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Acronym

AADI	Addis Ababa Dairy Industry
ADLI	Agriculture Development Led Industrialization
Birr	Ethiopia Currency
CSA	Central Statistics Authority
DDA	Dairy Development Agency
DDE	Dairy Development Enterprise
Dergue	The government that existed in Ethiopia from 1974-1991
EEA	Ethiopian Economic Association
ESAP	Ethiopian Society of Animal Production
FAO	Food and Agriculture Organization
GDP	Gross National Product
HH	Household
ILRI	International Livestock Research Institute
Kg	Kilogram
MEDac	Ministry of Economic Development and Cooperation (now incorporated in Ministry of Finance and Economic Development)
NGO	Non-Government Organization
PAs	Peasant Associations
PASDEP	Plan for Accelerated Development to End Poverty
UNDP	United Nations Development Programme
UNRDA	United Nation Rehabilitation Administrations
WB	World Bank
Woreda	The Administrative Unity (Sub-district)

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Abstract

This study is conducted to analyze the existence of linkage between dairy processing industry and milk producers and its role in improving rural livelihood. Interview and focus group discussion are the instruments used in data collection. Data before and after the introduction of Sebeta Agro-Industry are collected. The data collected described by tables and figures. The findings of the study revealed that: first, agriculture is the main source of livelihood for Dalati and Karabu Peasant Associations. Livestock, which includes the dairy sector, is the prominent source of income, asset, wealth, labor, fuel (energy), social and economic security. However, it dominantly produced in a traditional way. It is not intensified. Livestock holding, which was large in the past, decreased due to shortage of grazing land, low emphasis given to the sector and other related problems. Secondly, the study depicted that the dominant source of income for households are sell of crops (58.3%), sale of fruits and vegetables (21.7%), sale of milk (8.4%), employment in factories or non- farm activities (6.7%) and trade (5%). This does not mean that the sources of income are the indicated ones. These are the major sources of income. Farmers can earn income from sale of live animals, sale of milk and milk products, sale of egg and sale of eucalyptus tree. About 76.7% of the sample household heads claimed that the income they obtain from all sources of income increased in the past five years. This is due to increase in production, improve in the selling price of agricultural outputs and diversification of income sources. Thirdly, the study showed that about 88.3% of the total sample household-heads produce milk. But not all milk producers sell liquid milk to processing industries, consumers or retail traders. Those who sell liquid milk constitute about 35%. The largest proportions of milk sellers, about 18.3% of the sample population or 58% of liquid milk sellers, supply to Sebeta Agro – Industry. Fourth, the study revealed increase in milk production and income obtained from milk in the study area. However, the increment is not totally associated to the introduction of Sebeta Agro-Industry. Improve in price of milk and milk product is contributed a lot. Fifth, the study depicted that there is a linkage between Sebeta Agro-Industry and milk producers. But the linkage is restricted to roadside area. As one moves away from Addis Ababa-Jima road to inside the villages, there is no integration. However, the establishment of the factory benefited those who have integration to it. It provided market opportunity for milk (for about 18.3% of the sample), employment opportunity (for 8.3%), and initiate adoption of crossbreed or modern dairy cows (about 6.7%). In addition, about 6.7% of the sample population claimed that milk production, income, milk consumption and consumption of other commodities increased due to the introduction of Sebeta Agro Industry. It also improved access to education and health among this group. The factory instigated some household heads to adopt crossbreed or modern dairy cows. Finally, the study revealed that the linkage between the factory and milk producers is weak and one way. Milk producers supply milk to the factory and the factory pay money for the product. There is no input that targeted the development of the sector that the factory is transferring to milk producers. The price of milk is also not set by bargaining, rather by the factory. The factory lacks stable milk collection centers. It collects milk following Addis Abab–Jima road. What observed is not strong and motivating linkage. As a result the dairy sector do not developed very well in the area.

