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# Milk Value Chain Analysis in Sebeta District, Center High land of Ethiopia

Shimelis Gizachew Desalegn*
Adami Tulu Agricultural Research Center, Adami Tulu, Ethiopia
P.O.Box 35 Ziway Ethiopia

**Abstract**
The government of Ethiopia realized that if dairy sectors are well supported, it can contribute to the food security at the household level and increase income to the small holder farmers and processers which are operating under its capacity at this time. Dairy has a lot of constraints that are hampering it from delivering the desired good production. The research was carried out to identify these constraints using desk study and analytical tools such as PESTEC, SWOT and problem tree. This report attempts to analysis the dairy value chain in Sebeta district through identifying the different stakeholders, their functions and constraints. Afterward, looking at quantitative and qualitative analysis of the sector, quality management and product quality was also taken into consideration in helping to solve these constraints. Conclusions are included for the development of Sebeta dairy value chain.Ethiopia is a country located in the Eastern part of horn of Africa Continent. Being the first largest contributor to the GDP, the country's main economic activity is agricultural production. Being a under developed country in the tropical region large scale dairy production activities are crucial for social and economic development and food security. The incentive of Ethiopia geographical location, growing demand, cheap labor and input costs makes milk production an economical rewarding activity. With present day technology communication between all actors is good. The information flow between retailers and wholesalers and the milk collectors and processor helps maintains quality standards and positive working relationships between actors.

## CHAPTER 1: INTRODUCTION

### *1.1 Back ground and Justification*

Ethiopia has a huge untapped potential for market-oriented development of smallholder dairy production. The population of milking cows in the country is estimated at 9.9 million heads (CSA, 2008) although the majority of these fulfill multiple functions besides dairy production. The agro- ecology, particularly of the Ethiopian highland mixed crop–livestock systems, is considered conducive and relatively disease-free to support crossbreed dairy cattle (Ahmed et al. 2004). Livestock currently support and sustain livelihoods for 80% of all rural poor. Female cattle constitute about 55.48% of the national herd. Of the total female cattle population, dairy and milking cows total 16,941,361, 14.24% dairy cows (cow of any breed kept primarily for milking purposes) and 20.12% milking cows (cow of any breed which has been milked but not necessarily been kept for milking purposes (CSA, 2008). Eighty-three percent of all milk produced in Ethiopia comes from cattle with the remainder coming from goats and camels (MoARD, 2007). Ethiopia produces approximately 3.2 billion liters per year from 10 million milking cows. The farm-level value of the milk is an estimated 16 billion Ethiopian Birr per year (Kitaw.et al.2012). Therefore, this report is wrote and present the assessment of milk value chain analysis of Sebeta district high land area of Oromia regional state.

### *1.2 Problem statement*

The dairy sub-sector is currently facing a number of problems that have persisted for decades in Ethiopia. Productivity of the dairy herd is low (1.3L - 1.54L per cow per day) with an average lactation period of 180 – 210 days (CSA, 2008). The population of exotic and crossbred dairy cows accounted for less than 1% of the total dairy cattle. High mortality rates occur due to poor nutrition which makes cattle vulnerable to disease bernad et al. (2006). On the other hand, producers in the rural areas lack access to markets and extension services which reduces the ability of smallholder producers to be competitive. Despite the importance of this dairy farm as potential suppler of milk in Sebeta district of Ethiopia there is limited research done so far regarding dairy value chain.

Given the existing situation of the study area it is a fact that investment on dairy farm creates majority development. Most of dairy farm are operating as it is the supplementing the horticultural farm not as it is with stand dairy farm and processing plants are working under capacity because they did not get quality milk so researching the function and importance of the major Actors, supporters and influencers involved in dairy value chain of Sebeta., generate quantitative and qualitative analytical data on dairy value chain in Sebeta district and identifying the bottleneck of dairy value chain in Sebeta district are most important to make the dairy farm with stand by itself as sustainable as possible. Therefore the research questions set for this report is what are the function and importance of the major Actors, supporters and influencers involved in dairy value chain of Sebeta?

 

What are quantitative and qualitative analytical data to be generated in dairy value chain of Sebeta district? And what are bottleneck of dairy value chain sector in Sebeta district that needs farter intervention?

### *1.3 Objectives of the study*

- To identify and analysis of the function and importance of the major Actors, supporters and influencers involved in dairy value chain of Sebeta district.
- To generate quantitative and qualitative analytical data on dairy value chain in Sebeta district.
- To identify the bottleneck of dairy value chain in Sebeta district.

### *1.4 My Role in the Dairy Value Chain*

I work in Adami Tulu Agricultural Research Center whose overall objective is primarily to conduct research on livestock, crop, agricultural extension and socioeconomic and Natural resource. Specific objective of the center is to promote sustainable agriculture through research and agriculture technology development, effective extension and other support services to farmers, traders and processors for improved livelihood in the areas. Hence, center works under huge responsibility in areas where research output has hardly reached by working closely and in collaboration with different stakeholders. Thus, my direct involvement in the dairy chain is with respect to identification and analysis dairy problems, development of improved technology, multiplication and distribution of the technologies and information to the producers, traders and processers involved in the milk production and marketing chain through extension activities.

### *1.5 Materials and Methods*

#### 1.5.1 Description of the study area

This study is conducted in Sebeta district which is located in special zone of Oromia regional state in central highlands of Ethiopia at 24 km west of Addis Ababa on the main road to Jimma. The area receives an average annual rainfall of around 1100 mm, more than 85% of which falls in the main rainy season (June to September). The altitude of the area ranges from 2200 – 2600 meter above sea level, and the average annual temperature ranges from 6 – 21$^{o}$C. The major crops grown include teff (Eragrostis tef), wheat, barley and bean. The district is characterized by a crop-livestock mixed farming system in which livestock in general and dairy production in particular contributes significantly to livelihoods. (MoARD,2010).


**Figure 1. Map of Sebata district**

#### 1.5.2 Methods of data collection and analysis

Data were collected from different literatures, my own unpublished materials on preliminary assessment and my own work experience in this area. Secondary data which can support this analysis was also collected from the district's livestock development, health and market agency to support this work.

The collected data were organized and the results are presented using picture, tables, graph, problem tree and chain map. In addition as method of data collection, different sources of information was used to organize this value chain analysis report. Lastly the problem in the area was analysis using the combination of PESTEC/SWOT to reach to the final conclusion.

## CHAPTER 2: DAIRY VALUE CHAIN ACTORS AND SUPPORTERS IN SEBETA

### *2.1 Chain Map of dairy value chain in Sebeta*

Dairy chain map incorporate many stakeholders involved in dairy sector which include inputs supplies (inputs AI, bull and feed), small holder farmers, milk collectors, milk collection unit, cooperatives and union, small processors, Processing plants, retailers (small shops and supermarkets) and the different supporters and influencers as presented in the chain map below (figure 2).

