenges for the farmers. Other constraints such as inconsistency in supply; the unorganized nature of the sector; poor pest and disease control; and lack of quality inputs must be addressed in order for farmers to benefit from the sector.

What is immediately clear from the value chain assessment is that there are significant commercial opportunities in Kilte Awlalo. The PSNP and its implementing partners are at a critical juncture. Either take advantage of these emerging opportunities to develop sustainable market systems, or continue with a “business as usual” approach thus reinforcing the cycle of donor dependency. The PSNP, the wealth ranking activity, and the value chain analysis give an in depth understanding of the target group and specific market systems, their dynamics, constraints and opportunities. It is therefore recommended that the graduation pilot be developed and implemented on the basis of this solid analysis. Other key recommendations include i) applying a systemic approach, rather than merely addressing the weak performance of the farmers; ii) avoiding traditional donor delivery and instilling a commercial mindset among stakeholders; ii) applying a self-selection methodology; and iv) defining clear roles for NGOs and government. It is also recommended that the graduation pilot identify one or two sectors (out of the four) for the Graduation Pilot since the initial objective of the pilot is to test the model, not to reach a large number of clients.

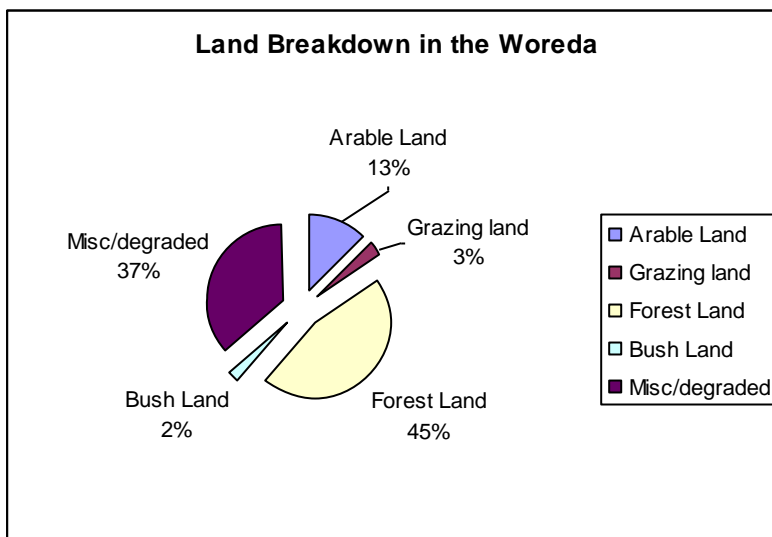


PART II. BACKGROUND

This report details the results of a value chain analysis undertaken by Emerging Markets Group, Ltd. (EMG) for the Beekeeping, Dairy, Vegetables (Tomatoes), and Shoats sectors in Kilde Awlaelo Wereda in Tigray. The analysis was undertaken to support a model that combines safety net assistance with microfinance to help very poor people establish sustainable livelihood activities in order to graduate from safety net support. Incorporating the value chain analysis identifies viable market opportunities that safety net participants (and possibly non-participant community members as well) can tap into.

Kilde Awlaelo is one of the 36 Weredas in Tigray Region of Ethiopia. It is located in the area stretching from 13°33'–13°58' North latitude and 39°18'–39°41' East longitude¹ with elevation ranging from 1760 to 2720 meters above sea level. Larger towns in Kilde Awlaelo include Agula, Tsigereda, and Wukro, which is in close proximity and access to Mekelle, the region's capital. Kilde Awlaelo is made up of 17 Tabias with a total population of approximately 118,153 people of which 55,543 are female and 62,610 male². The population is further organized into 28,928 households, of which more than 20% are headed by women.

According to the REST, there is approximately 1,444,000 ha of total land available in the Wereda. 15% of the land is highland while 85% is midland. The total available land can be categorized in the following manner:



Land inaccessibility for a subset of the population (primarily those aged under 40 due to land distribution policies) is considered to be a major constraint to agricultural productivity. Soil infertility is another major constraint sighted by farmers and experts during any discussion on land.

The Wereda has two main rainfall seasons: The short rains are from April to May, and the main rains are from June to Mid September. The average rainfall over the past 14 years is 450mm per annum with a range of 217.3 to 638.4 mm per year. Farmers in the Wereda grow a wide range of crops and keep a variety of livestock. Crops grown include wheat, hanfets, barley, terf, maize, vegetables (tomatoes, onions, cabbage, lettuce, pepper), potatoes, spices, cereals (horse beans, chick pea, lentil, peasant pea), and fruits such as oranges, guava, and papaya. Farmers keep cattle, goats, sheep, chicken and bees.

¹ FAO Statistics

² REST – Wukro office



Cattle are considered the most productive assets and are rarely sold except during a bad year when a drought sets in.

Being an agriculture-based area, most of the income is from the sale of crops, livestock and animal products. It should be noted however that the very poor and poor households rarely produce crops with the intention of selling them. In fact, most of these households do not produce enough for their consumption, resulting in a food gap. The Productive Safety Net Programme (PSNP) was established as one of the ways to address this gap. Better off households often have enough to feed their households by cultivating larger pieces of land (by renting from poorer households) and by purchasing additional food. Other sources of income are from livestock and day laboring. As noted above, cattle are rarely sold, but goats and sheep (Shoats) are often sold to supplement household incomes. Donkeys provide labor and transportation while Oxen provide draught power. Human labor to other households or small enterprises within the Wereda or beyond is an additional source of income for some youth. Labor within the agricultural sector is mostly sought after during weeding and harvesting seasons. Opportunities for casual laborers in the construction sector are available from time to time in larger towns such as Wukro and Mekelle. The PSNP, another source of income, provides cash and food through its Public Works and Direct Support programs. Beneficiaries in the Wereda receive cash distribution of six Birr for five working days a month or 3 kg of cereal per person per day which is equal to 15 kg per person per month.

Overview of PNSP

The objectives of the Productive Safety Net Programme (PSNP) are to provide transfers to the food insecure population in chronically food insecure Weredas in a way that prevents asset depletion at the household level and creates assets at the community level. The Program aims to address immediate human needs while simultaneously (i) supporting the rural transformation process, (ii) preventing long-term consequences of short-term consumption shortages, (iii) encouraging households to engage in production and investment, and (iv) promoting market development by increasing household purchasing power. The PSNP consists of two components: (i) a labor-intensive Public Works component; and (ii) a Direct Support component to ensure support to those households who have no labour at all, no other means of support, and who chronically lack food security.

Consultants' Scope of Work:

USAID's office of Microenterprise Development, along with several partners, is testing a model that combines safety net assistance with microfinance to help very poor people establish sustainable livelihood activities in order to graduate from safety net support. The pilot methodology includes a rigorous impact analysis that will help determine this model's potential. The goal is to identify a model that (1) effectively moves very poor people out of dependency on safety net assistance, (2) can be replicated widely, and (3) can be scaled up. This model is also being tested in Haiti; West Bengal, India; Honduras; Pakistan; and Andra Pradesh, India.

The aim in Kilde Awlaelo is to incorporate sector assessment/selection and enterprise development components into the model. This will facilitate identification of a viable market and plug pilot participants (and possibly non-participant community members as well) into the opportunities that such a viable market presents, in order to expand participants' livelihood options; introduce activities relevant for landless people (including youth); and increase the value participants generate and return they receive for their efforts. To this end, the consultants undertook a value chain analysis for the beekeeping, dairy, vegetables (tomatoes), and shoats sectors whose results are included in this report.



Methodology

The value chain assessment was conducted by two international consultants with assistance from REST staff. In order to successfully handle all the aspects of the assessment and within the parameters of the scope of work, the consultants used both secondary and primary research. Secondary research was drawn from donor, NGO, business, and government reports; case studies; and website data. Primary research included one-one-one interviews and focus group discussions with farmers (PSNP beneficiaries and non-participants), government officials, sector specialists, NGOs, and key market actors working in the sectors. As detailed under Part III, a sector selection activity was conducted with a team of local stakeholders to arrive at the shortlist for analysis. The information gathered for targeted sectors, including key opportunities and constraints, was then used to identify priority areas for intervention.

The consultants spent a total of 17 days in Kilde Awlaelo which included general data gathering, value-chain selection, and sector-specific interviews with key market actors. Given the limited time available, consultants focused on developing an overall understanding of the value chain dynamics of each sector rather than a comprehensive analysis. Each of the four sectors may warrant a similar amount of time (or more) for their individual analysis.



PART III. VALUE CHAIN SELECTION

A value chain selection activity was undertaken with Mekelle-based stakeholders in order to identify the priority sectors for targeting. It must be noted that this methodology is largely a subjective process, and drawn from the combined knowledge and experience of the selection committee. Therefore the consultants strived to select stakeholders that possessed a diverse technical background, while sharing a common understanding of the graduation pilot activity. The following individuals comprised the value-chain selection committee:

- Atakilti Abebe, Agricultural Development Division Head, REST
- Mehari Taamrat, Livestock Expert, REST
- Dawit Woldelibanos, PNSP Expert and M&E Coordinator, REST
- Daniel Assefa, Head Operations Department, DECSI
- Zerastion Fessha, Marketing and Cooperative Promotion Division Head, REST
- Mulugeta Berhane, Department Head, Environmental Rehabilitation and Agricultural Development, REST
- Semere Gebrebre Tsadik, Head, Department of Market Research and Information, TAMPA
- Alyaham Hailu, Head, Promotion of Capacity-Building, TAMPA

The value chain selection process entailed three stages: 1) initial brainstorming session to develop a raw list; 2) application of an initial filter through an attractiveness matrix; and 3) selection of final sectors through evaluation and scoring.

Initial Brainstorming

As an initial activity, an open brainstorming discussion was facilitated by the consultants in order to identify any potential industries that could have relevance to target beneficiaries of the safety net program located in the Kilde Awlaleo Wereda. The following on-and off-farm sectors were identified:

- | | | | | |
|-----------------|--------------------------------|----------------|---------------|-------------------|
| ▪ Agro-forestry | ▪ Salt | ▪ Sand | ▪ Shoats | ▪ Tomatoes |
| ▪ Spices | ▪ Beekeeping | ▪ Dairy | ▪ Orange | ▪ Cactus |
| ▪ Poultry | ▪ Silkworm | ▪ Sisal | ▪ Ground nuts | ▪ Stone Quarrying |
| ▪ Potato | ▪ Metal/Woodwork | ▪ Block-making | ▪ Barley | ▪ Chickpeas |
| ▪ Wheat | ▪ Teff | ▪ Guava | ▪ Onion | ▪ Hides & Skins |
| ▪ Garlic | ▪ Lettuce/Cabbage | ▪ Carrots | ▪ Cauliflower | ▪ Beer Production |
| ▪ Papaya | ▪ Mango | ▪ Banana | ▪ Avocado | ▪ Grapes |
| ▪ Lime | ▪ Improved Stove Manufacturing | | | |

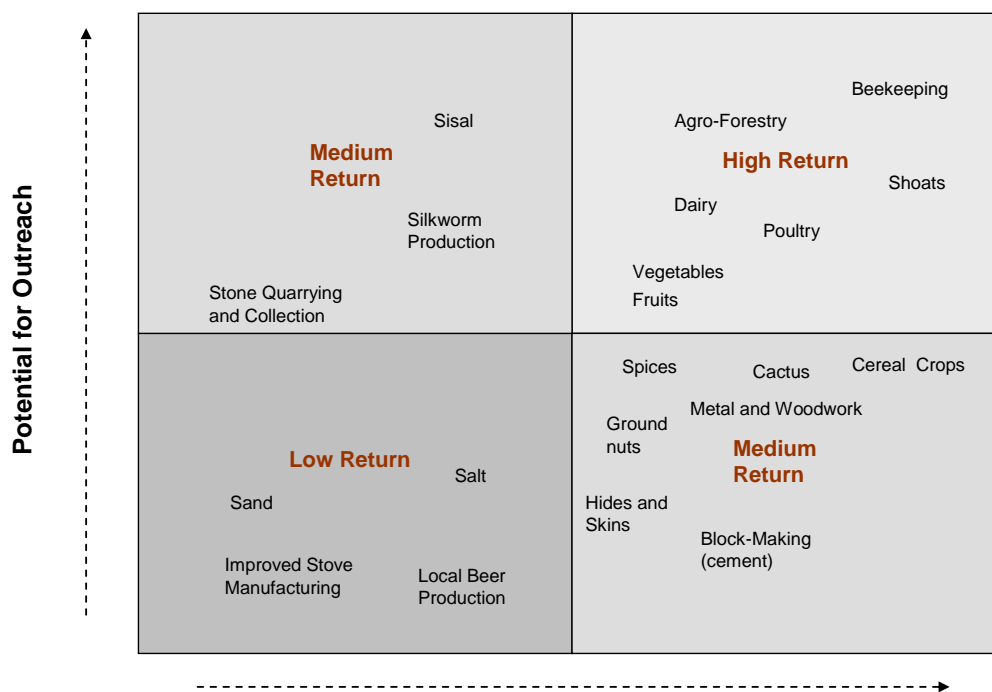
Attractiveness Matrix

To narrow the raw list of potential sectors, an Attractiveness Matrix was applied to measure and compare the relative “attractiveness” of each sector against the primary objectives of the pilot graduation program. All 37 potential industries were debated by members of the selection committee, where-after they were plotted against the X and Y Axis criteria of “Potential for Outreach” and “Potential for Growth.” For ease



of analysis it was decided that all horticulture commodities be grouped under the headings of vegetables and fruits, while teff, wheat, and barley be categorized as cereal crops. The results were as follows:

Filter #1: Attractiveness Matrix Results



The team was challenged by the consultants to narrow the list to 6 priority sectors for evaluation. It was noted that both fruits and vegetables were listed as equally attractive industries. After some discussion members agreed that vegetables offered greater opportunity for the target beneficiaries than fruits, largely due to the perennial nature of fruits which would require a minimum of 3-4 years from planting of seedlings until initial harvest. This rendered the sector unattractive for youth and the landless, who rented land on a seasonal basis.