CHAPTER ONE

INTRODCTION

1.1. Background of the Study

The largest proportion, about 85%, of the Ethiopian population lives and earns its living in rural areas (CSA, 2006; Ministry of Trade and Industry 2004). Agriculture (crop and livestock production) is the main source of livelihood for the majority of rural population, and for the overall economy of the country. It contributed about 46.7% to the GDP of the country in 2006 (CSA, 2006).

Ethiopia has one of the largest animal populations in Africa (Tangka, F.K., 2002; ESAP, 2000). There are 38,749,320 cattle, 18,075,580 sheep, 14,858,650 goats and 456,910 camels (CSA, 2006). The sector contributes a lot to GDP of the country, about 35% of the total agricultural product (MEDac, 1998 as cited in Ayele, et al, 2003). It is also the basic source of income, livelihood, asset, wealth and labor for the farming population of Ethiopia. In addition, livestock and livestock products are the major source of foreign exchange, next to coffee (Ibid).

Although the green revolution in some developing countries improved the livelihood of their people by boosting agricultural production, in countries like Ethiopia, rural population continue to lead poor living conditions. Poverty, food insecurity, famine, low income, low life expectancy, inadequate access to health and educational services, poor access to potable water supply and energy sources prevail (Eicher K. and Shaazt, 1998). These are due to poor performance of agriculture together with other factors such as lack of good governance, poor credit facilities, low investment in agriculture, backward agricultural technologies, erstwhile political instability and unbalanced emphasis given to the agricultural and industrial sectors. The performance of livestock sector in sub-Saharan Africa in general and Ethiopia in particular is also low. This is due to shortage of grazing land and animal forage, animal diseases, poor veterinary services and inefficient marketing system of livestock and its products (Van Massow V.H., 1989). The development in the agricultural sector thus significantly improves the livelihood of the rural population. This can be done by increasing agricultural production and productivity through the use of high yielding variety seeds and agricultural inputs. Water harvesting, irrigation, improving

marketing systems, strong extension services, providing credit services, commercializing subsistence farming and inter-sector linkage as indicated on the Agriculture Development Led Industrialization Strategy and PASDEP can also serve this purpose.

It is indicated on Agriculture Development Led Industrialization Strategy that the Government targeted to develop the livestock sector. PASDEP, adopted in 2005, also aims to develop the sector by commercializing and helping small holders. This is through improving the sector by enhancing the quality and quantity of forage through developing forage feed production sites; providing improved animal feed and extension services; improving livestock health services; improving the productivity of local cows by providing improved breeds such as Jersey, Holstein and artificial insemination, and through preserving the indigenous breeds (Benin et al, 2002; Ehui et al, 2003; MoFED, 2005). A study is also in progress by Ministry of Agriculture and Rural Development to develop Livestock Sub-sector Development Master Plan that guides the development of the livestock in general and dairy in particular.

Agriculture-industry linkage also plays a key role in agricultural development and improvement in rural livelihood. Agriculture-industry linkages can be backward, forward and consumption linkages. The development and expansion of agro-based industries, which have strong linkage with agriculture, provide employment opportunity, market and agricultural inputs to the rural areas (Shrivastava, 2001). It creates conducive environment for the development of market oriented agriculture or commercialization of agriculture and serve as a bridge between consumers and producers.

Milk production and processing in the past had been undertaken throughout the world in a traditional way. Milking machines have been replacing milking by hands and processing in modern times in all countries although there is variation between countries. The milk processing: pasteurization, homogenization; cream extraction; cheese, butter and casein making and yogurt processing have been performed in agro-processing industries (wikipedia, the free encyclopedia). In Ethiopia about 95% of milk comes from indigenous cows, goat and camel. It is dominantly produced by small holder farmers and for home consumption (Azage, 2004). The dairy processing, the largest proportion, has been taking place in a traditional way.