 

### 2.1.1 Formal Chain map for Milk value chain in Sebeta

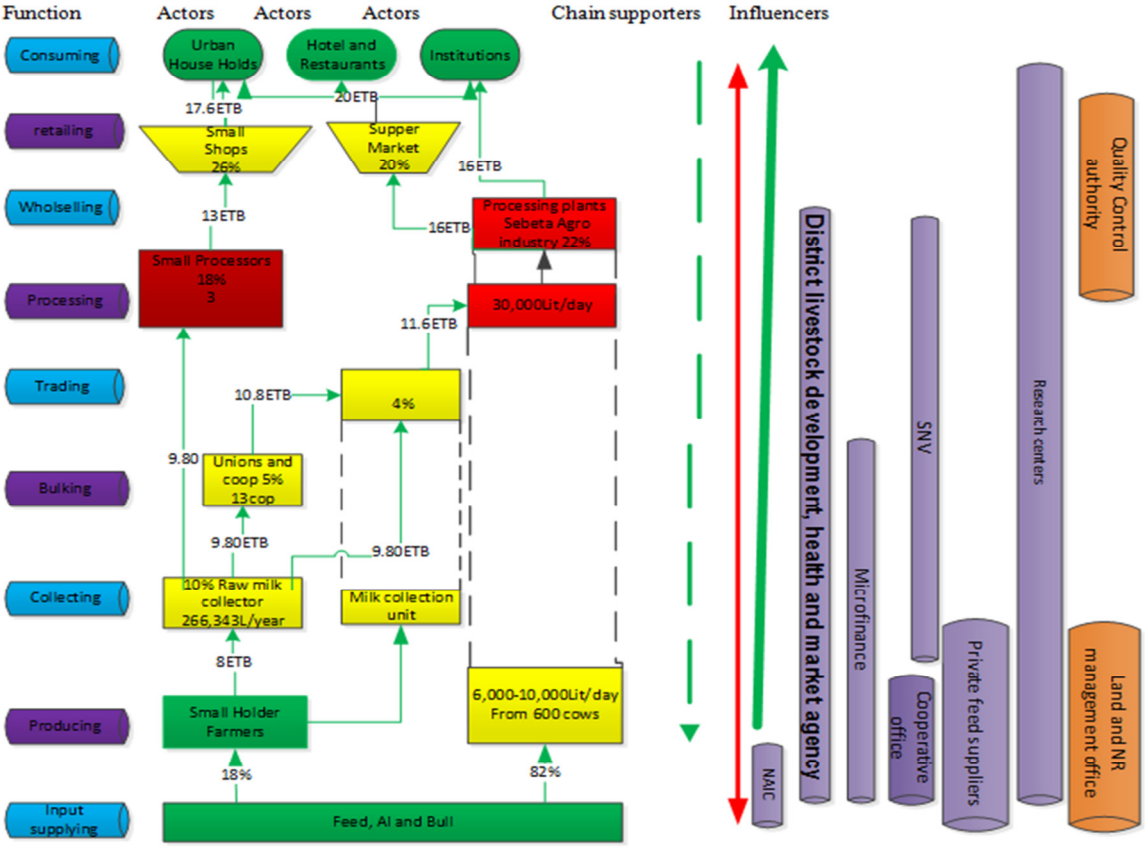


**Figure 2. Formal Chain map for Milk value chain in Sebeta**

### 2.1.2 Informal milk chain

In the study area 95% of milk is supplied to the final consumer through informal channel.

Informal Chain map for Milk value chain in Sebeta

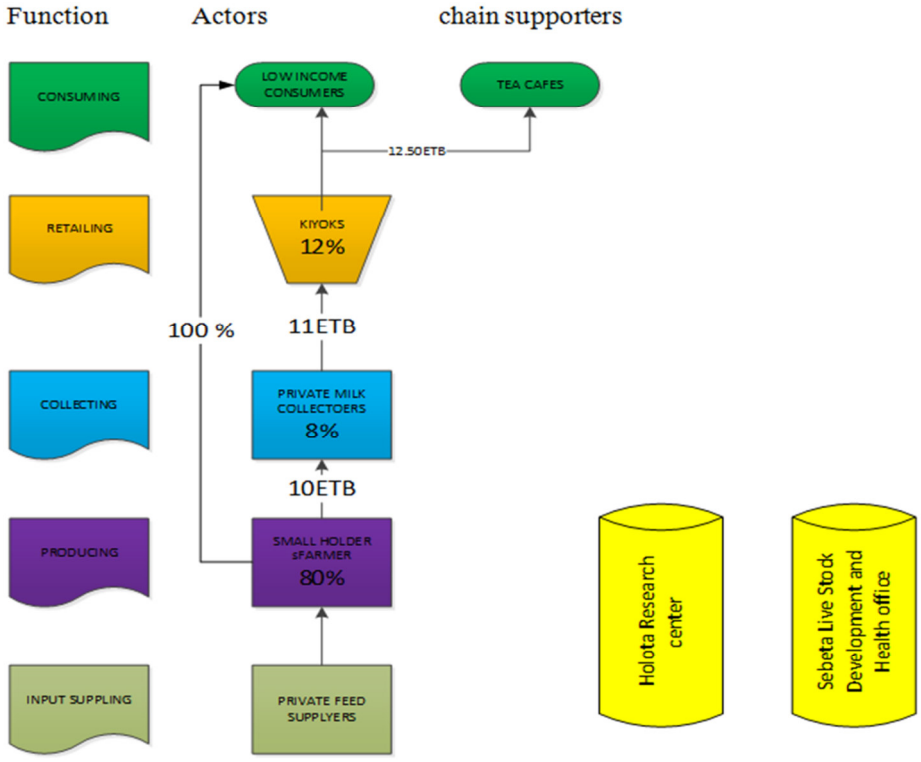


**Figure 3. Informal chain**

 

### *2.2 Dairy value chain Actors and their functions in Sebeta*

#### 2.2.1 Input suppliers

Governmental organizations and private traders that are involved on feed supply, bulls, and veterinary drugs. While AI service is delivered by the government National Artificial Insemination Center (NAIC), natural service is provided by bulls owned by individual farmers in the district who charge little or nothing.

#### 2.2.2 Producers

They are the main actors which are involving in the activities such as cow rearing, feeding, milking and selling of milk at farm get to formal chain actors such as raw milk collectors and milk collection unit and informal chain actors including private milk collectors and low income consumers. Besides processing plant has its own dairy farm that is located 40 km West of Addis Ababa at Sebeta town of Oromia state. This dairy farm involved in activities such as rearing and feeding of cows and milking and supplying raw milk to the processing unit. It is the biggest dairy farm in the country, the private company Sebeta Agro Industry, processes around 30,000 liters per day at present. Around 6,000 – 10,000 liters of milk comes from its own dairy farm with 600 cows. Other milk is also collected from stallholders dairy farmers in the region.

#### 2.2.3 Raw milk collectors

Formal milk collectors collect the milk from small holder farmers and sale the milk to cooperative/ union, collection unit and small processers. Informal private collectors collect the milk from small holder farmers and sale the milk to retailers such as kiyosk. On other hand, milk also collected directly from small holder farmers by collection unit and sell to large processing plant.

#### 2.2.4 Cooperatives and unions

Cooperatives and union are involved on activities such as collecting milk from formal collectors, bulking and refrigerating of milk and delver milk to milk collection unit by making market information and Create market linkage and transporting.