The Attractiveness Matrix filter resulted in the following sectors as having high potential for both growth as well as outreach:

- Agro-forestry
- Vegetable Production
- Beekeeping
- Shoats
- Dairy Production
- Poultry

Evaluation and Scoring

To rank the short-list and arrive at the priority sectors for targeting, an evaluation and scoring exercise was undertaken with more detailed criteria relevant to the graduation program.

Weighting was applied in the scoring to emphasize those sectors that would allow the graduation pilot to increase the competitiveness of a particularly industry (particularly strong end market demand and potential for value addition) while incorporating target beneficiaries as core actors of the value chain (including women, youth, and landless). The selection criteria, weighting, and rationale applied were as follows:



Filter #2: Ranking Matrix

Value Chain Selection Criteria	Weighting (%)	Rationale
Competitiveness potential of sector	30	<ul style="list-style-type: none">▪ Potential exists to significantly increase revenues or sales within a range of areas along the value chain▪ Sector offers possibilities for value-addition, product innovation, differentiation▪ Sector is not overly constrained by legal or regulatory barriers▪ Unmet demand in domestic, regional, and/or international markets.
Potential to maximize impact and outreach	35	<ul style="list-style-type: none">▪ A critical mass of target beneficiaries exists, with potential for program leverage▪ Sector has potential to increase employment for both men and women, as well as youth and landless▪ Significant potential exists to maximize incomes and improve livelihoods.
Lead firm presence	25	<ul style="list-style-type: none">▪ Presence of existing lead firm(s) willing to source or collaborate with target beneficiaries▪ Potential for forward / backward linkages between lead firms and target beneficiaries.
Potential for “multiplier” effect with other economic sectors	10	<ul style="list-style-type: none">▪ Expanded growth of sector has potential for stimulating the development and increased economic opportunity within other industries▪ Environmental impact within sector is minimal.

Each member of the team individually ranked each sub-sector according to the specific criteria, which were later combined to establish an average ranking. To offset any potential bias by a selection committee member, the highest and lowest scores under each evaluation criteria were removed to prevent a distorted outcome. The scoring process resulted in the following:

- Beekeeping 4.60 points
- Dairy 3.93 points
- Vegetables 3.69 points
- Shoats 3.68 points
- Agro-Forestry 3.64 points
- Poultry 3.27 points

It must be emphasized that the selection methodology applied is a subjective process, and merely a proxy indicator for those sectors that may have strongest potential for success under the pilot graduation program.



PART IV. BEE-KEEPING VALUE CHAIN

Overview

Beekeeping has a long-standing tradition in Tigray Region, dating back to ancient times during the kingdom of Abyssinia. Today Ethiopia ranks as the 9th largest honey producer in the world (greatest producer in Africa), with a total output of 39,000 MTs.³ It is also the 4th largest beeswax producer after China, Mexico, and Turkey, and has the largest bee population in Africa with an estimated 10 million bee colonies.⁴ In the Kilte Awlaelo Wereda alone, approximately 8,540 farmers are engaged in honey production with an annual output of 234.61 MTs of both traditional and modern variety.

Honey Productivity for Kilte Awlaelo Wereda (2003 – 2008)

Production Year	Productivity – Modern			Productivity – Traditional			Total Production of Honey		
	Amount (MTs)	No. of Hives	No. of Farmers	Amount (MTs)	No. of Hives	No. of Farmers	Amount (MTs)	No. of Hives	No. of Farmers
2003-04	16.2	625	381	1.28	132	132	17.48	757	513
2004-05	20.17	1537	724	1.64	226	226	21.81	1763	950
2005-06	115.5	4620	2697	26.19	3274	3230	141.69	7894	5927
2006-07	197.7	7300	3650	37	5292	3528	234.7	12592	7178
2007-08	191.25	7726	4183	43.36	5731	4366	234.61	13457	8549
2003-08	540.82	7726	4183	109.47	5731	4366	650.29	13457	8549

Source: Bureau of Agriculture, Wukro Wereda Office, October 2008

In Kilte Awlaelo the long (*kiremti*) rains take place from June through mid-September. This period is followed by heavy flowering and vegetation which characterizes the peak production and harvesting season (late September – mid December). Minor harvesting also takes place between May-June. Traditional beehives produce approximately 5-6 KGs per year, while modern production averages 15-25 Kgs per year. While modern technology has a dramatic increase on both quality and quantity of honey produced, the majority of farmers in Kilte Awlaelo still apply traditional practices. Honey has a long shelf life, and can be stored in clay jars on-farm or packed in plastic bottles and airtight transparent glass in varying sizes. Exporters are capable of delivering large bulk orders in food standard plastic containers holding 20 liters and greater.

Honey can be classified by the type of feed and color. Feed is derived from the diverse species of bushes and trees, which in Kilte Awlaelo includes Tebeb, Tiribioya, Sukakerni, Hohot, and Eucalyptus. Red, yellow, and white are the principal colors or varieties of honey produced, with white comprising 90% of

³ FAO statistics division 2005

⁴ Deffar, Girma. "Non-Wood Forest Products in Ethiopia," EC/FAO ACP Data Collection Project Technical Report. 1998.



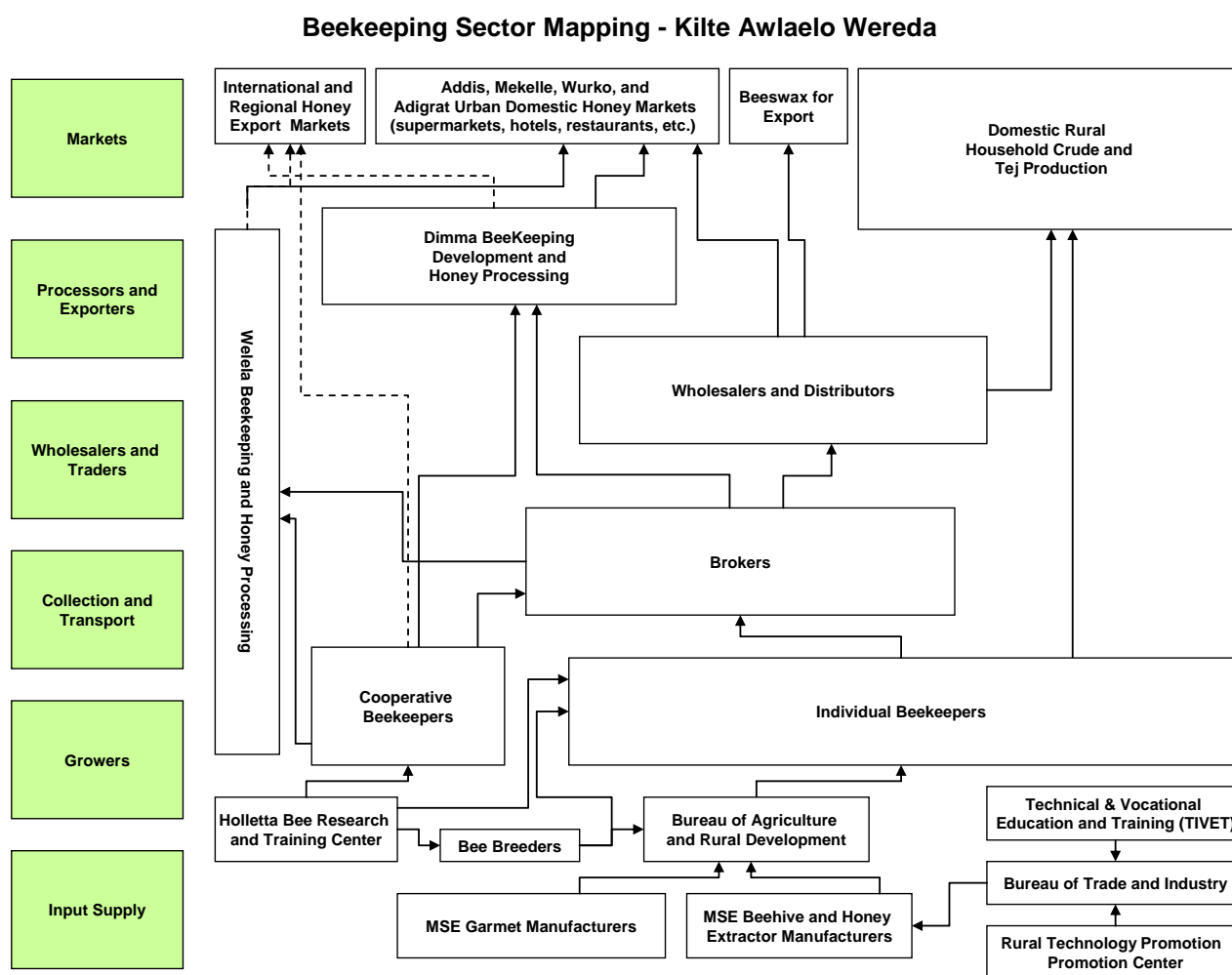
production and the highest in demand.⁵ White honey can be produced in both liquid and cream form, and is characterized by a strong aroma, low moisture content, consistent texture, and bright color.

Beeswax is an additional output with potential as a cash or export crop, although in Kilte Awlaelo extraction is limited due to lack of proper extraction equipment. The product can be easily stored, does not deteriorate with age, and presents significant export earnings potential.

The total quantity of beeswax from a traditional hive is 30% of total honey production, whereas a modern hive yields 3% of total honey production.⁶

Sector Mapping

The primary value chain actors in beekeeping include input suppliers (bee breeders, beehive honey extractor manufacturers, garment makers), research and training institutions, beekeepers, middlemen, honey processors and exporters, wholesalers, and retailers.



⁵ Red, yellow, and white are further divided into traditional and modern varieties, with the latter commonly found in the domestic retail and export markets.

⁶ Regional Gross Domestic Production Estimates for Tigray Region, 2007/2007, Tigray Regional National State Finance and Economic Development Bureau, January 2008, Mekelle



Value Chain Structure and Dynamics

- Enabling Environment:** Ethiopia does not regulate the production of honey, nor provide quality assurance mechanisms to prevent adulterated product from entering the market. The Ethiopia Honey and Beeswax Producers and Exporters Association (EHBEPX) in coordination with the Netherlands Development Agency (SNV) have put forth an actively lobbying effort in this regard. Should the government fail to enact a policy the opportunity for industry self-regulation must be explored. Additionally, producers have been found to label their product 100% natural and organic without valid certification mechanisms in place. At the processing level, ISO, HACCP, and organic certification are needed to fully exploit end market outlets. Organic certification must also extend to producer level, as well as traceability and quality management systems (QMS) to ensure grade 1 standards are met.
- End Markets:** There are 16 registered processors and exporters in-country, however the majority are under-producing due to lack of supply and high domestic demand. Strong end market opportunities exist in the immediate area surrounding Kilde Awlaleo. Located in neighboring Adi Grat, Dimma Bee-keeping Development and Honey Processing PLC opened in 2005 with a production capacity of 1,000 Kg per 8 hour shift. The firm has already received ISO 9001:2000 QMS and HACCP certification. Approximately 75% of production is sold to Addis, where the company markets through a promotional center and network of distribution agents and wholesalers. The remaining 25% is consumed in Mekelle and surrounding areas. The firm has recently commenced export to regional markets in Sudan, Benin, Uganda, Yemen, and Saudi Arabia. Dimma is also targeting the European market. Upon realization of these market outlets the company may incorporate an additional 8 hour shift provided steady supply is achieved.

Located in Mekelle, the Welela Bee-keeping and Honey Processing Plant (Comel PLC) is another industrial-scale firm with a processing capacity of 1,200 Kgs per day. The firm is slowly scaling up production (has presently reached 400 Kg/day) and is targeting both the Middle East and European markets. In Wukro town the “Beekeepers Association Selam of Wukro” actively sells 8,000 – 9,000 Kgs per year to the domestic and export market. Slowfood International Organization, a donor has assumed an active role as market intermediary for the Association. Adi Grat, Wukro, Makelle, and Addis all serve as viable domestic markets with prices consistently ranging from 33–53 BIR/Kg retail for modern white variety.

Monthly Average Retail Honey Prices for Wukro Market (Kgs)

Honey Variety	2007				2008							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Red	16.83	18.75	25.67	21.25	21.00	27.50	28.25	28.75	20.00	29.00	27.00	34.00
Red Traditional	17.33	17.00	17.50	19.75	18.30	19.25	19.75	20.40	23.00	24.13	25.83	28.00
White	40.00	33.50	40.50	41.63	39.40	40.63	39.88	44.40	43.00	45.38	43.67	51.50
White Traditional	34.50	31.83	35.88	35.25	35.80	36.38	37.88	39.80	41.13	41.88	38.13	47.50
Yellow	25.17	26.00	32.00	29.38	26.50	31.75	31.00	33.70	33.25	35.00	35.63	41.75
Yellow Traditional	29.33	25.67	26.63	25.50	26.13	26.63	30.75	27.60	29.00	29.75	28.67	31.00

Source: Tigray Agricultural Marketing Promotion Agency (TAMPA) 10/13/2008

Strong regional and international export markets exist in Africa (Uganda, Sudan, Benin, Yemen), Europe, Asia, and the Middle East (Saudi Arabia). Supply to the regional and international market however is constrained by the high domestic price of honey which exceeds that of the export market.



- **Horizontal and Vertical Relationships:** The majority of honey processing firms depend on small-scale beekeepers for supply. This fact, coupled with increasing end market requirements for traceability and organic certification serve as an incentive for more direct producer-buyer relationships. Dimma sources 10% of their supply from dedicated agents who have been trained in quality control and handling. The remaining 90% is sourced from a network of 19 rural-based production centers spread throughout Tigray District. Formerly property of the firm, the production sites have recently been handed over to youth cooperatives on soft credit terms. Each site consists of modern beehive boxes, production equipment (clothing, honey extractors, smokers, jars, casting molds, etc.) and storage sheds. The plots have been set-aside as communal land by the government allowing the landless youth to conduct their business. In addition to the inputs on credit, the firm provides embedded services by training the youth in modern bee-keeping techniques, while providing collection and transport from each production site. The firm recovers the costs of inputs and services from the supply of honey. Dimma is interested in extending this model to Kilte Awlaelo.