The development of modern dairy processing industry, compared to other countries, is a recent phenomenon in Ethiopia. Modern dairy production and processing was introduced to Ethiopia in

the early 1950s with the introduction of modern dairy cows from abroad (Ahmed et al, 2003).The imperial regime took various measures such as provision of high yielding cows and initiating projects targeted to increase milk production. In addition, organizations such as Addis Ababa Dairy Industry (AADI) and Dairy Development Agency (DDA) which took over the tasks of AADI were established in 1966 and 1971 respectively. These organizations controlled and organized the collection, processing and distribution of milk. Besides, DDA was established to support the development of dairy in the country. Thus milk production increased in the 1960s. During the Dergue's regime, it was attempted to develop the sector through cooperatives. Dairy Development Enterprise (DDE), previously known as DDA, dominated the collection, processing and marketing of dairy (Ibid).

The liberalization of the economy, in 1991, created conducive environment for the development of private dairy processing industries. Sebeta Agro-Industry is among the few industries established then after. The factory was established in 1995 and started operation in 1998. The factory collects milk from small farmers, medium farmers and commercial farmers surrounding Addis Ababa and processes and markets it. It reduced fear of market to produce milk in large volumes in the study area.

1.2. Statement of the Problem

Milk is one of the major sources of income, wealth, asset, and in general livelihood for small holder producers. However, it is a heavy and perishable commodity. Unlike crops, it is produced on a daily basis and needs to be consumed, marketed or processed within a short period of time. The perishable nature of the milk requires producers to be linked to dairy processing industries (Stokke and Chantalakhana, 1999). Thus the location of dairy processing industries in dairy producing areas helps reduce the high transaction costs associated with the nature of the product and raises the income, wealth, food consumption, food access, and livelihood of producers (Stokke and Chanlakhana, 1999). In addition, the development of such industries and cooperatives provides employment, income, and inputs for rural farmers. It also creates conducive environment for farmers to adopt market oriented crossbreed cows. Furthermore, this has a role in improving income, wealth and nutrition of rural farmers. It also improves the constraint in the supply of milk and milk products to urban centers. This adds a lot in bringing balanced development in all sectors. Agriculture, on the other hand, supplies raw materials for

the industry and creates market opportunity for industrial products. Thus, the linkage enables to bring balanced development between industry and agriculture. It is an outlet for the farmers and also instigates them to adopt new technologies that help them to increase production and productivity. The linkage makes both the industry and agriculture grow together.

Sebeta Agro-industry, which is located in Sebeta town, is one of the few industries engaged in milk collection, processing and marketing and link the rural with the urban centers. The assumption is that the existence of this factory in the area has an impact on the development of the dairy sector and improvement in rural livelihood in the area. It generates sustainable market for milk and reduces risks and costs associated with the nature of the product. In addition, it involves the rural poor in production, marketing and helps to develop the quantity and quality of the product. This helps us to better understand and analyze the role of the linkage in rural livelihood.

In Ethiopia, research institutions and researchers have been conducting research to increase dairy production through crossbreeding technologies. The studies conducted also show success in the area (ESAP, 2000). But the gap between production of milk and the demand for milk and milk products has been ever widening. The milk supplied is less than the milk demanded (Azage, 2004). The demand for milk and milk products in sub-Saharan Africa including Ethiopia is expected to increase further in the next 20 years due to increase in population and income (Delgado et al, 1998). This gap has been filled by import of milk and milk products from abroad. But milk production, productivity and supply in Ethiopia and the study area are still low. The reasons for low production and low supply include low productivity of the indigenous cows, prevalence of animal diseases and poor veterinary services, shortage of grazing land and animal forage, increase in price of processed animal feed and the production of milk primarily for household consumption (ESAP, 2000). The other things that have a strong bearing on low production and productivity are poor marketing, poor transportation facilities and under-development of the dairy processing industry in the country.

Furthermore, researches so far conducted assessed the impact of the introduction of market-oriented dairy production on food security (Tangka F. et al, 2002), on livestock and livestock product marketing (Nin A. et al, 2002), on dairy development in Ethiopia (Ahmed, et al, 2003) as well as on some other related issues. But there is a gap of knowledge on the area of the existence

of linkage between dairy processing industry and producers and its impact on rural livelihood in Ethiopia. The thesis aims to fill the gap.