#### 2.2.5 Milk collection unit

Milk collection unit are factory collection units that collect milk from farmers, formal collectors and cooperative/union and supply to large processing plant but they don't have refrigerating facilities in the rural area. Also they make market information linking with others actors.

#### 2.2.6 Dairy Processers

There are two processers in the study areas this are small scale processers and processing plants. Function of large processing plant are purchasing milk in large quantity from factory collection unit and processed the milk into cheese, yoghurt whole milk types like mama, Sebeta and sholla. Most of these processors operate under-capacity (40% gap between installed and attained capacities) because of shortage of the required quality raw milk Kitaw et al. (2012). Processing is limited to production of non- concentrated and short shelf-life products. Small processors are collect milk from formal milk collectors and processed. Both large and small processers are actors which involves on milk chilling, pasteurization, packaging, product making, and quality assessment. All actors engaged in processing conduct at least one or more types of milk quality analysis (microbial contamination test and milk compositional test) during the buying and selling process. While traders do not have cooling refrigerators on their collection trucks, processors most often do.

Major milk value chain actors in the district are large processors operating by supporting financially milk collectors. Accordingly, the volume of milk collected daily is >10,000 litter by formal collector (Sebeta agro industry or Mama), 2000 liter by cooperatives and union (Biftu Berga production and marketing union). Collection is done twice a day after quality tests using lactometer and alcohol tests at which this test was done only at processing level. Milk production reaches a peak during the main rainy season which extends from mid-June to early-October. There are 13 active cooperatives under Bifitu Berga Dairy union (488 male and 210 female members) at Sebeta Azage (2002).

#### 2.2.7 Wholesalers

In the study are wholesalers are only processing plant which are acting in both processing and wholesaling the milk.

#### 2.2.8. Milk Retailers

The retailer includes supermarket and small shops in formal chain and kiyosk in informal chain. They involve on activities such as purchasing from processors and transporting of processed milk and sell to final consumers such as urban households, hotel and restaurant and institutions like school and college in forma chain and raw milk from informal private collectors and sell to final consumers like low income consumers and tea cafés in informal chain.

#### 2.2.9. Consumers and milk utilization

There are different types of consumers in the dairy chain. They are the generally the one who often get the milk from the retailers. In formal chains consumers are get milk from retailers like small shop and supermarket. Whereas in informal they get milk from retailers like kiyosk.

 

**Table 1.**List of stake Holders in dairy value chain analysis of Sebeta

| S/N | Stakeholders | Activities | Numbers | Function |
|---|---|---|---|---|
| 1 | Input suppliers (privet, governmental sectors and cooperative NAIC) | Supply of semen, bull, feed and vet drug | 13 | actors |
| 2 | Small holder dairy farmers | Cow rearing, feeding and milking and selling milk to trader, milk collectors and rural milk consumers | Own 1-6 cross cows | actors |
| 3 | raw milk collector | Collection, transporting and delivery to the small processor and union/coop | 14 | actors |
| 4 | Unions and cooperatives (berga and Biftu) | Collection of milk from raw milk collector then refrigeration, transporting and delivery to the milk collection unit | 13 coop (698,F210488M | actors |
| 5 | Milk Collecting unit | Collection of milk from union /coop and milk collectors transporting and delivery to the processing plant | 6 | actors |
| 6 | Small scale processers | Milk chilling, pasteurization, packaging, product making and quality assessment 18% of milk | 3 | Actors |
| 7 | Processing plant ( Mama or Sebeta agro industry) | Milk chilling, pasteurization, packaging, product making and quality assessment 82% of milk and Cow rearing, feeding and milking 30,000Lit/day | 1 | Actors |
| 8 | Small shop | Selling, Transporting processed milk | | actors |
| 9 | Supermarkets | Selling, Transporting processed milk | | retailers |
| 10 | Sebeta, Holota ,Adami Tulu Agricultural research center and ILRI | Demonstrating new technologies and giving training and advice test animals for disease TB, brucellosis… | 4 | supporter |
| 11 | District cooperative office | Organizing farmers and training on cooperative formation and saving advantage | 1 | supporter |
| 12 | Oromia Credit and Saving Share Company | Credit service but very low | 1 | supporter |
| 13 | District Agricultural office | Training and technical support | 1 | supporter |
| 14 | Quality controlling authority | Quality control setting standard | 1 | Influencer |
| 15 | District Land use office | Control land use | 1 | influencer |
| 16 | SNV | Facilitating stakeholders meeting and conducting research on milk production and processing | 1 | supporter |

Source: compiled from PRA conducted 2010/11 by ATARC and SARC

### *2.3. Dairy value chain supporters in Sebeta district*

#### 2.3.1. Credit service

Credit is an important input for livestock production but is very low nearly absent in some part of the district while still in others government and non-government micro finance institutions are operating to a limited extent and capacity in the district. Government micro-finance institutions such as Oromia Credit and Saving Share Company and special savings and credit associations provide credit to some 35% of the producers in the area Firew et al. (2011). A non-governmental micro-finance institution called Africa Village is in its infancy and hence has not started its service. Marketing this involves the whole marketing process including major actors beginning with collection of milk from producers to retailing by traders, primary coops, unions, processors and consumers. Milk buying and selling price per liter varies among the different actors, across season of the year and in line with the prevailing feed cost.

#### 2.3.2. None Financial support for dairy in Sebeta

None financial support for dairy production in the study areas is extension services and veterinary service but it

 

is not sufficient as required that were given by different bodies.

***District livestock development, health and market agency***

Give training and technical advice for small holder on improved dairy animal handling was given by development agent in the area but it is not significant.

***ILRI International livestock research institute***

ILRI have been supporting small holder farmers by giving improved heifers and training on improved breed handling and gathering market information.

***Research institute***

Sebeta, Holota and Adami Tulu Agricultural research center conduct participatory research with dairy small holders on improving production and productivity and disease controlling mechanisms and offer the output, besides this training, technical advice for famers and experts, demonstration of improved technologies were given in the study area.

**SNV**

SNV facilitate stakeholder regular meeting and conducting research on milk production and processing.

**District cooperative office**

The main support of district cooperative office is organizing farmers and offering training on cooperative formation and saving advantage.

## CHAPTER 3. EXTERNAL FACTORS INFLUENCE MILK VALUE CHIN IN SEBETA

### *3.1 PESTC/SWOT*

Look at internal and external factors that can affect the dairy business at which internal factors are strengths and weaknesses and external factors are the treat and opportunities.