Welela has established in-house bee farms for honey production and queen rearing in Degua Tembien. This enables them to maintain a steady supply of honey, and provides traceability of their bee farms for the export market. The company-run plantation areas also serve as a demonstration to community outgrowers on best practices in bee-keeping. Welela supplements their internal production with individual farmers, cooperatives, and agents. The company would like to expand its outgrower network by developing youth groups and market centers for collection, while providing training in handling and preservation methods.

A strong domestic and emerging export demand, coupled with a variety of end market outlets has resulted in a relatively balanced governance structure for bee-keeping in Kilte Awlaelo. Both lead firms and suppliers set the terms for negotiation as well as market and brand value. A strategic advantage exists for both producers and buyers to maintain their vertical relationships.

Although the majority of beekeepers produce and sell as individuals, horizontal linkages have emerged in the form of associations such as the “Beekeepers Association Selam of Wukro,” who undertake the bulking of inputs as well as production. A recent trend is the development of youth cooperatives that practice bee-keeping on communal land. While some limited training in the technical aspects of bee-keeping has been provided to such cooperatives, their relative understanding of general business and financial management remains weak. For example, the Haitamo Cooperative located in Atsbi Wenberta is one of 19 Dimma outgrower production centers. While a significant amount of inputs have been handed to the Cooperative members (landless youth) on soft credit terms, the Cooperative Chairman was unable to articulate the costing of such inputs, payback terms, as well as buying price and marketing arrangement with lead firm Dimma.

- **Support Services:** Bee-keeping supports a dynamic input supply market which includes the beehive, bee colony, wax, tree and bush seed producers, casting mold, honey extractor, sprayer, smoker, brush, chisel, refractometer (to measure moisture content), glass or plastic storage jars, and clothing such as mesh veil, gloves, and boots. The diverse nature of such inputs supports a variety of off-farm industry. The Bureau of Trade, Industry, and Transport has played an active role engaging Mekelle-based metal and woodworking MSEs. Through coordination with the Rural Technology Promotion Center, the Technical and Vocation Education and Training Institute (TIVET), and the UNIDO Cluster Development Program, over 300 metal and woodworking MSEs have been trained in the production of modern beehives and honey extractor technology.⁷ Beehive boxes are typically sold for 700-750 BIR on soft credit terms. Over 99% of beehive production orders these MSEs receive are placed by the Bureau of Agriculture for distribution under the safety net program. Over the past 4

⁷ The Rural Technology Promotion Center is a division of the Tigray Agricultural Research Institute (TARI) based in Mekelle.



years more than 70,000 modern beehives have been purchased by the Bureau of Agriculture, and this year alone an additional 40,000 orders have been placed.

Habte Geoworgis is one of three metal and woodwork MSEs selected by the Bureau of Agriculture to manufacture beehive boxes in Wukro town. Over the past 3 years he has sold over 750 beehive boxes to the Bureau of Agriculture, while selling only 2 boxes for private beekeepers during that same period. While there is significant reliance on the government to place manufacturing orders, maintenance of the beehive boxes is taking place outside of government support. On average Mr. Geoworgis refurbishes approximately 30 beehive boxes per year at a cost of 50-100 BIR each, paid for by farmers in cash.

The Ministry of Agriculture is responsible for development of the apiculture industry in-country which liaises closely with the Holletta Bee Research and Training Center. Training in modern bee-keeping and handling is an important support service also offered by lead firms such as Dimma and Welela to their outgrower networks. Some of the more successful beekeepers such as Haleka Alem Aberha have been hired by the Bureau of Agriculture to provide awareness creation and skills training to upcoming beekeepers throughout Tigray. The majority of skills training however is provided through the Bureau of Agriculture Development Agents who are found at the Tabia level.

The vast majority of inputs for beekeepers in Kilde Finance have been provided through heavy donor subsidies or on soft credit terms by the government through the safety net package as “asset transfers.” The Bureau of Agriculture has been the most active in delivering inputs to beekeepers, with credit provided by DECSI backed by a government guarantee. While this has had significant impact and outreach among target beneficiaries, an expectation that the Bureau of Agriculture will continue to play this role has resulted in a level of dependency among farmers. The blanket provision of inputs on soft credit also undercuts the business aspects of bee-keeping. During the various focus group discussions and field interviews not one beekeeper was able to articulate their production costs or gross margins. For youth cooperatives managing the Dimma outgrower production centers, the understanding is that capital equipment will be paid back through the sale of honey to the processor over a three year period. However, there is confusion as to the actual monetary value of the equipment, the manner in which honey will be priced and applied to the deduction, as well as the terms and penalties should a cooperative fail to sell sufficient quantities of honey to the processor. According to one member, “we can sell to whom we please.”

- **Firm-Level Upgrading:** Transformation from traditional to modern beehive equipment is the most important factor to upgrading a beekeeper’s enterprise. A traditional beehive produces 3Kgs – 5Kgs of honey per annum while a modern beehive can yields between 30Kgs – 45Kgs during the same period. These differences are not only significant, but the quality of honey from modern technology also commands a higher margin. In addition to the box, inputs such as the honey extractor, bee colony, and even cultivation of nearby bushes and trees for the bees requires significant investment.

Systemic Opportunities and Constraints

OPPORTUNITIES

- **Dynamic and Growing End Market:** Two newly formed industrial-scale honey processors and exporters are operating within close proximity to Kilde Awlaelo and have expressed interest in the establishment of dedicated collection centers that provide bulking facilities and a guaranteed market for farmers. The processors are also committed to providing apiculture advisory services to ensure modern beekeeping practices are maintained. Both firms are currently operating only one 8 hour shift and have the potential to double production. In addition to this unmet supply, local retail domestic



demand remains unsaturated, with prices exceeding that of the export market. Domestic demand is also driven by local wine known as Tej of which honey is a key ingredient.

- **History of Bee-keeping Production and Traditional Know-How:** Bee-keeping is not unfamiliar to the people of Kilte Awlaelo. The Tigray people have a longstanding tradition of bee-keeping dating back to the ancient kingdom of Abyssinia. This familiarity and pride with bee-keeping can support rapid uptake among additional beneficiaries.
- **Bee-keeping can be practiced by Women and Landless Youth:** With relatively low start up costs and minimum land requirements, bee-keeping offers high potential for outreach among safety net beneficiaries. Cooperative-based production schemes offer opportunity for the landless and youth on communal lands. The non-labor intensive aspects of bee-keeping are favorable for women. For those beneficiaries engaged in other types of farming, bee-keeping can complement already-existing crops by increasing production through pollination while promoting biodiversity. Honey is also a stable commodity with a relatively long shelf life, and may serve as a risk mitigation strategy as an additional income stream.
- **Heavy Multiplier Effect on Support Services Industry:** A vibrant bee-keeping sector supports a number of off-farm industries in Wukro and Mekelle town, including garment manufacturing, as well as bee-hive box and honey extractor construction. Additional uptake of bee-keeping will serve as a stimulus particularly among MSEs operating in the wood-work and metal-work sector.
- **Unique Quality of White Wukro Variety:** Stemming from the nectar-yielding vegetation and climatic conditions, Kilte Awlaelo is able to produce a unique white cream honey with relatively low moisture content. The potential exists to exploit this high quality variety with a branding campaign on the international market.

CONSTRAINTS

- **Honey Adulteration and Lack of Quality Control Systems:** The practice of mixing traditional varieties with white modern has had a damaging effect on the end market reputation of Ethiopian honey at the domestic level, and may result in more serious imagery issues on the export market should the practice remain unchecked. This is partly due to the deficiency of established traceability and coding systems with outgrower producers, as well as the lack of a national honey policy with acceptable quality control standards and monitoring mechanisms.
- **Weak Outgrower Schemes and Non-Businesslike Approach of Producers:** The bee-keeping business in Kilte Awlaelo is largely characterized by a social welfare orientation rather than a business-like approach. Farmers are not able to cost inputs, calculate margins, articulate production costs, or forecast production. Youth Cooperatives have been handed extensive equipment on credit without an understanding of the monetary value or payback terms. Verbal marketing arrangements have been made with lead firms however confusion abounds regarding pricing, collection, grading, and supplier commitment. Significant dependency has developed on the supply-driven NGO and donor safety net schemes, which not only procure and deliver inputs to farmers on soft terms, but actively decide “whom” among the beneficiaries should be selected for assistance. Donor organizations such as Slowfood International have undertaken direct marketing activities for select groups. An exporter based in Mekelle lamented that such practices have induced price distortions and unrealistic expectations among producers, thus driving the price artificially high.
- **Lack of Modern Bee-keeping Equipment and Handling Techniques:** Modern movable frame hive technology not only produces the appropriate high value variety of honey, but exceeds yields from traditional hives by 400–500%. With the majority of beekeepers in Kilte Awlaelo still utilizing traditional or cultural equipment, the output per head/per hive remains comparatively low. The lack of proper harvesting equipment and apiary tools challenge farmers during extraction, and make it



difficult to maintain the standard moisture content. Proper post-harvest handling techniques are also lacking, and sanitation levels concerning production do not meet the minimum requirements for export.

- **Human and Nature-Induced Environmental Factors Hamper Production:** The application of agrochemicals on a neighboring crop can prove fatal to the health of a bee colony while it also limits opportunities to label production as organic. Environmental factors such as fungus and rust can also kill a colony. Drought can affect the availability of local flora and can limit the water source for a bee colony, which on average drinks over 1 liter of water per day. Degradation of the national bee-keeping resource base has been cited as an increasingly worrisome trend among stakeholders.
- **Low Volume of Production and Strong Domestic Demand Limits Supply for Export Market:** Even with modern equipment, beekeepers in Kilde Awlaelo averaged just 25Kgs per hive/per year during 2007-2008 (Source: BOARD, Wukro Wereda 2008). The limited production volumes and smallholder nature of the product complicates bulking, traceability, and certification efforts while raising the costs of production. For those honey processors targeting the export market, the unmet local demand for honey and strong domestic price (which exceeds that of the international market) will challenge a rethinking of their business strategy.

Priority Interventions

Given the various systemic opportunities and constraints the following interventions are offered to improve competitiveness of the bee-keeping value chain.

First, a concerted effort must be made to strengthen and expand cooperative structures, while laying the foundation for sustainable linkage arrangements with lead firms. Group based production schemes for honey are recommended, particularly for landless youth on communal lands. A business-like orientation however must be instilled, whereby time and resources are costed and expected margins calculated. Marketing strategies should be developed targeting domestic retail as well as lead firm export outlets. Linkage arrangements with producers and lead firms must be formalized, and based upon a clear set of shared risks and responsibilities, preferably detailed in a supply contract. Lead firms should be encouraged to offer price premiums for those cooperatives meeting minimum quality, volume, and traceability requirements. The success of a number of initial pilot cooperatives can stimulate eventual incorporation of additional producers that adhere to a minimum set of production and quality management system requirements.

Continued support is also needed to transition production to modern hive technology. Traditional beehives in Kilde Awlaelo still outnumber those of modern technology limiting production volume as well as quality. Over the past 5 years, 99% of modern beehive boxes have been procured and disseminated by the Bureau of Agriculture and Rural Development (BOARD) on soft credit terms. This has reinforced dependencies and expectations among farmers that it is the government's responsibility to effect such change. A more commercial approach is needed to promote modern beehive technology among safety net beneficiaries. Incentive schemes can be developed for those willing to invest or agree to more commercial financing terms (ex. Buy a beehive and get a free bee colony, or buy a beehive and receive free seedlings to plant and promote nectar-yielding vegetation). Above all BOARD should be delinked from the supply-driven approach of deciding who the beneficiaries are, procuring and distributing the equipment, and setting the purchase price from bee-hive manufacturers. Farmers should share some responsibility as well as risk. Incentives can be introduced to promote the modern technology while letting market forces be allowed to function.

Modern hive technology must be accompanied with the latest apiculture practices. Bee-keepers in Kilde Awlaelo require capacity-building in modern techniques related to breeding, extraction, and post-harvest handling. Such training should also include beeswax processing (heating, filtering, storage) as an



additional source of income. While Bureau of Agriculture Development Agents provide critical extension at the Tabia level, outreach is limited. Assistance can be provided to train and develop lead firm field officers to provide apiculture extension as part of their embedded service arrangement. In each Cooperative-based structure, a quality control expert can be appointed by members for training in modern apiculture techniques.

Whether through government policy or industry self-regulation, continued support should be provided to ensure adherence to minimum quality standards for both producers and processors. The Ethiopia Honey and Beeswax Producers and Exporters Association (EHBEPX) is appropriately placed to lead such industry efforts.

Finally, the increase in honey production will have a catalyzing effect on off-farm support industries. Further assistance should target those off-farm MSEs based in Wukro town that have the capacity to meet the input supply demands. These include manufacturers of bee-keeping clothing, honey extractor, smokers, bee-hives, and even clay jars for storage of honey on-farm (provided acceptable quality standards are met).



PART V. DAIRY VALUE CHAIN

Overview

Ethiopia is well known for having one of the largest cattle populations in Africa. The livestock industry is not only significant in terms of the large cattle count but also as an important source of food, income, and foreign exchange to the country. The livestock sector contributes 12% of the total GDP, and 33% of the agricultural GDP⁸. FAO statistics ranked fresh cow milk as one of the top food commodity in Ethiopia and estimates that more than 1.5 million tones of milk (equivalent to USD 398.9 million) was produced in 2005. Although farmers all over the country have kept dairy cattle for generations, modern dairy farming was only introduced in the 1950s when the country received its first lot of modern dairy breeds of cattle from the United Nations Relief and Rehabilitation Administration. While the overall productivity of the industry is considered to be lower than that of neighboring countries such as Kenya, all evidence points to a growing national dairy sector that is attracting both government and private sector investment.