1.3. Objective of the Study

The general objective of the thesis is to assess the existence of linkage between dairy processing industry and milk producers and the impact of the linkage on rural livelihood.

The specific objectives are:

- To assess the role livestock production plays in rural livelihood,
- To assess milk production, marketing and processing; and constraints in milk production, marketing and processing,
- To see whether there is linkage between Sebeta Agro-industry and milk producers,
- To assess the role of the linkage between dairy processing industries and milk producers on adoption of market driven-technologies (cross-breeding technologies or improved breeds and commercialization of milk), income of rural areas, health, education, milk consumption and other products consumption,
- To look on the impact of the introduction of the Sebeta Agro-Processing industry in overcoming crop failure, and
- To see the impact of the linkage between dairy processing industries and female headed household milk producers on women's life.

1.4. Significance of the Study

The study may instigate researchers to conduct research on the area. Socioeconomic, policy and researches targeted to improve dairy production and productivity play a significant role in the development of the sector. The research also contributes to the development of the sector by informing the stakeholders to focus on the sector and strengthening the linkage between dairy processing industry and milk producers. At the time of the study respondents indicated that the dairy sector is the "neglected sector". Emphasis was not provided to it like crop and cash crop production. However, it is an important source of income, especially for women. The income obtained from milk covers daily expenditure of households. Thus, it needs emphasis.

1.5. Scope of the Study

The study was conducted in Sebeta Awas woreda. The woreda has 42 Peasant Associations. Two peasant Associations, i.e. Dalati and Karabu, are covered by the study. It assessed the linkage that prevails between dairy processing industry and milk producers and the impact of the linkage on rural livelihood. In addition, it assessed the role of milk production in rural livelihood. There are various processing industries that have linkage with agriculture and involve the rural poor. But the study does not cover the whole agro-processing industries that have linkage with the agriculture.

1.6. Research Method

1.6. 1. Sources of Data

The research relies both on secondary and primary data sources. Literature is reviewed on inter-sector linkage, milk production, processing and marketing. In addition, the role of livestock production in the Ethiopian economy, and the linkage between industry and agriculture in Ethiopia are surveyed. In general, to obtain the desired secondary data, books, journals, documents and reports, data of various years from Ethiopian CSA and pamphlets are considered.

On the other hand, primary data was collected from farmers, dairy processing industry (Sebeta Agro-industry) and government officials (Sebeta Awas woreda Agriculture and Rural Development Office).

1.6.2. Selection of the Study Area

Although milk is produced in all agro-ecological zones and all Regions of Ethiopia, Sebeta Awas woreda is purposively selected as a study area. The criteria for the selection of the woreda are the existence of Sebeta agro-processing industry, access to market and proximity to the capital city, Addis Ababa. The woreda consists of 42 administrative PAs (Peasant Associations) and towns. Each PA is again divided into *Garees*, the smallest administrative unit. According to the information obtained from the Woreda Agriculture and Rural Development office all PAs produce milk. But not all have contact with the milk collecting, processing and marketing industry, Sebeta Agro-industry. The numbers of PAs that sell liquid milk are six. These are *Karabu, Dalati, Rogge, Dima Magna and Dima Goranda*. Sebeta Agro-Industry is located near

to *Dalati and Karabu* PAs as compared to others. The two PAs have strong linkage with the factory than others. Thus, based on distance and the linkage they have with the Sebeta Agro-Processing Industry, the two PAs, Dalati and Karabu, are selected purposively.

1.6.3. Sampling

It is difficult to study the entire population due to time and cost constraints. Thus, a sample of household heads was selected from the population under study. The sample was taken from household heads residing in all Garees of Dalati and Karabu Peasant Associations. In the two PAs, about 600 household heads or 3000 people are estimated to be living and earning their living dominantly from agriculture. 10% of the total household population is female headed households. Out of the 600 household heads, 10% or 60 household heads are included in the sample. 11.7% of the sample is female headed households. To obtain the sample, first list of household heads are obtained from PAs administrators. Then the sample is taken from list of household heads randomly, using lottery method.