**Table 2.**List of problem analysis PESTC/SWOT

| | Political | Economical | Social | Technical | Environmental | Cultural |
|---|---|---|---|---|---|---|
| **Strengths** | -Respect Governmental low.<br>-Availability of market information through governmental radio. | -High demand of milk in local market.<br>-Creating of raw milk traders strong market segment. | -Good in social relation. | -Good in handling of cross breeds.<br>- Expansion of mobile phone technologies for information exchange. | -Good indoor feeding system. | -Good daily life leading.<br>-Good perceptions of societies to milk. |
| **Weaknesses** | -Shortage of dairy supporting organization.<br>-Lack of cooling tanks and laboratory equipments for quality test at governmental office. | -Shortage of quality based payment.<br>- Low income earned from dairy sector.<br>- Shortage of capital.<br>- Restriction of working hours to only eight hours. | -low emphasis on milk safety by producers.<br>-Cooperatives are not well organized.<br>-Use of inappropriate container for transportation of milk. | -Mixing of Milk from different house during collection.<br>-Absence of quality test in the field.<br>-Inadequate of chilling facilities.<br>-Mixing of milk with water. | -Susceptibility to climate condition of crosses cows.<br>-Low ability to adapt to new areas of cross cows. | Milk is traditionally for cat, infant and sick peoples |
| **Opportunities** | -Expansions of milk processing plants by government initiation. | -Increase demand of milk.<br>-cheap labor force or low wage rate. | -high growth rate of population<br>-willing of farmers to expand dairy farm.<br>. | -Presence of improved technologies at research center. | -Presence of suitable environment for cows rearing. | -Good culture for economical empowerment of women on milk and milk product activities. |
| **Threats** | -Limited support from the government.<br>- High tax on import of packing materials.<br>-shortage of foreign exchange. | -Increasing cost of Inputs required for dairy production.<br>-Inaccessibility to credit.<br>-Increase in inflation rate and unemployment. | -Low access to social infrastructure by rural small holder producers.<br>-food insecurity. | -Inadequate extension service.<br>-Low milk production per cow.<br>-high prevalence of mastitis disease<br>-shortage of packing materials. | -Bad weather. | -Unfamiliarity of consumers with pasteurized milk. |

Source: compiled from PRA conducted 2010/11 by ATARC and literature review.

 

### *3.2 Problem Tree Analysis*

The use of the problem tree analytical tool has been helped in the identification of the main problem, the causes and their possible effects in the dairy chain. Thus, according to problem tree analysis the identified main problem are low income earned from dairy sectors. The problem definitions was formulate as low income to dairy sectors caused by shortage of improved breeds, Insufficient finance, low milk production, low quality and low milk supply to processers, and shortage of packing materials which are caused by shortage of ranch, and back breeding, low price of milk, low nutritive value of feeds, high prevalence of mastitis disease and poor hygiene, mixing of milk with water and absence of quality test on field, shortage of foreign exchange and high tax on import of packing materials . Finally production income obtained from dairy sector was low thereby farmers food unsecured and number of unemployed increased.

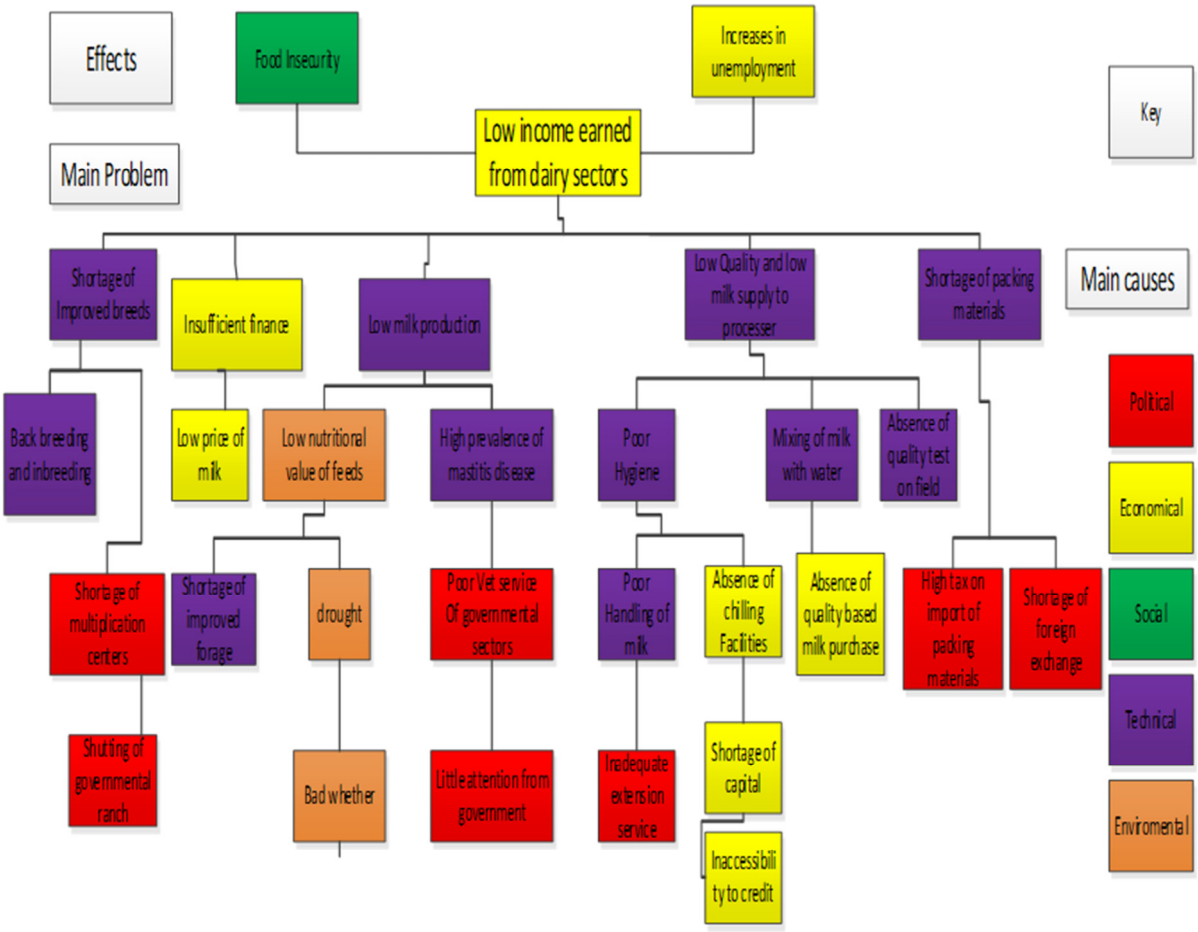


Figure 4. Problem Tree of the milk Chain in Sebeta district

## CHAPTER 4.QUANTITATIVE ANALYSIS OF DAIRY SUB SECTOR IN SEBETA

### *4.1 Trend of milk collected quantities at Sebeta milk collection unit: From 2008 to 2012*

The trend of Sebeta milk collected quantities from 2008 to 2012 are summarized in the table below

**Table 3.** Trend of milk collected quantities at Sebeta collection unit: from 2008 to 2012

| Year | Quantity (Lit) | Average per Month (Lit) | Average lactation of months/year | Average milk collected per day (Lit) | Number of collection unit | Average per day per collection unit (Lit) |
|---|---|---|---|---|---|---|
| 2008 | 1,348,620 | 192,660 | 7 | 6422 | 6 | 1070 |
| 2009 | 1,267560 | 181,080 | 7 | 6036 | 9 | 670 |
| 2010 | 1,215,690 | 173,670 | 7 | 5789 | 7 | 827 |
| 2011 | 1,081080 | 154,440 | 7 | 5148 | 8 | 6435 |
| 2012 | 996,450 | 142,350 | 7 | 4745 | 7 | 677 |

**Source: Sebeta Live stock agency, 2013**

The above table shows that the collected production decrease from 2008 to 2012 this because the feed price increase so that farmers can't afforded to buy and feed for dairy cow which also has negative impact on the milk

 

yield.