There are three primary dairy production systems that are recognized in Ethiopia: *Rural dairy system* which is part of the subsistence farming system and includes pastoralists, agro-pastoralists, and mixed crop–livestock producers; *the peri-urban*; and *urban* dairy systems. These systems are organized based on climate, land holdings and integration with crop production.

The Livestock Census Analysis Result undertaken by the Bureau of Agriculture in 1999 (EC) indicates that there are more than 3 million cattle in Tigray. Of these, approximately 1.1 million, which represent 62.81% of the total heard, are female. The average cattle holding within the region is 4.54 animals per household, with the highest average cattle holding being in the Western Zone with an average holding of 7.72 animals per household. The lowest average holding is in the Eastern Zone with an average holding of 2.79. The regional per capita milk consumption is estimated at 14 kg/year, which is lower than the national rate of 20 kg/year.

The main dairy products sold in the region are raw milk, butter, and traditional yoghurt (fermented whole milk). These products are mostly consumed by households, cafes, and restaurants. Data on the amount of milk consumed by hotels and restaurants was unavailable during the study, but other data showed that on average, hotels and restaurants consume 8.5 kg of butter and 2.5 kgs of imported powder milk per month while snack bars utilize 12 kg of butter and 10 kg of powder milk per month⁹. Low incomes and purchasing power of households in the region have adversely affected consumption and purchase of dairy products. A recent study by REST estimated that consumption of dairy products could be up to 10% of a household's budget when considering the regional annual average price of milk and butter. This makes dairy products a luxury that most households cannot afford. However, respondents interviewed around Mekelle town indicated that the consumption rate is likely to increase due to the lifestyle changes especially among the younger generation who tend to consume more dairy products. Other studies project that the average milk consumption in the region will catch up to the national average within five years. An expected increase in the region's population by approximately 3% per annum is likely to increase the demand of dairy products.

For small holder farmers in Kilte Awlaelo, cattle are considered to be the most productive asset after land and are rarely sold except in drought years or after their productive years¹⁰. Historically, cattle were kept for draught power, as a means to accumulate wealth, and as a source of milk for household consumption. Milk was rarely sold to generate income, but the surplus was shared with neighbors. Prior to 1992 EC

⁸ Dairy production, processing and marketing systems of Shashemene–Dilla area, South Ethiopia- ILRI & IPMS

⁹ Gebregziabher Gebreyohannes, TARI, Mekelle

¹⁰ Tigray Livelihood Zone Reports



(Ethiopian Calendar), only local breeds were reared in the Wereda. In 1992 (EC), REST and the Bureau of Agriculture introduced 5 cows of the Beigait breed to the district. The current total herd in the district is dominated by the Arado breed, a local breed, with a current total number of 59,236. The table below illustrates the total number of cattle by breed, their average daily and annual milk production.

Total Number of Cattle in the District and their Milk Production in the Kilte Awlaelo (2008)

Breed	Number	Average daily milk production	Annual Production
Holstein/Friesian	355	18 liters/day	88,200 liters per year
Arado	59,236	3 liters/day	1,368,351.6 liters per year
Begait	163	6 liters/day	171,150 liters per year
Boran	58	8-12 liters/day	Not available, since introduced less than 2 months before the study

Source: Bureau of Agriculture, Wukro

There has been a steady increase of improved breed cattle in district. Currently there are 355 Holstein/Friesian, 163 Begait, and 58 Boran cattle. The table below shows historical data on the introduction of improved breed animals in the Wereda. Though a modest number for a district its size, NGOs and the Bureau of Agriculture have been faced with a chronic shortage of these breeds. In fact, all new breeds introduced to the district have been acquired from the Central and Western part of the country. Despite this and other challenges, interviews with farmers indicated that their attitudes towards dairy farming are changing from merely being a sign of wealth or source of milk for household consumption to a potential source of recurrent and multiple sources of income. To this end, a trend of farmers collaborating in groups and cooperatives to secure more benefits from dairy farming was observed.

Historical Data on the introduction of Improved Breeds in the District

	1991 (EC)	1992	1993	1994	1995	1996	1997	1998	1999	2000
Holstein	5	0	3	11	12	14	23	58	76	152
Begait		5	42	38	14	21	32			11

Source: Bureau of Agriculture, Wukro

A study done in Addis Ababa and surrounding areas in 1997 EC estimates that the cost of milk production is 1.2 Birr/liter¹¹. This study was based on the average sale price of 2.75, which is lower than the current milk prices. REST estimates that the cost of production in Tigray is 1.20 Birr/liter in urban areas and 0.85 Birr/Liter in rural areas. However, more recent interviews with farmers in Kilte Awlaelo indicate that their production costs are much higher than the above estimates. For example, data from three farmers shows production costs ranging from 1.89 Birr/liter to 2.89 Birr/liter. More analysis needs to be done in this area since these costs are important to illustrate potential/actual profits.

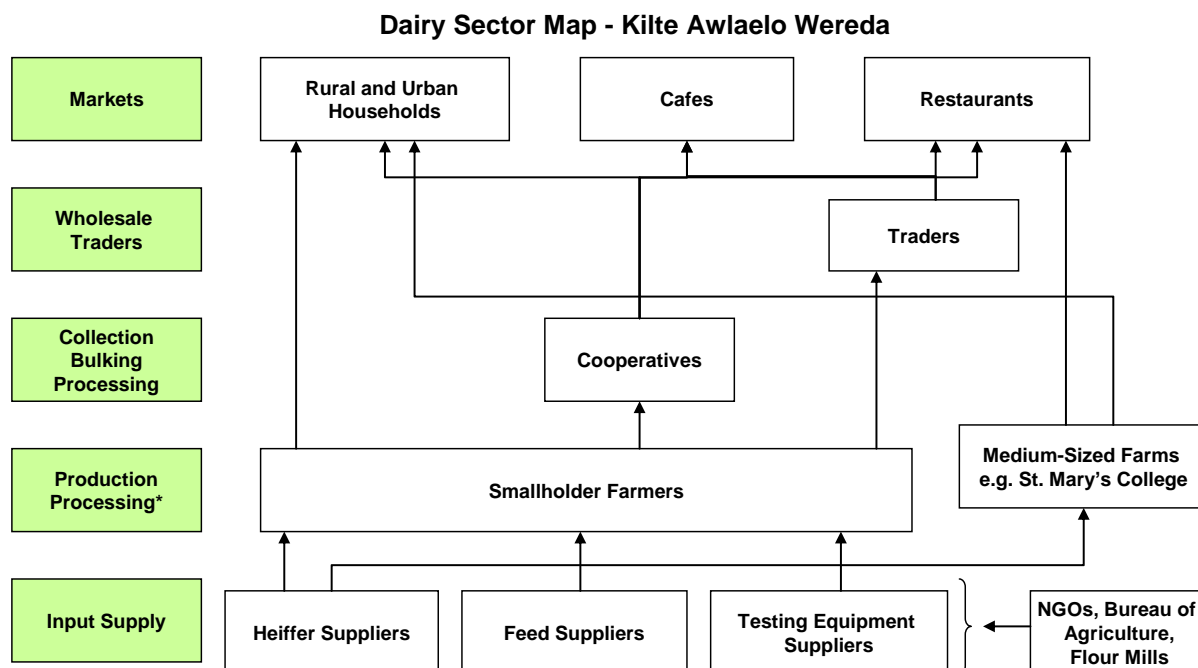
Recent improvements in the district's infrastructure show potential to support further development of the dairy industry. New roads linking villages to towns and good access from Wukro to Mekelle can support a strong marketing chain. Ongoing efforts in natural resource management through the PSNP are supporting construction of livestock ponds, land management, and enrichment of grazing land with improved seeds which are all critical for dairy farming.

¹¹ Dinsho PLC 1997



Sector Mapping

The diagram below shows the various channels and market actors involved in selling milk in the Wereda. The dairy sector map in the Kilde Awlalelo is fairly simple compared to similar maps in cities such as Addis Ababa where the sector includes more actors.



Note: Processing refers to the traditional practices of turning whole milk into butter or yoghurt

The following channels are illustrated in the diagram:

- **Raw milk from farmers to rural consumers:** Milk is sold by small holder farmers directly to rural consumers in their immediate neighborhoods. This is the most vibrant channel and is likely to continue to grow due to its simple structure. Sales to local consumers provide the opportunity to quickly dispose of milk, a highly perishable product, in any quantity at the current market price. Production of butter prolongs the shelf life of the milk especially during fasting periods and is sold directly to other households or at markets. Poor households (with 0-2 cattle), middle households (with 2-6 cattle) and better off households (with 3-9 cattle) are all involved in this channel, but the middle and better off households benefit the most from this channel due to higher amounts of milk produced. Anecdotal evidence shows that the price of milk through this channel mirrors that of the market in the surrounding areas, which currently ranges from 3-5 Birr per liter of whole milk and 80 Birr per kg of butter.
- **Raw milk from cooperatives to rural and semi urban consumers:** Farmers in the district are slowly changing their attitudes towards dairy farming and are collaborating in form of cooperatives in an effort to maximize benefits from their enterprises. Most of the cooperatives that were visited collect milk from their members and resell it as boiled milk, traditional yoghurt, or butter through their shops in semi urban areas or directly to rural consumers. The cooperatives buy milk from their members at a lower price than the market price and then resell it at a higher price. A profile of one of a cooperative in Agula is illustrated in a text box on the right.
- **Raw milk and milk products via intermediaries to rural and urban consumers:** The consultants did not come across any traders or intermediaries during their primary data collection. However,



empirical evidence shows that there may be a few traders who buy dairy products, primarily butter from rural areas within the region, for resale in open markets and to urban consumers.

Value Chain Structure and Dynamics

- **Enabling Environment:** Interviews with personnel in the Bureau of agriculture, NGOs, and farmers suggest that the regional and district government, despite their limited resources, are supportive of the sector and are playing an active role in its development. While the government has not established any quality standards to regulate the distribution or sale of dairy products, it is involved in several areas of service provision. For example, it guarantees loans that MFIs are lending to farmers, provides veterinary and AI services, and distributes inputs (primarily heifers and feeds) to farmers.
- **End Markets:** Several market outlets were observed in the rural and semi urban areas.

Daero Milk Processing Cooperative, Agula, Kilte Awlaelo

- **Membership:** Begun in 2006 with 10 members. Current membership is at 30 members and is open to more members. 50% of the members are on the Safety Net Program.
- Total Number of cattle: 60
- Daily Production: 200 liters/day
- **Products Sold:** Boiled milk, butter, yoghurt, skim milk
- Estimated Annual Net Profit (2001 EC): 137,376 Birr (\$13,737)
- Selling outlets: Shop in Agula
- **Member Benefits:** Cooperative i) buys milk from members and pays them on a monthly basis, ii) buys wheat bran in Mekelle and resales it to members, iii) gives loans of up to 2,000 Birr to members that are payable in six months, and iv) rents 5 ha of land by the river where they are growing feeds for their animals
- **Challenges:** i) Limited access to veterinary services; currently only one veterinary is available for all members. ii) Lack of credit for the cooperative. iii) Lack of a market during the fasting period. iv) Limited selection of high breed animals. v) High prices of concentrated feeds.
- **Future plans:** To open a collection center in each village and purchase a vehicle to transport milk to Mekelle and Adi Grat

- *Rural consumers:* As noted above rural consumers buy milk directly from farmers in close proximity to their neighborhood. Milk is sold at the producer or consumer's gate.
- *Cooperatives:* Small holder farmers that belong to cooperatives or self help groups sell their milk to them. The cooperative/self help groups then resell the milk or process the milk into butter or traditional yoghurt for sale in their shops or directly to rural or semi urban consumers.
- *Retailers:* Snack bars, small restaurants, and other similar retail shops are a common market for milk in the district. These retailers often buy milk from farmers or cooperatives through a contract arrangement and then resell it as boiled milk, traditional yoghurt, or butter. Potential linkages to larger cities like Mekelle and Adi Grat, while untapped, present an opportunity for small holder farmers (ideally through cooperatives) to tap into a larger number of snack bars, restaurants, hospitals, and education institutions.
- *Processors:* Two milk processors are being established in Mekelle town. Both processors seem to be in an advanced stage of their establishment since they are building their factories and have acquired the necessary machinery. While these processors are not a realized end market, their close proximity to the district and the potential to substantially change the market dynamics warrants their mention. Both processors are expected to collect and purchase milk within a 120 km radius from Mekelle. The first processing plant, to be owned and managed by the Mekelle Processing and Marketing Union Cooperative, is expected to process 5000 liters per day and establish several collection centers around Mekelle and Adi Grat. The second processor, to be owned and managed by the Simraet Agro Industrial Share Company, has the capacity to process more than 15,000 liters per day and plans to collect milk within a 100 km radius from Mekelle. Both processors plan to sell pasteurized milk, butter, cheese and yoghurt within Tigray and possibly beyond. While prices, actual benefits, and supply potential were not examined in detail, should these plans actualize, both of these processors will prolong the shelf life of milk, diversify



milk products, improve sanitation, and most importantly, provide a formal market link for small holders to the market.