1.6.4. Instruments of Data Collection

To obtain data both quantitative and qualitative research techniques were used. Quantitative data was collected by using structured questionnaires. On the other hand, focus group discussion and open ended questionnaires were the instruments employed to collect qualitative data. The techniques used are:

Interview- face-to-face interview with household heads in dairy business are the main source of data. Fully structured (close-ended questionnaires and responses recorded on a standardized schedule) and unstructured interviews are the instruments employed to collect quantitative and qualitative data.

Focus Group Discussion: This aimed to support the data obtained through interview. Two groups from both PAs have been organized to discuss on the importance of participating in dairy business, dairy market and problems in dairy production among others. Each group consisted of 10 household heads. Females, Poor household heads, household heads that do not produce milk, and those who have and have not linkage with the factory are included in the group.

1.6.4. Data Analysis

After the data collection was completed, proper edition and organizing of the data into tables or graphs followed using SPSS and Excel Software. The analysis of qualitative data goes hand in hand with data collection.

1.7. Limitation of the Study

Lack of secondary data on milk production was the first limitation of the study. The second limitation is the unwillingness of Sebeta Agro-Industry to provide data on various issues such as total milk supplied by small holder producers, medium farmers, and commercial farmers and own farm, processing capacity of the factory and the assistance the factory provides to milk producers. As a result, the status of the linkage was assessed from farmers' point of view.

1.8. Organization of the Report

The remaining parts of the report are organized as follows. Chapter two presents the conceptual framework (inter-sector linkage), the linkage between industry and agriculture in Ethiopia, and milk production, processing and marketing in Ethiopia. Background information of the study area and sample characteristics are presented in chapter three. Findings of the study and the conclusion and recommendation are dealt with in chapter four and five.

CHAPTER TWO

LITERATURE REVIEW

2.1. Conceptual Framework: Inter-sector Linkage

Although the degree of the linkage varies, the various sectors of the economy are inter linked. The linkage is either as the users of inputs of other sectors and/or as suppliers of inputs to other sectors (Mulat and Tassew, 2001). These linkages could be backward, forward or consumption linkages. Backward and forward linkages are known as production linkages (Dunham, 1991; Mulat and Tassew, 2001; Stokke, et al, 1991).

Backward linkage refers to the proportion of an activity's output that represents purchase from other activities, while forward linkage depicts the proportion of an activity's output that is used as input by other sectors (Ibid). Agriculture provides raw materials and other agricultural products to the industrial sector. Milk producers provide inputs required by the processing industry, i.e. milk and labor. On the other hand, dairy processing industries provide sustainable market, forage, employment and technical advice to dairy producers. In addition, dairy processing industries induce farmers to adopt crossbreed cows, i.e. expand and intensify their production. It reduces risk of perishability by processing and linking the producers with the consumers. This raises the income and purchasing power of farmers and opens market for industrial products. On the other hand, the industrial sector supplies technologies, agricultural inputs (fertilizers, chemicals, etc), and construction materials to the agricultural sector. These assist the agricultural population to boost their production (Fukumishi, et al 2006).

UNIDO, the World Bank and many authors believe that agro-processing industries play a significant role in improving rural livelihood and reducing poverty. It is the most important industry in rural areas. It involves extensively the poor in the production process and "create competitiveness" by utilization of low cost inputs and upgrading the quality of the products and technology utilized for production. Agro-based industries have strong linkage to agriculture. It is the main activity that draws the rural poor. The development of the sector in rural areas reduces transaction costs, unit cost of production, creates network of marketing, links the poor with the

global economy, helps to improve the quality of both agricultural and industrial products and promotes the development of competitiveness (Fukumishi, et al 2006).