### *4.2. Profit/Loss of small holder dairy Farmers in Sebeta per cow per year*

The data used to calculate the value share of small holder farmer incurred to produce 20,160 liter of milk per cow per year as indicated in table 4 and for the following net profit calculation only farmers used indoor feeding and have cross breed cows live in per urban and urban area of Sebeta district were used for the value share calculation of producers which are not good on record keeping because of this estimation of cost they incurred is used for net profit calculations.

**Table 4. Indicate Profit/Loss of small holder dairy Farmers in Sebeta per cow per year**

| *S/No* | *Gross out put* | *unit* | *Quantity* | *Average unit price* | *Total* |
|---|---|---|---|---|---|
| *1* | *Average milk produced* | *Liter* | *12*210 days 2520* | *8* | *20160.00* |
| | ***Total Revenue*** | | | | ***20,160.00*** |
| *2* | ***Variable cost*** | | | | |
| *2.1* | *Cost of feeds* | *Kg and sack* | *2kg and 2 sack roughage per cow per day for 7 month* | *3.4*<br><br><br>*10* | *6.8*<br><br><br>*20*<br>*26.8*210=5628.00* |
| | | | *1kg and 2 sack of crop residues for 5 month* | *3.4*<br><br>*10* | *3.4*<br><br>*20.00*<br>*23.4*150=3510.00* |
| *2.2* | *Cost of AI* | *number* | *1* | *30* | *30.00* |
| *2.3* | *Cost of vet service* | | | *500* | *500.00* |
| *2.4* | *Other cost* | | | | *20.00* |
| | | | | | *Subtotal= 9688.00* |
| *3* | ***Gross Margin*** | | | | *20,160-9688=10,472.00* |
| *4* | ***Fixed cost*** | | | | |
| *4.1* | *Cost of lab our per year* | *number* | *1* | *400 per month* | *4800.00* |
| *4.2* | *Cost of shelter* | *ETB* | *estimated* | | *2400.00* |
| *4.3* | *Deprecation* | *ETB* | *Useful life 10 years* | | *240.00* |
| *4.4* | *Feeding and watering materials* | *ETB* | | *Estimated* | *1400.00* |
| *4.5* | *Deprecation* | *ETB* | *10 year* | | *140.00* |
| *5* | *Total fixed cost* | | | | *8980.00* |
| *6* | *Net profit* | | | | ***1492.00 ETB per cow per year*** |

Source: Sebeta Live stock agency, 2012

| Total milk Yield in lit per cow per year (Ave milk yield *lactation) | Total Variable cost per cow per year (ETB) (TC) | Cost price per kg in ETB (CP=TC/TY) | Selling price ETB per lit (SP)/lit | Total Revenue per hectare in ETB (TR=TY*SP) | Profit per lit (SP-CP) |
|---|---|---|---|---|---|
| 210*12= 2520 | 9688.88 | 3.80 | 8 | 20160.00 | 4.2 |

 

### *4.3 Variable cost of dairy union/cooperative*

**Table 5.**Indicate Variable cost of dairy union/cooperative incurred to bulking and transporting milk per day per liter for 1000 liter of milk.

| *Variable cost* | *Quantity* | *Unit price* | *Total cost* | *Cost price ETB per liter* |
|---|---|---|---|---|
| *Cost of transport of milk to milk collectors* | *92.5 Lit of diesel* | *16 ETB* | *1480.00* | |
| *Cost of milk collection* | *4* | *30* | *120.00* | |
| *Electric city(generator diesel )* | *1 day* | *400* | *400.00* | |
| *Total variable cost* | | | *2000.00* | *2000/1000=2* |

Source: Sebeta Live stock agency, 2012

### *4.4 Value shares of actors in the dairy Value chain in Sebeta district.*

**Table 6.**Shows Value share of Actors involved in dairy value chain of per liter of milk (in formal milk chain 2) (Ethiopian birr (€1= 25.36 ETB)

| Chain Actors | Variable cost | Revenue Price *quantity of milk produced | Gross Income Revenue – variable cost | Added value Revenue-previous actor's revenue | Gross Margin Gross income ×100/revenue | Value share Added value×100/retail price |
|---|---|---|---|---|---|---|
| Small holder farmers | 3.80 | 8 | 4.20 | 8 | 53% | 46% |
| Milk collectors | 2.20 | 9.8 | 7.60 | 1.80 | 78% | 10% |
| Small processors | 1.90 | 13 | 11.10 | 3.20 | 85% | 18% |
| Small shops | 1.10 | 17.60 | 16.50 | 4.60 | 94% | 26% |
| Total value share | | | | **17.60** | | **100%** |

**Table 6.** Shows Value share of Actors involved in dairy value chain of Sebeta per liter of milk (€1= 25.36 ETB) (formal milk chain 1)

| Chain Actors | Variable cost | Revenue Price *quantity of milk produced | Gross Income Revenue – variable cost | Added value Revenue-previous actor's revenue | Gross Margin Gross income ×100/revenue | Value share Added value×100/retail price |
|---|---|---|---|---|---|---|
| Small holder farmers | 3.80 | 8 | 4.2 | 8 | 53% | 40% |
| Raw milk collector | 2.5 | 9.8 | 7.30 | 1.80 | 75% | 9% |
| Union/cooperatives | 2 | 10.8 | 8.80 | 1.00 | 82% | 5% |
| Milk collection unit | 2.50 | 11.6 | 9.10 | 0.80 | 78% | 4% |
| Processing plant | 4.8 | 16 | 11.20 | 4.40 | 70% | 22% |
| supermarket | 1.25 | 20 | 18.75 | 4.00 | 94% | 20% |
| Total value share | | | | **20.00** | | 100% |

The above table 7 indicates the different variable costs, revenues, gross margins and the value shares for the different actors in formal dairy value chain in Sebeta district.

 

**Table 7.**Shows Value share of Actors involved in dairy value chain of Sebeta per liter of milk (€1= 25.36 ETB) (formal milk chain 1)

| Chain Actors | Variable cost | Revenue Price *quantity of milk produced | Gross Income Revenue – variable cost | Added value Revenue-previous actor's revenue | Gross Margin Gross income ×100/revenue | Value share Added value×100/retail price |
|---|---|---|---|---|---|---|
| Small holder farmers | 3.80 | 8 | 4.2 | 8 | 53% | 40% |
| Milk collection unit | 2.5 | 11.6 | 9.1 | 3.6 | 78% | 18% |
| Processing plant | 4.8 | 16 | 11.20 | 4.40 | 70% | 22% |
| supermarket | 1.25 | 20 | 18.75 | 4.00 | 94% | 20% |
| Total value share | | | | **20.00** | | 100% |