- **Horizontal and Vertical Relationships:** Vertical linkages characterize how firms along a value chain interact to allow or not allow risks to be shared up the chain or down the chain. Cooperatives are reliant on small holder farmers for their milk supply. Café and restaurants purchase milk from farmers/cooperatives. Processors being established in Mekelle indicated that they will not establish dairy farms but rather will rely on farmers and cooperatives for their milk supply and intend to provide transportation. The trend by farmers to collaborate through cooperatives and then cooperatives into unions is an encouraging trend in terms of horizontal linkages.
- **Support Services:** The following services are required for farmers to contribute to and benefit from the competitiveness of the dairy industry within the district and beyond. These would enable farmers to access inputs, capital, know-how, skill-sets, etc.
 - *Financial services:* Savings and credit are the most prevalent form of financial services available and being used by dairy farmers in the Wereda. Credit is being offered by Dedebit and NGOs such as REST. The Bureau of Agriculture is often involved in the identification of credit receipts. Credit is primarily offered to individual households as opposed to cooperatives. While credit packages differ within organizations, the household credit package has assisted poor households to buy dairy cows. This loan is repaid over 2-4 years at an interest rate of 9% and can be restructured during bad years. Several farmers noted that the maximum amount available (5,000 Birr) is no longer sufficient to purchase dairy cows, which are now being sold at 8000 – 12000 Birr each. In addition, the loan only covers the cost of the animal without incorporating other start up costs. REST gives credit in form of animals payable over a period of five years. A new project by IFAD is expected to provide an additional source of credit (to be managed by MFIs) and will focus on value addition.
 - *Input suppliers:* a) Veterinary Services in the Wereda are provided at a subsidized fee by officers from the Bureau of Agriculture. These officers are identified by Bureau of Agriculture and trained for a period of three months. Currently, there are only 6 veterinary officers in the Wereda available in three sites. Farmers cited the limited access to veterinary services as one of their main challenges in dairy farming. b) Artificial Insemination (AI)- This service has the potential to improve productivity by improving the genetic quality of the animal. Currently AI is being provided by officers from the Bureau of Agriculture at subsidized rates. Discussions with Livestock officers in the Wereda indicated that there are only four AI experts working from three sites. Farmers highlighted the limited availability of AI services as a challenge to improving their current herds. c) Feeds – Farmers use a variety of feeds for their dairy animals. These include, i) grass within their neighborhood, ii) straw - crop residue from wheat, barley, etc, iii) cactus, which is mostly used during dry seasons, iii) attella, residue from local brew, iv) hay -found in enclosure area/farm, and v) improved varieties such as alfalfa, elephant grass, vetch, and fodder tree. Straw, Cactus, and hay are the most common types of feeds. Inputs such as seed, seedlings, and cuttings are provided by the Bureau of Agriculture, NGOs and the private sector. Both REST and the Bureau of Agriculture used to import improved varieties, but they have both recently established multiplication centers. Well off farmers and cooperatives from the district purchase feeds from flour mills in Mekelle. Most of these mills are private businesses, but a few are owned by the government. The availability of feeds from flour mills is directly related to the availability of grain since they are a by product of the milling process. There has been a sharp price increase in the price of these feeds in 2008. Before January 2008, the price of feeds from one of the flour mills in Mekelle was 150 Birr per quintile. From February to May 2008, the same amount of feed was selling at 350 Birr per quintile at the same mill. The high increase in price is primarily attributed to a shortage of grains and high gas prices. Individual farmers and cooperatives identified the high cost of these feeds as another major constraint.



- *Training:* Training on better animal husbandry, including disease management, is being provided by the Bureau of Agriculture and NGOs like REST, Land O'Lakes, and St Mary's College, which has a demonstration site for farmers.
- *Heifers:* Heifers are an important aspect to dairy farming especially for new farmers. New breeds have been introduced by the Bureau of Agriculture and NGOs such as REST, World Vision, and St. Mary's College. The credit structure for provision of the heifers differs from one organization to another. For example, St Mary's College has been providing farmers with pregnant heifers, which they repay after they give birth to a female calf. To date the college has provided 50 cows. This in kind form of credit is complimented with training from the College before the farmer receives the cow. The current high price of heifers and loss of animals due to farmers' limited experience with modern dairy farming is limiting the College's ability to scale up this intervention.
- **Firm-Level Upgrading:** While dairy farming has been part of the tradition in Kilte Awlaelo, farmers need to move away from traditional practices to modern ways of dairy farming. This will include progressively reducing or replacing their local breeds with improved breeds that have a higher production capacity. For example, the Arado, a local breed, produces an average of 3 liters per day while the Holstein/ Friesian produces an average of 18 liters per day.

Systemic Opportunities and Constraints

OPPORTUNITIES

Dairy farming presents an opportunity for PSNP participants to increase their income and move towards self sufficiency. Farmers in Kilte Awlaelo have a tradition of cattle rearing, which provides a platform to upgrade to more modern practices. Modern dairy farming can be practised in back yards by men or women-headed households or even cooperatives made up of landless youth in enclosure areas provided by the government. Young people, especially, may have the energy and drive to manage a dairy enterprise since it requires attention, close follow up, and willingness to learn new practices. The dairy sector requires various inputs which can jumpstart private support businesses. These support services, such as providing AI services, breeding, selling feeds, can provide employment opportunities for youth or others in the community. Strong cooperatives can ensure that farmers have a stronger link with the market and possibly lower their production costs through bulk purchases of feeds and collective transportation. Despite these potential opportunities, it should be noted that dairy farming requires what would be considered a large initial investment for PSNP participants. In addition, poor management and diseases can increase the probability of animal loss, which can have an adverse effect on the household.

CONSTRAINTS

The value chain analysis revealed a number of constraints that are affecting farmer productivity:

- **Limited and high cost of feeds:** There is often a shortage of feeds due to the erratic and uneven distribution of rainfall in the Wereda. This problem is further exacerbated by the limited amount of land available to small holder farmers and other potential entrants into the enterprise. The high cost of feeds from flour mills in Mekelle was cited by cooperatives as one of the paramount challenges. As noted above, the price of these feeds has more than doubled within the first six months of 2008. In addition, the seasonality of their availability affects productivity during certain times of the year.
- **Limited/unguaranteed market for milk and other dairy products:** The current end markets described are neither guaranteed nor sufficient to meet the current supply of milk especially during the fasting periods. Fasting, which is estimated to be more than 200 days in a year for Orthodox Christians is a recurrent constraint for small holder farmers who do not have access to chilling or



other modern forms of milk preservation. This leads to price fluctuations that make it difficult for farmers to manage or project their income.

- **Limited availability of credit:** The lack of capital makes it impossible for very poor/ poor households to venture into dairy farming unless credit is made available. This is further exacerbated by the available credit which limits households to a ‘menu of products’ that do not cover most of the start up costs except for part of the cost of the animal. It was also noted that farmers are often reluctant to take on large loans.
- **Traditional herd management practices:** Modern practices in dairy farming require farmers to leave behind their traditional practices that are more lax in disease, feed, and overall animal management. It also requires a mental shift from viewing a larger herd of local cattle as being more valuable than a few high breed animals. Discussions with REST staff in Wukro indicated that farmers can be reluctant to adopt modern dairy farming due to the high amount of attention required by the enterprise and a strong desire to stick with what they know.
- **Limited availability of land:** While a small holder farmer can keep a dairy cow in their back yard, the limited availability of land in the district restricts existing farmers from expanding their enterprises and potential entrants (such as landless youth) from entering into the sector quickly.
- **Limited source of high breed cattle:** The dire lack of high breed animals in the region presents a great threat to the expansion of the sector as a whole. This unmet demand has adversely affected the price of cattle. It was noted that some NGO’s are looking into more advanced forms of AI that would allow farmers to cross breed their current herds. This would reduce the high cost of purchasing new animals.
- **Limited access to high quality AI and veterinary services:** The limited access to both of these services restricts farmers from improving their breeds and thereby limiting their productivity. Lack of veterinary services can lead to animal losses which can discourage uptake or expansion of the enterprise.

Priority Interventions

To address the various constraints and take advantage of opportunities noted above, the following interventions have the potential to substantially upgrade the dairy sector within the Wereda.

1. **Developing standards and regulations:** The government should take a lead role in this intervention which would facilitate transparency in the sector and progressively move it from an informal structure to a more formal one.
2. **Supporting formation and strengthening of dairy self help/cooperatives:** Cooperation is often required for small scale farmers to contribute to and benefit from players within the chain. Dairy farmers in the Wereda are beginning to understand some of the benefits of collaboration and are organizing themselves in groups to boost their production capacity and pool their resources together. Supporting this trend by encouraging cooperative formation and strengthening their offer should be a priority since it can have a direct impact on profits and lower costs of production.
3. **Facilitating availability of critical services:** This intervention would seek to develop veterinary, AI services, and other services, ideally by private providers and to facilitate access to critical information and advice to farmers. This will also include structuring the business service in a manner that is viable and attractive to entrepreneurs and facilitating access to training for potential providers.
4. **Increasing access to high breed animals:** A critical intervention, facilitating access to high breed animals is likely to have an immediate and sizeable impact on the industry especially for new



entrants. Options here may include encouraging private provision, applying better technologies in AI, developing breeding services, or even securing better sources for these breeds.

5. **Increasing consumer awareness of the benefits of dairy products:** Consumer awareness on the benefits of a product is directly related to its demand. This intervention would seek to promote awareness of the nutritional values of dairy products and thereby increase their demand, which is currently lower in the district compared to the national average.
6. **Improving infrastructure:** A lot is being done in this area through the Public Works component of the PNSP. Making land management, access to water and good roads a priority in the Wereda will continue to benefit dairy farmers as well as most of the other agricultural activities.
7. **Facilitating availability of critical inputs:** This would include facilitating wide access to these inputs (feeds, medications, etc) by the private sector. Also educating the farmers on the proper use and benefits of these inputs.
8. **Improving productivity and reducing smallholder costs:** Another priority intervention, it would seek to provide farmers and service providers with accurate information and practical understanding of the gains of small scale dairy farming. It aims at improving the animal husbandry management practices of farmers, increase access to services noted above and foster competition among provision of feeds, medication, etc, which is likely to reduce prices.
9. **Improving milk safety among all participates in the channels:** It was noted that some existing cooperatives and farmers do little to reduce adulteration and maintain hygienic conditions in their shops/collection places. This intervention would seek to improve the knowledge and performance of farmers in the production and handling of safe milk, improve knowledge and performance of sellers and small scale processors in milk hygiene and handling as well as enable access to affordable testing kits for detecting contamination at each level in the supply chain.
10. **Facilitating access to credit:** In addition to the current services being offered by Dedebit, this would seek to support the development of credit products that are tailored to the needs of dairy farmers and then making them widely accessible.
11. **Increase the supply of milk from small scale farmers:** While somewhat related to increased productivity, this intervention would seek to encourage new entrants to the industry, encourage existing farmers to expand their herds, improve loss or wastage of milk especially due to poor preservation methods, among others.



PART VI. SHOATS VALUE CHAIN

Overview

Shoats represent a major industry for Ethiopian farmers, with a total count of 33 million sheep and goats according to a recent 2005 survey.¹² Within Kilte Awlaelo, a recent census indicated an overall figure of 20,053 goats and 26,359 sheep spread among 28,928 households.¹³ Of the sheep, 99% are *Begie Degua* with the remaining largely comprised of *Elle* breed. Approximately 99% of goats are *Tel Duga* with the remaining *Wider* and *Maefur* breed. The average weight of shoats at time of sale is between 15-25 Kg live weight.

Total Livestock Holding by Sex of Holder in Wukro Wereda

Species	Male	Female	Total
Female Sheep	17,438	3,104	
Male Sheep	2,784	419	
Total Sheep	20,222	3,523	23,745
Female Goat	11,452	1,577	
Male Goat	2,574	362	
Total Goat	14,026	1,939	15,965

Source: National Regional State of Tigray, Bureau of Agriculture & Natural Resources, Livestock Census Analysis Result, November 2005, Mekelle

The majority of shoat production is based upon traditional practices. Feed consists primarily of natural pastures on fallow land, roadsides, or grazing within the 4,793.75 hectares of grazing land within Kilte Awlaelo. Typically sold between 12-24 months following birth, shoats require relatively low-intensive labor, and may be easily maintained by poor households, women, and the landless youth. Production of shoats also serves as a risk mitigation strategy, as it complements other on-farm activities and serves to diversify the household investment portfolio. Critical diseases affecting goats include goat pox, skin disease, worms, and external parasites, while sheep are affected by pasteurellosis, sheep pox, liver fluke (fasciolosis), mastitis, and blood urine. Livestock diseases were cited as a significant constraint to the sector, and partly a result of the low awareness and poor outreach of livestock extension.

An industrial-scale abattoir in Mekelle and tannery in Kilte Awlaelo offer significant end market opportunities for shoat farmers, including the establishment of rural-based collection centers for reconditioning and feed. Local household demand for shoats is also strong, particularly during the 8 primary holiday periods. Among these, April (Easter/*Fasika*), September (New Year/*Meskerem*), and January (Epiphany/*Timkat*) offer the strongest markets and on average a 50% price markup. Horizontal linkages have yet to materialize at the production level, leaving shoat farmers to market their product largely as individuals or through traders. In 2005 the country produced a total of 56,000MTs indigenous sheep meat, but was not among the 20 highest producing countries (Australia led with 667,000MTs).¹⁴

¹² Gebremedhin B, Hoekstra D, and Jemaneh S. 2007. *Heading towards commercialization? The case of live animal marketing in Ethiopia*. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project Working Paper 5. ILRI (International Livestock Research Institute), Nairobi, Kenya.