Weak inter-sector linkage hinders agricultural development. It is one among the many factors that constrain increase in agricultural production, productivity and in general agricultural development (Purcell R. and Morrison, 1987). For products like milk, low linkage constrains the development of the sector negatively. It is impossible to keep raw milk, like crops, for long period of time. It is perishable. This, with the regularity of milk production, makes it to be dependent on milk processing industries and consumers (Flavely and Chantalakhana, 1999). The prevalence of strong integration between the processing industries and milk producers helps to increase milk production and consumption. In general, strong inter-sector linkage facilitates the transformation of the economy from agriculture dominated economy to industry dominated economy and finally service sector dominated economy (Fukumishi, et al 2006).

A small study conducted on the effect of intensified dairy farming on food security indicated that market-oriented dairy production helps to achieve food security (Tangka F, et al 2002). According to the same study, technological change increases milk production. It increases milk to be consumed at household level and to be sold, which enables producers to purchase other consumable food. Increases in food consumption, income, asset and wealth in turn improve the health of the household. The final result is livelihood improvement.

2.2. The Linkage between Industry and Agriculture in Ethiopia

The contribution of industrial sector to the GDP of the country is less than 15%, 13.3% in 2005/06 (CSA, 2006). The sector is also characterized by "structural weakness". However, there is potential for industrial development in the country (Ministry of Trade and Industry, 2004). The population of the country is over 77,000,000 people. This indicates the market opportunity irrespective of purchasing power. The government also took various measures to encourage investment in the country. Tax exemption is one among this. These and the availability of resources provide opportunity for the expansion of the industrial sector.

The emergence and development of the industrial sector goes back to the 19th century. The major reasons indicated for the development of industrial sector include opening up of the country to westerners and change in consumption patterns of urban population: food, clothing, drinking,

furniture and construction or in general increase in demand of manufactured goods in the country. The relationship the country started with westerners gave opportunity for foreigners to settle in urban centers. Foreigners, who settled in urban areas and involved in import-export business, discerned the demand for manufactured goods and established industries. Many factories were established at the end of 1950s (Woldu, 1980)

The country provided more emphasis to the development industrial sector during imperial regime (Getnet, 2002). A total of 80 manufacturing industries, most of which were light industries, were established from 1950-1974 (Woldu, 1980). In the 1950s, there was no capital inflow into Ethiopia .The industries established were financed by capital obtained from within the country (Woldu, 1980).

Most of the first established industries were agro-based. The government also tried to forge linkage between agriculture and industry (Woldu, 1980). However, the policies and strategies enacted by the then government were not designed in the way that brings balanced development. The policies neglected the agricultural sector in support of industrialization. This was due to the influence of modernization theory. The only way to development, according to modernization theoreticians, was industrialization. However, the result was not success but poverty, inequality and unemployment (Abebe, 2000). The industries developed in the country also depended on imported inputs. The forward and backward linkages between the agriculture and industrial sector remained weak (Solomon, 2006).

Strong linkage facilitates balanced development. Agriculture in poor countries like Ethiopia is the main source of capital to be invested. In addition, it provides market for manufactured output and raw materials. On the other hand, manufacturing sector supplies agricultural inputs (fertilizers, insecticide, herbicide, etc), technology, tools used for infrastructure development, consumer goods and packing and storing materials. Such inter linkages benefits both sectors and the service sector.