**Table 8.** Shows Value share of small holder dairy farmer where farmers directly sell raw milk to rural consumer per liter of milk (informal chain 2) (€1= 25.36 ETB)

| *Chain Actors* | *Variable cost* | *Revenue Price *quantity of milk produced* | *Gross Income Revenue – variable cost* | *Added value Revenue-previous actor's revenue* | *Gross Margin Gross income ×100/revenue* | *Value share Added value×100/retail price* |
|---|---|---|---|---|---|---|
| *Small holder farmers* | *3.8* | *8* | *4.2* | *8* | *53%* | *100%* |
| *Consumers* | *10* | *0* | *0* | *0* | *0* | *0* |

**Table 9.**Shows Value share of actors in the informal chain1 (€1= 25.36 ETB)

| Chain Actors | Variable cost | Revenue Price *quantity of milk produced | Gross Income Revenue – variable cost | Added value Revenue-previous actor's revenue | Gross Margin Gross income ×100/revenue | Value share Added value×100/retail price |
|---|---|---|---|---|---|---|
| small holder farmers | 3.80 | 10 | 6.2 | 10 | 62% | 80% |
| privet milk collector | 2.5 | 11 | 8.5 | 1 | 77% | 8% |
| kiosks | 2 | 12.50 | 10.5 | 1.5 | 84% | 12% |
| Total value share | | | | **12.50** | | 100% |

### *4.5 Different prices of milk and their sub products*

**Table 10. Different prices of milk and their sub products in Sebeta district.**

| Type of milk product | Average Price (ETB/ Lit or kg) | | | |
|---|---|---|---|---|
| | Farm get | kiyoks | shops | supermarket |
| Raw milk | 8 | 12.50 | - | - |
| Pasturalized milk | - | - | 17.50 | 20 |
| butter | 100 | 120 | 130 | 150 |
| Yogurt | - | - | 23 | 28 |
| Chees (ayib) | 20 | 24 | 26 | 32 |

Source: USAID (2013)

The value shares of different actors are shown in the figure 5 below.

 

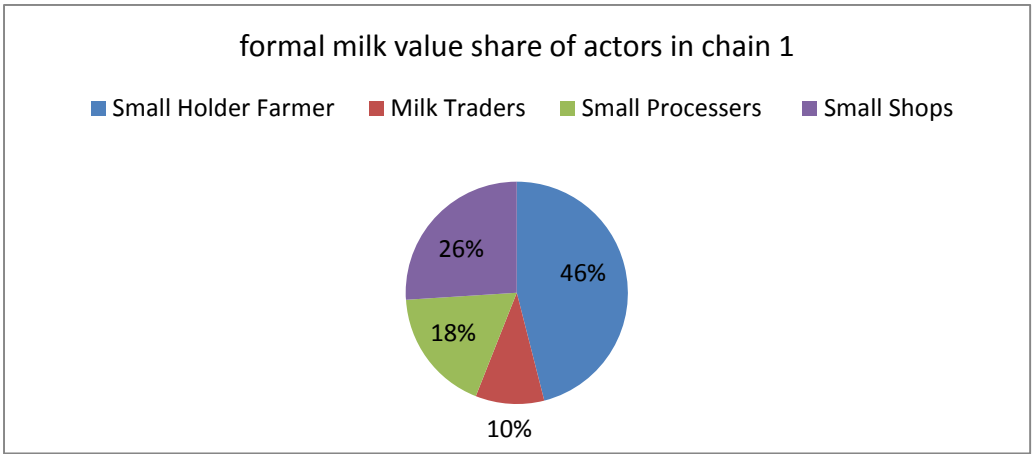


**Figure 5. Formal milk value share of actors in channel 1**

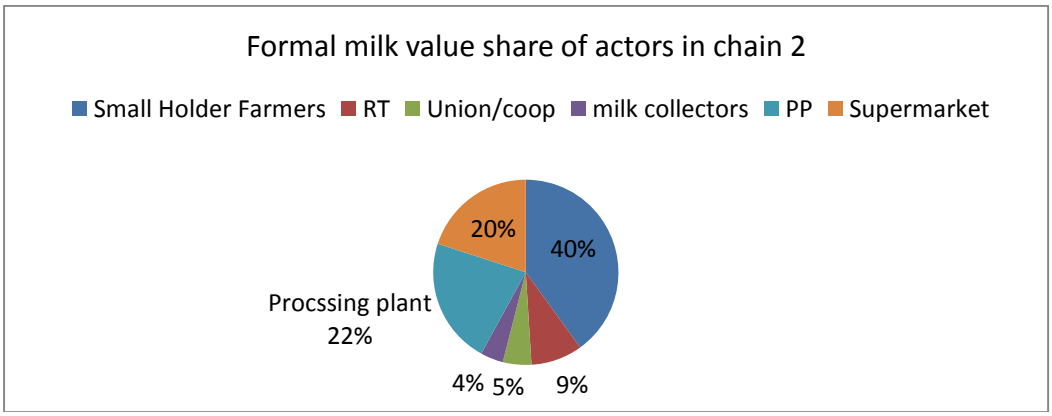


**Figure 6. formal milk value share of actors in chennel 2**

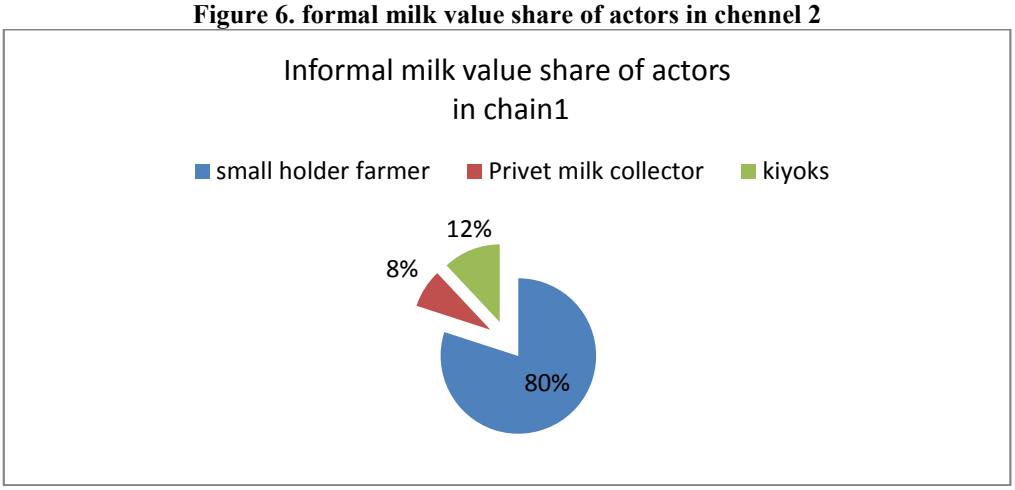


**Figure 7. Informal milk value shares of actors in channel 1**

 