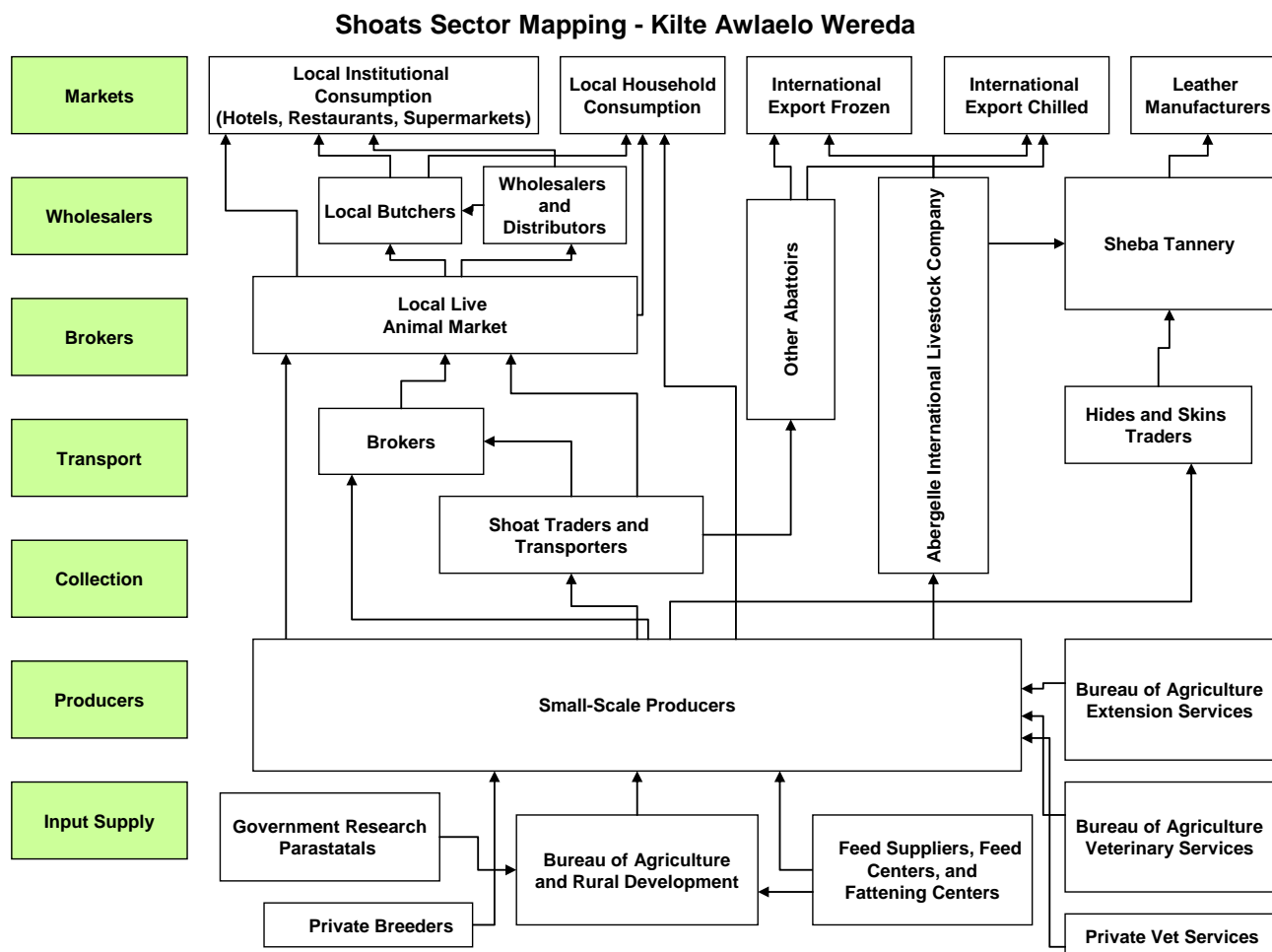
¹³ REST, Wukro Office 2008

¹⁴ FAO Statistics Division, 2005



Sector Mapping

The primary market actors include input suppliers (feed), breeders, support service providers (extension, veterinary, credit), producers, traders, brokers, transporters, wholesalers, retailers, abattoirs and exporters, and tanneries.



Value Chain Structure and Dynamics

- **Enabling Environment:** Ethiopia cannot export meat to the EU or United States as there is no disease-free zone established at the country level. Unlike cattle, there also is no quarantine control requirement for shoats in advance of slaughter. Hence the traditional practice of slaughtering a shoat at home, particularly during holiday season is widespread. For Tigray Region as a whole there are no license requirements for livestock trading.¹⁵ For hides and skins however the Ministry of Agriculture does require a license for traders to supply a tannery.

¹⁵ Gebremedhin B, Hoekstra D, and Jemaneh S. 2007. *Heading towards commercialization? The case of live animal marketing in Ethiopia*. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers Project Working Paper 5. ILRI (International Livestock Research Institute), Nairobi, Kenya.



- **End Markets:** With increased urbanization, population growth, and a long-standing tradition for livestock consumption, end market opportunities for shoat farmers are significant. Six industrial scale abattoirs are currently operational within Ethiopia while three new exporters are under construction. The Abergelle International Livestock Company PLC is a \$10 Million investment which is scheduled to open in January or February 2009. Located in Mekelle, the slaughterhouse will operate to EU standards with a processing capacity of 960 shoats and 240 cattle per 8 hour shift. The abattoir has a license to export to the Middle East (Kuwait, Bahrain, UAE, Saudi Arabia) and select West African countries. Transport will largely comprise of two routes: 1) chilled meat airfreight direct from Mekelle airport; and 2) frozen beef on refrigerated containers through Djibouti.

Sheba Tannery is the largest commercial operation within Kilte Awlaelo and is currently undergoing a significant enlargement. By March 2009, the tannery will increase from a current processing of 6,000 to 10,000 skins per day of sheep and goat, while a new line for cattle will be introduced with an output of 1,000 hides per day. The firm will establish an on-site shoe and glove manufacturing operation, with the majority of output targeting the export market.

Within the Kilte Awlaelo area there exist a number of urban and semi-urban markets that trade on a weekly basis (typically Saturday, Monday, Tuesday, or Thursday). It is common for middlemen to organize collection and transport (trekking) to the larger outlets of Adigrat and Mekelle, as well as (illegal) supply to Djibouti and Eritrea. Both farmers and traders however are challenged by market information outlets, and rely primarily on spot market prices at the day of sale.

**Average Live Annual Prices (ETB)
Mekelle Town Traders Market**

Size	Sheep	Goat
Large	450	400
Full Grown	350	300
Small	225	175

Source: Mekelle Market Assessment, 2008

Note: Assume 50% price increase for holiday period

- **Horizontal and Vertical Relationships:** Shoat farmers operate largely as individuals, and other than a few youth group initiatives have not organized into Cooperatives or producer associations for joint marketing. To assist in the bulking of supply for Abergelle, the Dejena Endowment has supported the establishment of 3 “Fattening and Collection Centers” in the greater Tigray area to assist in the collection, reconditioning, feed, and transport of shoats to the slaughterhouse.¹⁶ Farmers will be paid cash on delivery at established market prices. Each site can house between 3,000 to 5,000 live animals at a given time, and is equipped with weighing scales, feed stalls, barns, and grazing land between 30 and 90 hectares. Commercial by-products such as molasses will also be availed to shoat farmers. Kilte Awlaelo has been designated as a location for an additional collection center during the next expansion phase.

Vertical relationships within the shoats sector have several market actors. Most producers sell directly to consumers or through traders who also undertake transportation (primarily by trekking) to market. Few producers have strategic relationships with traders and typically sell on cash at spot market price. Some traders sell direct in the urban markets, while others operate through wholesalers that have strategic relationships with retail outlets. Some local markets are dominated by brokers that

¹⁶ The 3 centers are located at Agbe near Kolatemben District (Central Tigray), Shire in Tahtaykoraro District (Northwestern Tigray), and the Alamata Center in Alamatat District in Raya (Southern Zone).



negotiate prices on behalf of producers on commission, however allegations of collusion between brokers and buyers abound.

Tanneries such as Sheba used to engage directly with farmers, including the direct collection of skins and provision of salt on an embedded basis. The tannery however found this approach problematic, as collection was cumbersome with negligible returns on their investment. The tannery also cited dependency (expectations of free handouts) and a non-businesslike approach among farmers as challenging. Based upon this experience the tannery prefers to collect directly from abattoirs and select traders (in addition to the licensing requirement for the supply of hides and skins).

- **Support Services:** Critical support services in shoats involve veterinary services, extension services, credit, feed, and breeding. Extension services are provided solely by the public sector, primarily through the Tabia-level livestock extension officer. While critical services are provided related to feed technologies and animal management, outreach is limited. Veterinary services are also largely provided by the public sector, which is limited to 3 animal health posts within Kilde Awlaelo. The majority of farmers obtain their shoats from breeding existing stock. Sources for initial breeding stock include family and friends, the local market, and government sponsored safety net schemes. A feed processing plant has been established at Raya Azobe Wereda for shoat farmers participating in fattening, however most farmers do not undertake a formal fattening regime for their shoats.

Finance for shoat farmers operates under similar supply-driven conditions as the larger safety net program. REST and the local administration select program beneficiaries to participate under the safety net program. Through a revolving fund mechanism administered in part by FAO, credit is then given to the farmer in one of two forms: 1) 900 – 1,000 ETB cash is provided for the farmer to purchase local variety shoats in the market under the supervision of a local Development Agent; or 2) farmer receives improved variety shoats which are purchased by the Bureau of Agriculture and Rural Development from one of two government research center parastatls - Debrehane or Debrezeit. A 12.5% interest rate is applied over a 3 year period, however may be suspended or renegotiated in the event of a drought or natural hazard. The local administration and REST are currently responsible for collecting loan repayment. Plans are for DECSI to assume this role in the future.

- **Firm-Level Upgrading:** Growth within the shoats sector has the potential to provide a multiplier effect on a number of new industries within Kilde Awlaelo. Sheba Tannery is expecting to produce a significant amount of wool from the increased intake of sheepskin. The firm has expressed interest in washing and cleaning the wool, which could then be purchased by local entrepreneurs for a nominal fee. Off-cuts and rejects of leather trimmings are also expected from the glove and shoe manufacturing operation. Again, such remnants could be distributed to local entrepreneurs to support small-scale leather goods production. The tannery itself will employ between 1,700 and 1,800 personnel each day, which will generate immediate demand for local food products to feed staff including milk (estimated 90 liters per day requirement), vegetables, and meat.

Systemic Opportunities and Constraints

OPPORTUNITIES

- **Strong end market demand:** The longstanding tradition of meat consumption in Tigray (particularly during holidays) provides shoat farmers with a steady demand in the domestic market. With the advent of a state-of-the-art slaughterhouse based in Mekelle town that will process 960 shoats in one shift, farmers will have access to alternative market outlets. The expansion of Sheba Tannery and direct linkages with Abergelle may serve as a further incentive for farmers to invest in fattening and “live-care” of the animal, as price premiums will be offered for those that meet export standards.



- **Rural-based collection model will facilitate more efficient vertical linkages:** Rural-based fattening and collection centers will serve as an efficient means for enhancing both quality and supply intake for Abergelle. The centers may also serve as a centralized point for demonstration, extension, and even veterinary services for shoat farmers based in the rural areas where public services may not be available.
- **Multiplier effect from support industries:** The expansion of output within Sheba Tannery has the potential to stimulate a number of cottage industries in the greater Kilte Awlaelo Wereda, including wool manufacturing, small-goods leather manufacturing, and increased demand for dairy and vegetables stemming from their daily workforce food requirements. The increased demand for quality shoats may also stimulate new private sector entrants in fattening, extension, and veterinary services.
- **Strong outreach among target beneficiaries:** Cultivation of shoats may be practiced by most target beneficiaries under the safety net program, including women and the landless youth. The business may complement other farming activities, and allows the producer to withhold the sale of product until the market provides a favorable price.

CONSTRAINTS

- **Feed shortage:** Shortage of feed is the overriding production constraint among farmers in Kilte Awlaelo. The primary feed source is free grazing on communal or road-side land, and to a lesser extent private pastures. Some farmers supplement this supply with grass hay and crop residues (straws, maize, “sewa” residual from “hatela,” a local beverage) for protein. The lack of proper nutrition and fattening of shoats stemming from the feed shortage has limited the end market supply, and has a direct correlation with poor prices. According to the Managing Director of Abergelle, at present “90% of shoats do not meet export standard.”
- **Livestock diseases:** Widespread disease among shoats is a result of poor management and animal care. Pasteurellosis is particularly worrisome, and can kill within a couple days. Sheep and goat pox, liver fluke (fasciolosis), mastitis, blood urine, trypanosomosis, lung worm, and external parasites such as tick, mites, lice, and fleas were all cited as damaging to both the health and skin. Much of this is promulgated by the lack of preventative treatment, as well as the practice of huddling (unvaccinated) animals in the same compound where disease can spread. The shortage of animal health workers and limited animal health posts in the Wereda deter shoat farmers from taking their animals for veterinary service.
- **Poor body conditions and “lost opportunities for skins:** Poorly conditioned animals are a concern for both abattoirs as well as tanneries, particularly during the dry season. There is an estimated annual national production of 9.2 million sheep skins and 6 million goat skins, however total production within Ethiopian tanneries is only 7.5 million sheep skins and 4.5 million goat skins. This discrepancy between potential and actual collection is largely based upon the traditional nature of shoat consumption, where the animal is slaughtered within the household backyard.¹⁷ Farmers also lack appropriate concern for the pre-slaughter life of the shoat, which is a critical factor in determining the grade of skin. Lashing the animal, hot-iron branding, and the failure to treat against parasites and other skin diseases are contributing factors. A shoat skin should technically arrive at the tannery within 24 hours of slaughter. Some speculators hold the skins for weeks which lead to immediate rejection, while others pass the skins through a long chain of brokers, thus resulting in excessive handling.

¹⁷ Elfring W. Agonafir Y. and Tefera M. April 2005. *Value Chains Identification for Intervention – Progress Report on Identification Process*, SNV Support to Business Organizations and their Access to Markets (BOAM), Addis Ababa.



- **Non-Businesslike approach among farmers:** The majority of farmers interviewed appeared to treat shoat production primarily as a subsistence activity, with a weak understanding of production costs, gross margins, and an overall poor business orientation. This is partly driven by the fact that farmers typically breed their own animals, undertake free grazing, and have access to heavily subsidized veterinary services. Not until a farmer understands the link between investing in a live animal and the increased returns will pro-active measures be undertaken to properly condition the shoat.
- **Little access to market information and marketing support services:** Producers and traders depend on daily market day information for spot prices, which is on readily available until the seller reaches the actual market. If the price is unacceptable the shoat will return home, thus rendering unnecessary caloric burn and wear on the animal. The lack of organization among producers also leaves ample room for broker exploitation.

Priority Interventions

Given the various systemic opportunities and constraints the following interventions are offered to improve competitiveness of the shoats value chain.