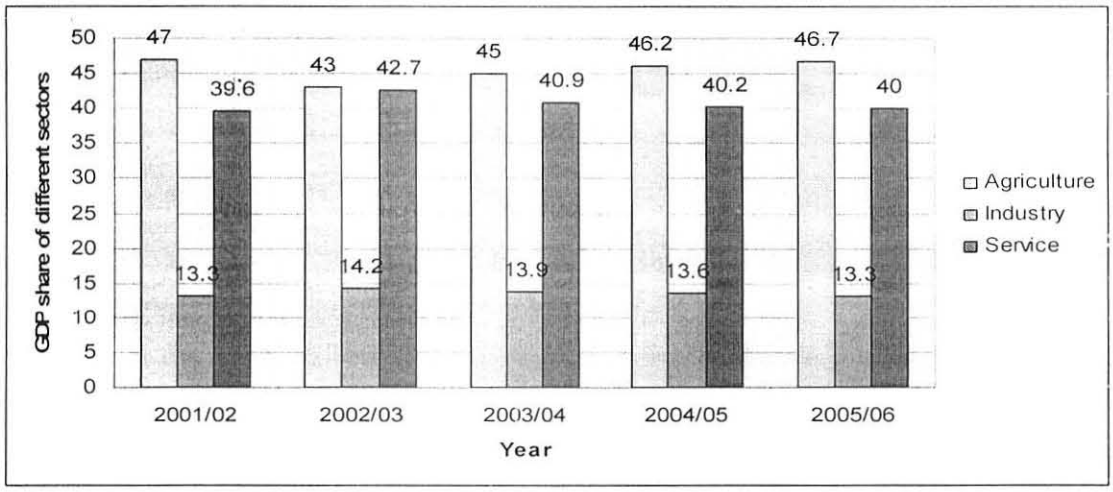
2.3 Livelihood Constraints, Resources and Mediating Factors

The rural populations earn their living dominantly from agriculture: crop and livestock production. However, many factors affect agriculture. These are government policies, availability of land, weather conditions, access to agricultural inputs (fertilizers, chemicals, high yielding

variety seeds and other agricultural inputs), development of agro-processing industries and the existence of the linkage between agriculture and industry. This section describes the major resources, mediating factors, livelihood strategies and constraints in rural livelihood improvement.

Agriculture is the major source of income, wealth, asset, employment and consumption and in general livelihood for the largest proportion of rural population. The sector, which includes crop and livestock production, forestry and fishing, contributed 46.7% to the GDP of the country in 2005/2006 (CSA, 2006). It creates employment opportunity for the largest proportion of the countries population.

Figure 1: GDP share of different sectors in the past five years



Source: CSA 2006 statistical abstract

The above figure indicates that agriculture is the dominant sector of the Ethiopian economy. Its contribution to the GDP has been almost constant in the past five years: 47%, 43%, 45%, 46.2% and 46.7% in 2001/2002, 2002/03, 2003/04, 2004/05, and 2005/06 respectively. In other words, this indicates that there is no structural change occurred in the Ethiopian economy. Thus it is possible to say that the Ethiopian economy is still agricultural dominated economy.

But agriculture is a risky activity. It is characterized by seasonality, bulkiness, preshability and variability (Solomon, 2006). The nature of the product needs to be processed, packed and /or stored. Otherwise, the quality of the product will be reduced. This is because there are a number of factors that affect agricultural production in general and the dairy sector in particular. These

include the nature of the product, government strategy and policy, climate change, technology, terms of trade, population pressure and political conditions in general.

Government policy and strategy is one of the major factors that affect the development of agriculture. Agricultural development, the major source of livelihood for the majority of rural population, has gone roughly through three stages. These are the modernization era of the 1950s and 1960s, 1970s (when development was defined in terms of equity) and the 1980s and 1990s (Eicher and Staatz M, 1998). In the 1950s, development was defined in terms of per capita income growth and industrialization was considered as the major way to development (Eicher and Staatz, 1998). Lewis (1954) model cited in (Eicher and Staatz, 1998) considers the industrial sector as the engine of growth. Most, of course not all, developing countries including Ethiopia adopted industrial-led development strategy due to the influence of modernization theory and two different reasons. The first is the interest to provide basic needs such as health, education, housing and sanitation for their population. It was believed that it is difficult to provide basic needs without industrialization. Agriculture is expected to supply capital to be invested in the industrial sector. In addition, agriculture is considered to be the source of labor, raw materials and market for industrial products. The second reason for prioritizing industrial-led development strategy is associated with the need to achieve independence (economic and political freedom) in developing countries. Building a strong industrialized nation is supposed to be the major avenue to independence (Abebe, 2000; Eicher and Staatz, 1998: Getnet, 2002).