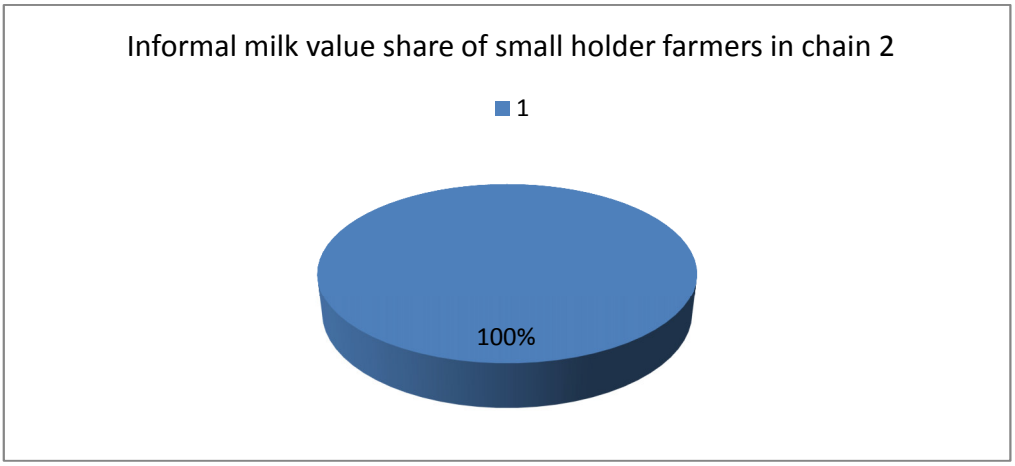


**Figure 8.** Informal milk value share of small holder farmers in channel 2

## CHAPTER 5.QUALITATIVE ANALYSIS OF DAIRY SUB SECTOR IN SEBETA

### *5.1 Power Relations*

The dairy chain in a district the actors with the most powerful influence are the processing plant. The processors buy most of the milk produced by small holder farmers through collection units of the district. Coordination is at the hand of processing plant that will determine that what, how and when milk trade activities to be done within the chain but processing plant does not practice fully quality based purchase of milk which will minimize the problems associated with milk quality.

### *5.2 Actors Relations*

Relationships among actors in the milk chain is strong, it is more of formal especially the relationship between collector, traders and processors in district. Even though actors have been and known each other in the milk chain the information reach producers (farmers) regarding market price is not sufficient since some traders hide current market information. There are an agreement contracts between milk collection unit and processing plant in the chain

### *5.3 Information flow*

There is information flow in both directions from producers to consumers and from consumers to producers. Regarding with market information there is information exchange between producers, traders, processors, and consumers. An information transfer from dairy producers to traders is somewhat not transparent on the price of the market. Regarding with milk traders and processors are transfer information to producer market price for milk, consumers' preference and market information. But, there is information gap between district of agriculture office, extension service and milk producers on quality management. According to own PRA survey of MoARD (2007), there was no recorded data on feed amount, price of feeds purchase treatments given activities. Farmers got information from development agents and the extension services and they had no any exposure to model demonstration to improve their production and quality of milk. As far as milk price setting is concerned there is some negotiation and legal agreement in most cases but this does not include producers. Quality-based payment is only practiced by one processor (Mama additionally paying 1-2 birr/liter depending on quality) leading to unhealthy competition among collectors where one accepts what the other rejects for inferior quality. Payment is made either every 2 weeks or sometimes on monthly basis. Milk collection and distribution prices increase on average by 10% each year.

 

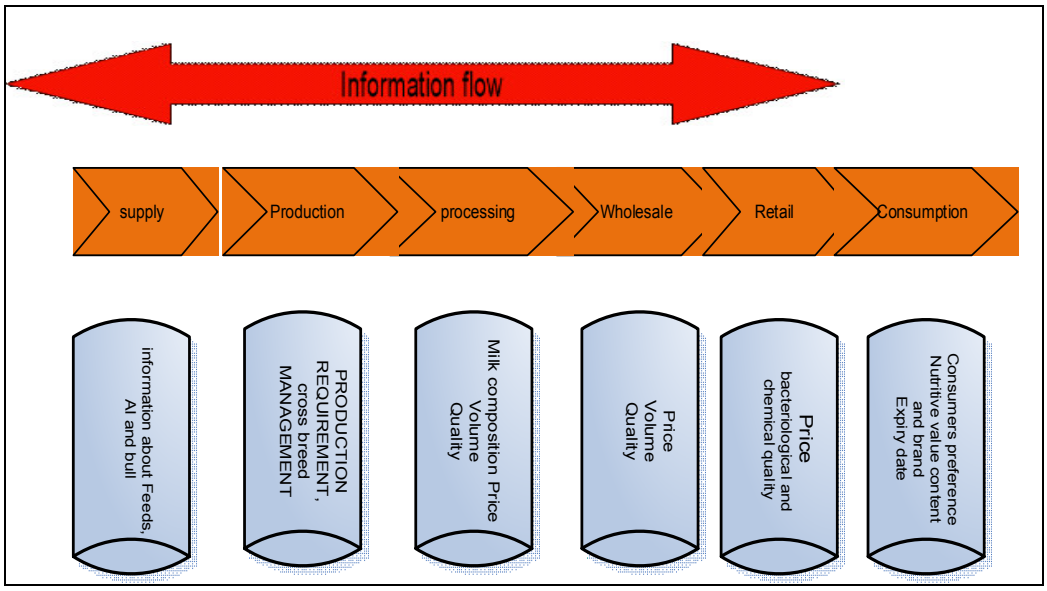


**Figure 9. Information flow chart**

### *5.4 Gender issue in milk value chain at Sebeta*

In study areas milk production and marketing is the major duties of women. Milking of cow is done by adult and young female. Milk production utilization for different purpose like house hold level consumption, gift to relatives', neighbors, processed and preserved and amount to be used for sale are decided by women. The allocation and utilization of income sourced from sale of milk and milk products also decided by adult women. As it was observed the milk utilization rates for different purpose in Sebeta district used for home consumption, for social gift, for marketed and for home processing also decided by women.

### *5.5 Sustainability*

In the study area to sustain the milk production there must be strategic alignment between actors, effective information flows, trust and commitment between actors and the most important one is consumer insight must be developed in the mind of the consumers. In addition it is believed that sustainability goals in dairy sector of Sebeta will be archived by smart technology and service that will increase the milk quality and use of dairy resource on farm. In spire by environmental challenges it is based on four interlink pillars environment, animal health, social responsibility and farm profitability of dairy sector in the study area.

Lastly there are already a number of products that can contribute significantly to make Sebeta dairy farm more sustainable and this number is growing steadily as farmers and concerned bodies integrated dairy recourse efficiency in to their product development. Thus, to depict chain sustainability making use of the 3 P's as follows:

#### 5.5.1 People

The chain demonstrates gender equity, child labor is forbidden (over legal working age of 17) at processing but farmer can use all family members. The chain provides over 26,000 direct jobs the local farmers. On the other hand, milk producing has considerable socio-cultural significance. In the district milk producers are appreciated by the community for their product to infant foods it is considered as prestige as they produce more milk especially before ten years.

#### 5.5.2 Planet

The dairy sector has been promoting use of multipurpose trees as an alternative to seasonality of availability of fodder in the district. Farmer's plant multipurpose trees and this adds to the tree cover and soil fertility. The use of animal manure on the farms helps to improve the soil fertility. This plays great role to improve crop yields and quality through using animal dug as main component of compost organic fertilizer. Once the farmers apply the compost it will use them for three and more years with and without applying chemical fertilizers and play important role in soil and water conservation. However, dairy farming is also known to contribute to increase in methane gas, a greenhouse gas, in the atmosphere.