At present commercial feed supply is limited to urban centers where it is primarily focused on dairy. **A portfolio of interventions should be explored to develop feed as a critical input supply industry for the shoat sector.** This may include strengthening and replication of the Dejena-sponsored fattening and collection centers. Value-chain financing should be explored whereby fattening and collection centers could provide feed on credit, backed through a USAID loan guarantee mechanism. Private sector suppliers should be developed to offer crop residues (what, barley, teff, straw), commercial feed (baled grass, hay), and protein rich by-products (wheat and rice bran, noug cake) at the Tabia level. Increased access to feed must be coupled with an active awareness campaign on strategic feeding and the linkages with productivity, health, and nutrition.

Shoat farmers in Kilte Awlaelo largely produce and market their product as individuals. **The development of shoat-focused production associations or cooperative structures should be explored,** whereby producers may benefit from the joint bulking of inputs (feed), collective managing of grazing land, sharing of extension services and knowledge, and the joint transport and marketing of product. Training on basic business and bookkeeping should be offered to the cooperative structures. Economies of scale will increase the competitiveness of shoat producers.

A joint promotional campaign could be undertaken with both Abergelle and Sheba to educate farmers that price premiums will be offered not only on fattened animals but also well-kept hides. Rather than rely on government development agents, commercial opportunities should be explored for the continued provision of farmer extension. The capacity of existing and planned rural-based fattening and collection centers could be developed to provide extension advice, demonstration, while even credit linkages could be facilitated with DECSI.

An effort should also be undertaken to identify the few emerging private sector veterinary providers, and explore ways of enhancing their service offering or outreach. Interventions could include assistance in bundling multiple services, such as examinations, dipping, preventative medications or treatment, or even the provision of feed supplement. Linkages could be made between town-based veterinary providers and Tabia-based agents (private sector) who could be trained and operate under contract from the formal vet business. Such providers could be linked directly with producer-based associations for the bulk provision of extension services.

Training on extension and handling could also be offered to licensed traders who collect and supply skins directly to Sheba, as they have the direct interface with rural shoat farmers. Wherever possible, service points should be identified within the value chain where private sector actors may be leveraged to increase awareness and understanding on handling among producers.



To overcome broker exploitation and to avoid the unnecessary trekking of long distances to market, the development of a livestock information service should also be explored. The real-time provision of daily market prices as well as animal husbandry notices (such as disease outbreaks) would empower the target beneficiary while improving quality for the end market.

Finally, support should be provided to those target beneficiaries in the area surrounding Sheba Tannery as the plant nears completion of their expansion. Training on product quality and consistency should be offered to those farmers that may provide dairy, vegetable, and meat products on a daily basis. Assistance in formalizing supplier linkages with the Tannery would also ensure sustained business for target beneficiaries (preferably through cooperative or association structures), as well as a reliable source of food product for the 1,700 - 1,800 employees. Support could be offered to nascent and existing MSEs in Wukro town to take advantage of the wool byproduct and remnant leather cuts.



PART VII. VEGETABLES (TOMATOES) VALUE CHAIN

Overview

Among vegetables, tomatoes are the most widely produced in Kilte Awlaelo, with a current outreach of 3,031 farmers and an annual production 1,990 Kgs. Of the 1,500.6 hectares of land currently irrigated, approximately 36% is utilized for tomato production. Climatic conditions in the Wereda are favorable. Three major rivers and an abundance of natural springs, rivers, and recently constructed dams allow for diversions as well as treadle and motorized pump irrigation.

Vegetable Production in Kilte Awlaelo Wereda 2005-2008

Type of Vegetable	2005-2006			2006-2007			2007-2008		
	Area Irrigated (ha.)	# Farmers	Yield (Quintar)	Area Irrigated (ha.)	# Farmers	Yield (Quintar)	Area Irrigated (ha.)	# Farmers	Yield (Quintar)
Tomato	430	4704	128970	524	1904	154146	533	3031	199021
Onion	65	656	863	106	758	13226	154	1031	22169
Pepper	127	1726	2030	120	1088	2153	116	1039	34412
Cabbage	49	745	9700	62	521	15380	73	1007	24843
Potato	63	1121	6750	93	421	11656	113	318	10004
Lettuce	36	478	7629	53	400	11616	63	172	4542
Garlic	-	-	-	.83	15	54	17	20	178

Source: Office of Agriculture and Rural Development, Wukro/Kilte Awlaelo, 2008.

Roma VFN and Marglobe are the dominant improved varieties found in Kilte Awlaelo, and preferred by farmers due to seed accessibility, production potential, and market demand. Holland bred Roma VFN is the most popular variety and least perishable with a shelf life of 1 to 1.5 months. Marglobe is also exotic with high production potential, but slightly lower in market demand. There is no production of hybrid varieties due to inaccessibility of seeds and high price. Although a number of burgeoning private sector seed suppliers exist, farmers typically obtain seeds from NGOs and the Bureau of Agriculture and Rural Development.

The growing period for tomato production is between 90-150 days which allows for 2 harvests per annum. Farmers typically plant and sow seeds from August, followed by germination and transplanting in late September and harvesting in December. Following the frost period in December-January, farmers commence an additional transplanting in February and harvest during the May/June period before the onset of the long (*kiremti*) rains.¹⁸

It is this combination of frost in late December and the onset of long rains in June which dictate the production calendar for tomato farmers in Kilte Awlaelo. Farmers tend to harvest during the same period in December and May, leading to significant overproduction with corresponding low prices. There is no agro-industrial processor or exporter of significance operating in Tigray Region, leaving tomato farmers with the local fresh markets of Wukro, Mekelle, Adigrat, and surrounding semi-urban areas. With limited market outlets and concentration of production around specific periods, tomato prices are subject to heavy fluctuation, ranging from 1.00 to almost 8.00 ETB as evidenced in the following table:

¹⁸ During the rainy season farmers with “use right” of land typically produce wheat, maize, teff, and barley.



Monthly Average Retail Prices for Wukro Market

	9/07	10/07	11/07	12/07	1/08	2/08	3/08	4/08	5/08	6/08	7/08	8/08	9/08
Tomato	4.00	5.55	3.77	1.88	2.00	3.00	2.88	3.50	1.90	1.03	1.50	4.05	7.42

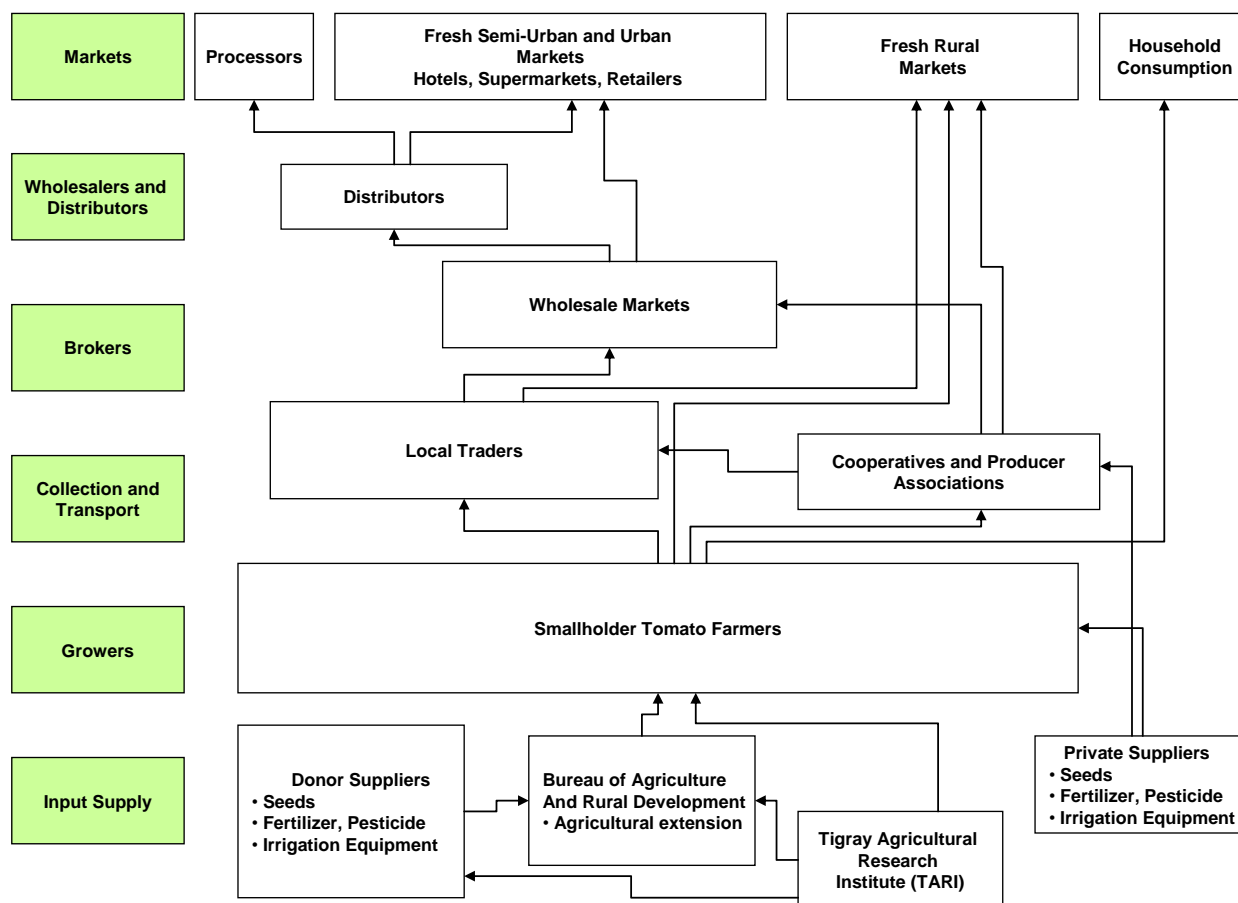
Source: Tigray Agricultural Marketing Promotion Agency (TAMPA), October 2008.

Concerns regarding the sustainability of supply have deterred investors from opening a tomato processing plant in the region. These concerns are not without reason. Many farmers (virtually all below the age of 40) in Kilde Awlaelo do not have “use right” of land, and must rent during the dry season at approximately 1,000 ETB per .25 hectare. Without guaranteed access to land, farmers migrate towards short cycle crops such as tomatoes, however rarely look beyond the present harvesting season and often shift crops by the year. Lack of access to land serves as a powerful disincentive for long-term investment. As one farmer remarked, “with no land I have no dream.”

Sector Mapping

The key market actors in the tomato value chain are research institutions, extension officers, seed growers and dealers, agrovet suppliers, farmers, traders, wholesalers, distributors, processors, and end market retailers.

Vegetables (Tomatoes) Sector Mapping - Kilde Awlaelo Wereda





Value Chain Structure and Dynamics

- **Enabling Environment:** There is no overriding legal or regulatory constraint affecting the sector, although the short period land lease policy system does deter cultivation of perennial crops and encourage those with quick harvesting turnaround such as tomatoes.
- **End Markets:** Tomato producers target the local fresh markets of Wukro, Mekelle, Adigrat, and neighboring semi-urban areas. Such limited market outlets contribute to the oversaturation in supply during harvesting season. There is no agro-industry operational in Tigray region. State-owned Merti and privately held Melge factory process tomato paste for the domestic market, however the consultants did not find any traders or wholesalers from Mekelle targeting these outlets.
- **Horizontal and Vertical Relationships:** While a few emerging cooperatives have developed to access fertilizer, pesticide, and motorized pumps, the majority of tomato production and marketing in Kilte Awlaelo is still conducted by individual farmers. Most farmers sell through traders and wholesalers who in turn sell to local market retailers. Mekelle-based wholesalers buy on credit with an oral understanding with farmers they will return for repayment.
- **Support Services:** The Bureau of Agriculture and Rural Development is the primary provider of extension services, fertilizer, and agrochemicals for tomato farmers in Kilte Awlaelo. While a few private sector seed growers have entered the market, the lack of quality control, coupled with a history of sourcing from government has made the latter the preferred provider among farmers. As seen in other sectors, the Government procures and distributes the requisite inputs to farmers on credit which is then managed by DECSI. Motorized pumps and fuel are the most expensive and critical inputs for tomato farmers. Pumps may be rented on individual or group-based schemes, with arrangements varying from cash rental to a share in tomatoes harvested. Day laborers are also required for dredging, tillage, weeding, and application of fertilizer and pesticides.¹⁹ The Tigray Agricultural Research Institute (TARI) is the primary research and development organization in Tigray Region. Stakeholders however lament that 90% of research is focused on cereal crops while vegetables have largely been neglected.
- **Firm-Level Upgrading:** Current price fluctuations and oversupply have served as a deterrent for farmers to increase production of tomatoes, while uncertainty stemming from those farmers who rent land discourages additional investment in the sector. Those farmers that are able to access their own modern irrigation equipment will be able to ensure steady production, while those that access new cottage industry technologies such as sun-dried tomato production may open new market outlets as well as provide for enhanced storage capabilities. Post-harvest storage, collection, and cooling facilities are extremely limited.

Systemic Opportunities and Constraints

OPPORTUNITIES

- **Short-Cycle Nature of Crop:** Landless farmers who rent on a seasonal basis cannot enter into perennial crop production. The short-cycle nature of tomatoes is attractive, and may be complimented with other crops such as pepper, onion, or cabbage to diversify revenue streams.
- **Climatic Conditions Favor Production:** Provided access to irrigation equipment is available, the climatic conditions in Kilte Awlaelo allow for 2 harvests per year. More attractive market prices are also available for those farmers able to extend production in to the frost or long-rain periods.

¹⁹ The typically daily wage for such labor is 20 ETB per person per day.



- **Strong Outreach among Safety Net Beneficiaries:** More than 3,000 farmers in Kilte Awlaelo are engaged in tomato farming, with a significant percentage of these being safety net beneficiaries. Many of these farmers are the landless youth, who cover their own costs associated with land and motorized pump rental. It is these landless farmers during Focus Group Discussions that the consultants found most entrepreneurial.