#### 5.5.3 Profit

Milk production is economically viable activities. But, low relative market price seen only during orthodox fasting time for 146 days in a year. Milk producing is one of the most important income generating activities in the rural community of Sebeta for poor women in the area. Milk selling helps for the diversification of the incomes of farmers. Some milk producers of the area reported to earn up to 10,800.00 Ethiopian birr annually from milk selling only. Many resource poor farmers sell their milk and milk products to the local market and use

 

in come to purchase livestock, agricultural inputs, food crops and others household items.

## CHAPTER 6. QUALITY MANAGEMENT

Offers both product and systems certification services was started in the study area which must be strengthen for quality management. Milk quality control is the use of various tests to ensure that milk and milk products are safe, healthy, and meet the standards for chemical composition, purity and levels of bacteria and other micro-organisms. The food industry uses various systems for quality and safety management, e.g. ISO 9000, Total Quality Management (TQM), Hazard Analysis and Critical Control Point (HACCP), etc. These systems are very effective, but complex and expensive. Therefore, low-cost methods for milk quality control, which will help dairy sectors and sell dairy products of consistent good quality was preferred in the study area like organoleptic test, clot on boiling, alcohol test and lactometer test. Milk quality test such as somatic cell count, bacterial count, antibiotics, sediment, butyric acid, free fatty acids, freezing point and chloroform frequency, limit and average performance was set by the government but they are expensive to apply all the tests in the study area.

### *6.1 Milk grading and quality standards*

Good quality dairy products can only be made from good quality milk. Therefore, it is important to grade milk, so that poor quality samples are rejected and only good quality milk is sold to retailers and processors. To do this, farmer cooperatives and milk traders must know how to test the milk they produce or receive from individual farmers. Similarly, dairy staff must have knowledge of various quality control tests. They should be able to identify off-flavors, and understand what causes these problems. In addition the dairy processers sets minimum requirement for hygienic production of milk and milk products. Quality control standard officer in dairy cow farming service sometimes inspect and registering processing milk industrial and monitoring product quality. Sebeta milk producers are not serious about quality control, record keeping. Only actors engaged in milk processing conduct at least one or more types of milk quality analysis (Organoleptic test, clot on boiling, alcohol test and lactometer test) during the process of buying.

**Table 11.**Indicate legal minimum grading standards for milk

| Milk composition | % |
|---|---|
| Fat | 3.8 |
| Total Protein | 3.4 |
| Casein | 2.7 |
| Albumen and Globulin | 0.70 |
| Lactose | 4.8 |
| Mineral salt | 0.7 |
| Water | 87.3 |

Source: quality test institute Legal standard for milk (QTILSM)

### *6.2 Factors affecting quality*

The following are some of the factors that can affect quality of milk;

- Feeds and feeding- The animals should be feed with the right quantity and quality of feeds to ensure the right compositional quality of milk. Animal health condition Zoonotic diseases can be transmitted through animal products to humans; presence of residual drugs in milk.
- Unhygienic milking environment including the cleanliness of the milker, the milking equipment and the animal.
- Transport containers and the mode of transportation. The containers should be clean and sanitized. Excessive shaking of milk can cause the milk to churn.
- Milk processing.

Inadequate or lack of cooling of milk after milking, Use of inadequate time/temperature combinations for processing, Unhygienic processing environment-buildings, personnel, machinery, presence of rodents, Inadequate quality checks on inputs like packaging materials and water for processing and cleaning and Inadequate refrigeration after processing and before sale and consumption.

- Environmental aspects

Poor disposal of packaging material after use and Poor disposal of sewage and product waste.

### *6.3 Critical control point along the value chain*

#### 6.3.1 Animal feed

In order to main high quality of milk the anima should be feed with high quality feed such as concentrate, silage, roughage which have their own influence on the quality of the milk.

#### 6.3.2 Milking

Milking is a crucial activity such as clean way of milking, cooling and proper maintenance in order to improve

 

the quality of milk is very important. Despite the fact, some Sebeta small scale farmers do not care on materials to use and hygiene of the udder which will cause quality loss. This seems to be the general problem in all milk producing part of district.

**6.3.3 Storage materials of milk**

Majority of the milk producers in Sebeta used plastic and metallic containers to store and transport to local market. In the Sebeta farmers still use containers such as clay pot and tin to store milk that are not technically appropriate storage facilities as they result in serious of quality losses. Farmers faced a problem by using this container for storage milk. They observed the problems due to container were quickly spoiling and fermentation of milk, changing of general appearance and taste of milk. Such milk will coagulated before boiling as the result it is not preferred by consumers. Lastly there is no cooling facility at farmers and collectors level

**6.3.4 Transportation**

During transporting milk from producers or one actor to another they must use chilling facilities which was not practiced in the collectors and trader's level which has direct effect on quality of the product. But chilling facilities was only at processed level which affects the quality. Sebeta Agro Industry established the first UHT dairy processing facility in the country. The new production lines will produce 500ml carton pouches (Tetra Fino Aseptic) and 250ml portion packages (Tetra Brik Aseptic). The introduction of UHT dairy products on the market is a great step forward to offset the seasonality in milk production and consumption.

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

**6.3.5 Cow**

Excellent care for cow results in the best quality of milk therefore; cow housing, health care and responsible medicines used during lactation must be controlled to insure the quality of milk.

**6.3.6 Processing**

Currently there are no ISO or HACCP certified domestic dairy producers or processors in Sebeta. One processor, Mama Dairy, is in the process of obtaining HACCP certification IFPRI (2004).

At processing level focus on feed and water for animals should have to take care of chemical and biological hazards at which the residual may pass to human by drinking milk that will cause serious damage. At study area processing level due to interruption of electricity the problem of quality loss was encountered before which was avoided by using standby generator. Lastly there must be critical controlling point established from grass to glass.

## CHAPTER 7. CONCLUSION AND PRILIMINARY RECOMMENDATION

### *7.1 CONCLUSION*

From this report findings it can be concluded that the main problem of dairy sectors is shortage of improved breed at input level which is caused by back breeding, inbreeding and shortage of multiplication center, low level of milk production and insufficient finance at producers level caused by low nutritional value of feeds, high prevalence of mastitis disease and low price of milk, shortage of packaging materials caused by high tax and shortage of foreign exchange, low quality of milk and low milk supply to processer which is caused by poor hygiene, adding water to milk, and absence of quality test on filed at processing level which will result in low income earned from dairy sector in the study area. Besides this even if the power of the chain is at the hand of milk processing plant they did not fully made the milk procurement based on the quality of milk which leads the producers and processors to loss the income. Training and awareness creation for women group and milk collectors on issue of milk quality is very low. Capital limitation to expand breeding and improvement ranch is also bottle neck in study area which will be solved by establishing micro finances.

### *7.2 PRILIMINARY RECOMMENDATION*

It is necessary to initiate and undertake continuous marketing studies of the starting from the farm gate to final consumers. This helps to make a practical fair pricing system that will consider production costs and consumers purchasing power. To overcome these barriers, they need new skills, capacity for leader ship and administration on general dairy production and marketing system of milk and payment should be under taken quality based.

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