CONSTRAINTS

- **Market Uncertainty and Heavy Price Fluctuations:** Without any significant agro-industry in Tigray Region, tomato farmers in Kilte Awlaelo are limited to the local fresh outlets. Opportunities for value-addition and market expansion will be limited until lead firm investment occurs in the sector. The land policy in Ethiopia also serves as a disincentive for long-term planning among farmers and has led to erratic seasonal production.
- **Inconsistency in Supply:** Long rains and frost place limitations on the harvesting periods for tomato farmers. Even within these limited windows, there is no planned coordination of production among farmers, nor a cropping calendar to stagger production even by a few days time. The lack of coordination results in a semi-annual production glut, whereby tomatoes are even left on-farm to rot rather than sold at a loss.
- **Unorganized Sector and Non-Business-like Approach:** During the course of this assessment, no farmers or stakeholders were able to break down the costs of production or calculate gross margins associated with tomato farming. Much of this may be attributed to the non-businesslike approach of farming in the Wereda, as well as the overreliance on the procurement and disbursement of inputs from the Bureau of Agriculture which are bundled together in package-offerings to farmers. Farmers also largely produce and market tomatoes as individuals, which complicates efforts on production planning as well as achieving end market leverage.
- **Poor Pest and Disease Control:** Compared to other crops in the Wereda, tomatoes are fairly intensive and subject to a number of fungal (blight, mildew), bacterial (fusarium wilt and leaf spot), and viral diseases (aphid transmitted viruses), as well as pests such as aphids, mites, termites, and thrips. Physiological disorders include blossom end rot, cracking of fruits due to irregular irrigation, and sun burn (scorch). With the sole extension advice provided by the Tabia-based development agent, knowledge among farmers on appropriate disease and pest control techniques is limited.
- **Lack of Quality Inputs and Limited R&D:** It is reported by farmers that there does not exist a certification process for seed suppliers to sell in the local market. This has led to questionable quality and a continual reliance on public sector provision. Stakeholders have also cited the limited R&D into new varieties of tomatoes which could prolong production further into the frost period, or offer higher yields given the agro-ecological conditions.

Priority Interventions

Given the various systemic opportunities and constraints, the following immediate interventions are offered to improve competitiveness of the vegetables (tomatoes) value chain.

Although natural climatic factors largely dictate the harvesting periods, farmers could benefit from coordinated production planning at the individual, Tabia, and Wereda level. A cropping calendar which staggers production by weeks (even days) could lessen the seasonal production glut. Such planning however may only be achieved with better horizontal relationships at the production level. Group-based production and cooperative initiatives require further support, particularly in the areas of bulking inputs, group-rental of irrigation equipment, and centralized collection and transport of produce



to market. Specific technical assistance on the business aspects of farming, including the calculation of production costs and gross margins is warranted.

Other methods can also be explored to lengthen the period of production, such as storage sheds or nighttime irrigation. Research into disease-resistant varieties of tomatoes that are less prone to frost could also extend the harvesting period. Some stakeholders have recommended the introduction of tomato drying machines to increase the shelf life and develop an additional market outlet, however further research into the commercial viability of this option is required.

While NGOs and the Bureau of Agriculture currently play a critical role in providing inputs and extension advice to farmers, this is not a sustainable approach and has instilled a dependency among target beneficiaries. **To effectively stimulate a vibrant and functioning market (and avoid creation of a permanent welfare state), it will be necessary to delink government from those activities which should be left to private sector actors.** Rather than procure and distribute seeds to farmers (while crowding out private sector suppliers), the government should instead focus on ensuring that those seeds which enter the market are properly certified and of good quality. In other words, a paradigm shift from “market provider” to “market enabler” is needed.

To the extent private sector extension services could be introduced it would also serve to upgrade competitiveness of the sector, however such services are best commercialized when bundled with other offerings such as seed supply, fertilizer provision, or agrochemical spray. This will be difficult to develop in the absence of a strong end market demand or a discerning buyer that pays a price premium on quality.



PART VIII. THOUGHTS ON FACILITATION STRATEGY

The PSNP, the wealth ranking activity, and the value chain analysis give an in depth understanding of the i) target group and the nature of their livelihoods, ii) an understanding of specific market systems, their dynamics, and where the poor fit within them, and iii) the constraints and opportunities that specific sectors present for the PSNP participants and non-participants. It is on the basis of this analysis that the graduation pilot should be developed and implemented. Promoting market development by increasing household purchasing power is one of the goals of the PSNP. In order to achieve this goal, a systemic approach, rather than merely addressing the weak performance of the farmers should be integrated into the graduation pilot. The systemic approach will focus on developing market systems and addressing underlying causes rather than providing temporary solutions to symptoms. This approach will be more effective at improving the lives of pilot participants sustainably and has potential for scale up to a larger number of beneficiaries.

The assessment makes it clear that there are significant commercial opportunities in Kilte Awlælo and the region as whole. During fiscal years 2006-2007, regional (Tigray) GDP at current prices grew by 19.0 percent. GDP grew at constant prices at a rate of 14.4 percent while the average growth rate for the last four years at constant factor costs was 15.5 percent²⁰. Given the commercial opportunities and growth in the region, the PSNP and its implementing partners are at a critical juncture. Either take advantage of these emerging opportunities to develop sustainable market systems, or continue with a “business as usual” approach thus reinforcing the cycle of donor dependency.

While developing the graduation pilot program, the following should be considered:

- **Identify One or Two Sectors for the Graduation Pilot:** The graduation pilot aims to test its model among 500 PSNP participants and possibly some non participants. The initial objective of the pilot is to test the model, not to reach a large number of clients. It is therefore recommended that the graduation pilot focus on one or two sectors detailed in this report. Given the results of the analysis, beekeeping, shoats, and dairy sectors, would be the priority sectors.
- **Avoid Traditional Donor Delivery and Instill a Commercial Mindset:** To stimulate change that is both effective and sustainable, a shift away from the supply-driven approach is required. NGOs and Government in Kilte Awlælo are doing much to meet the needs of farmers by providing direct skills, assets, and food to meet their consumption gap. While these interventions are filling critical gaps, they are dependent upon donor support for their continued delivery. This is unsustainable, and does little to encourage private sector development. With a minimal role being played by the private sector currently, an assumption of its unwillingness to uptake services may seem reasonable. However, this assumption must be tested and strategies to facilitate private sector involvement developed. Subsidized services may continue to play a critical role in emergency relief or social protection, but a longer term solution should be sought after concurrently. To support this, donors and NGOs can also do much to develop and implement programs that instill a business sense and change in mind set for beneficiaries to view themselves not as victims but important participants in markets. This should be an important aspect of the pilot program since it is looking to move a group of beneficiaries that are accustomed to donor support to self sufficiency.
- **Application of Self-Selection:** Targeting a specific group of people for an intervention ensures that program resources are going to those that need them the most. However, targeting often limits the

²⁰ Regional Gross Domestic Production Estimates for Tigray Region. 2008 January (1999 E.C.) Tigray Regional National State Finance and Economic Development Bureau, Mekelle.



opportunities to effect broader change. Consideration therefore should be made to broaden the target group to avail opportunities to households that are not currently on the PSNP. This is likely to widen the impact of the pilot program from merely being a graduation exercise to jumpstarting market development in the Wereda. With this in mind, the concept of self selection is critical. Currently, Government and NGOs select which farmers may participate in the safety net program as well as receive specific forms of assistance such as credit. Rather than unilaterally selecting participants, the graduation pilot should expose PSNP beneficiaries and other farmers to opportunities within a certain sector, with information and incentives on how to take advantage of them. The success of those farmers that are willing to invest, assume risk, and take advantage of such opportunities will serve as a demonstrator effect to those who are reliant on continual donor handouts. PNSP beneficiaries however must have clear incentives to work towards graduation.

- **Apply a Dynamic and Flexible Facilitation Strategy:** Markets are in constant flux, which requires facilitators to continuously read, monitor, and readjust program activities. The graduation pilot program will work towards linking pilot participants to viable market opportunities within high growth sectors. Close follow up will identify opportunities for innovation and consistently keep track of progress being made. It will also assist implementers to assess how pilot participants are reacting to the various opportunities. For example, it will be critical to closely monitor the effect of the interventions on their vulnerability, how contingencies such as inflation or drought affect them and their ability to withstand them. Adopting a market-led approach, the pilot program will be promoting change in uncertain situations. Failure may be part of the learning but consideration should be made to ensure that a robust risk management strategy is incorporated into planning. A dynamic and flexible facilitation strategy will ensure that risk and progress are tracked and managed appropriately.
- **Define Clear Roles for NGOs and Government:** Consideration should be given on the efficiency of government providing business services. Government and NGOs could de-link themselves from providing certain services best left to market actors within the value chain, and strive to facilitate growth versus crowd out the private sector. For example, by procuring and distributing tomato seeds to farmers, the Government is competing directly with private sector seed suppliers. It might be more effective for the Government to develop standards and mechanisms to certify quality seed in the sector. Rather than procure and distribute bee-hives directly to farmers, the Government could pursue forums to link bee-hive manufacturers with those producers in demand. The effect of donor food aid on local market dynamics should also be explored. For instance, the practice of selling USAID-sponsored vegetable oil and wheat in local retail markets is both widespread and unchecked, and undoubtedly has a distortionary effect particularly when wheat is one of the primary local crops in the region. As the district donors seeks to move from relief to market development, the challenge for these organizations will be to work towards taking on facilitation roles rather than being direct providers of services. This will allow private sector to flourish and has the potential to jumpstart longer lasting impact.



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ANNEX B. LIST OF RESPONDENTS

Primary Research – List of Respondents

Key Stakeholders

- Kelem Tilaun, Wukro Coordinator for REST
- Atakilti Abebe, Head Agricultural Development Division, REST
- Mehari Taamrat, Livestock Expert, REST
- Dawit Woldelibanos, PNSP Expert and M&E Coordinator, REST
- Zerastion Fessha, Marketing and Cooperative Promotion Division Head, REST
- Yemane Solomon, Planning and Coordination Head, REST
- Tesfay Gebretsadik, REST Coordinator, Wukro Wereda
- Teklewoini Assefa, Executive Director, REST
- Mebrhatu Tsegay, Agronomist Environmental Rehabilitation and Agricultural Development, REST
- Abraham Lemlem, Senior Livestock Expert, REST
- Mebrahetom Tsegaye, Crop Expert, ERAD Department, REST
- Mulugeta Berhane, Department Head, Environmental Rehabilitation and Agricultural Development, REST
- Daniel Assefa, Head Operations Department, DECSI
- Semere Gebrebre Tsadik, Head, Department of Market Research and Information, TAMPA
- Alyaham Hailu, Head, Promotion of Capacity-Building, TAMPA
- Gezachew Nerea, IT Expert Market Information, TAMPA
- Dawit Legesse, Market Research Expert, TAMPA
- Gidey G/Meohin, IFAD Programme, TAMPA
- Adugna Abreha, Contract Farming Officer, TAMPA
- Yared Tsehayou, Livestock Expert, REST

Ethiopian Government Bureaus and Local Administration

- Gebrehiwot Smur, Vice Administrator, Wukro Wereda Local Administration
- Halefam Ayele, Development Agent, Aynalem Tabia
- Araya Tesfay, Bureau of Finance and Economic Development,
- Brhane Grmay, Horticulturalist, Bureau of Agriculture, Wukro Wereda
- Fikre Barhe, Bee Expert, Bureau of Agriculture, Kilte Awlaelo Wereda
- Haftu Gebrehiwot, Development Agent and Bee Expert, Hayellom Tabia, Atsbi Wenberta Wereda
- Gebremedhin Berhe, Business Processing Re-engineering, Bureau of Agriculture, Mekelle
- Berhanu Dino, Electromechanical Expert, Bureau of Trade, Industry, and Transport



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- Yemane Weldegebriel, Process Owner for Establishment & Strengthening of MSEs, Bureau of Trade, Industry, and Transport
 - Hegas Gidey, Livestock Expert, Bureau of Agriculture, Wukro, Wereda
 - Gebregziabher Gebreyohannes, Livestock Expert/Researcher, TARI

Lead Firms

- Mussie Hagos, General Manager, Dimma Beekeeping Development and Honey Processing PLC
- Abraham Dissassa, Plant Manager, Welela Honey Processing, COMEL PLC
- Tsehaye GebreMichael, Operations Manager, Dejenna Endowment
- Kassaye Mulatu, General Manager, Abergelle International Livestock Development, PLC
- Alem Asfaw, General Manager, Sheba Tannery PLC
- Gday Abraha, Deputy General Manager, Sheba Tannery PLC

Donors and other NGOs

- Tsegabu Teka, Cluster Development Agent, Mekelle Metal & Wood Works Cluster, UNIDO
- Yetemwork Gebremeskea, Agricultural Department Head, St. Mary's College, Wukro
- Kahesay Tadele, Project Coordinator, Agricultural Department, St. Mary's College, Wukro
- Gebremedhin Woldewahid, IPMS Ethiopia Farmers Project., Tigray Provincial Office, ILRI
- Hedera Mehari, Land O' Lakes

Focus Group and Cooperative-Level Discussions

- Alem Asefa, Chairman, Haitamo Cooperative, Hayellom Tabia, Atsbi Wenberta Wereda
- Meles Alem, Vice-Chair, Haitamo Cooperative, Hayellom Tabia, Atsbi Wenberta Wereda
- Negash Tabia
- Gemade Tabia
- Agulae Tabia
- Aynalem Tabia
- Haile Gebreselasie, Shewait Milk Cooperative, Agula
- Daero Milk Processing Cooperative, Agula

Service Providers

- Habte Geoworgis, Metal and Woodwork MSE, Wukro Wereda
- Haleka Alem Aberha, Beekeeper, Wukro Wereda
- Tesfamariam Berehe, Bee-Breeder
- Tigabu Sharew, Manager, Tigray Flour Share Company



ANNEX C. VETTING PRESENTATION