The industrial-led development strategy is considered as the strategy to bring sustainable economic growth, reduce poverty and achieve independence. As a result, investments were made in favor of industry. Low emphasis was given to the agricultural sector. However, the intended development in developing countries, especially in sub-Saharan Africa, has not been realized (Ibid). Poverty, unemployment and inequality even worsened. Therefore, development economists revised the definition of development. In the 1970s, many development economists shifted their focus to income distribution, reducing inequality and poverty (Ibid).

The focus on equity in defining development, and the prevailing inequality, poverty and unemployment convinced policy makers to focus on employment generation, improving agricultural productivity and income distribution. These gave for policy makers a clearer and

greater understanding about importance of rural development than the two sector models of 1950s and 1960s (Ibid).

It was observed that agriculture failed to provide capital for investment, food for non-agricultural sector workers and input for the industry in Ethiopia. Thus the government of Ethiopia provided emphasis to agriculture in the third development plan during the imperial regime, though not as high as industry (Getnet, 2002; Ministry of Economic Development and cooperation, 1998). The aim was to increase agricultural productivity. The stress was to pick up crop productivity and production. But still low concern was given to the livestock sub-sector (Scoones and Wolmer, 2002). Ethiopia lacks a specific policy targeted to develop the livestock sector.

The 1980s and 1990s were the period when macro-economic and institutional restructuring was introduced throughout the world. It was the time when the theory of free trade dominated the development thinking. Many countries of the world opened up their market to foreigners. During this period Southeast Asia achieved high economic growth while Sub-Saharan Africa and South Asia continued to lead poor living conditions (Eicher and Staatz, 1998).

The Ethiopian economy liberalized with the down fall of Dergue regime in 1991. A strategy, Agriculture Development led industrialization, that aimed to improve the livelihood of the majority population was introduced and in place. However, a specific policy targeted to improve livestock and dairy sector, which hold special position in rural livelihood, is not yet proclaimed.

The other factor that has an impact on rural livelihood improvement is access to resources. The resources include natural resource, human, financial and social resources. The adoption of various livelihood strategies (diversification, intensification and migration) depends on access to resources the household has (Scoones, 1998).

Livelihood Resources include:

Natural resources: Natural resources include land, rainfall, water, and other physical environments up on which human, material and financial resources depend. Land is the important resource up on which livelihood of farmers depends. Rainfall is also essential resource. The uneven distribution or shortage of rainfall reduces crop production. This can be compensated either through irrigation or diversifying livelihood. It is possible to diversify sources of livelihood

to crop, livestock and milk, and non-farm activities. Thus, failure of one could be compensated by others (MEDaC, 1999).

Human resources: Shrivastava (2001) indicated that being rich in natural resources by itself is not a sufficient condition to bring development but a help. He further argued that some African countries are rich in natural resource but poor. On the other hand, Japan and South Korea are poor in natural resources but rich. The quality of people facilitates better use of natural resources.

Financial Resources: The availability of sources of cash income, credit, savings, and provision of agricultural inputs, equipment and infrastructure are important for sustainable livelihood. Milk is one important source of cash income on regular basis and helps to accumulate capital (Delgado et al, 1999). These and other resources are essential for the households or individuals to adapt livelihood strategies that help to cope up with risks and hazards.

Social Resources: social relations and social organizations such as social interaction, *Debo, wonfel* and so on are important resources in the area.

Institutions and organizations have an impact on rural livelihood. Scoones (1998) indicated that organizations and institutions influence access to resources and achieving sustainable rural livelihood. Agro-processing industries play such a role. Milk is perishable and bulky commodity. This places milk in a unique position from other agricultural products. It is produced on a regular basis and a source of income, wealth, asset and consumption. The nature of the product, perishability and bulkiness, has make milk producers dependent on dairy processing industry (Falvey and Chantalkhan, 1999). The product should be consumed or processed within a short period of time. Otherwise, it causes food poisoning. This is because milk contains low acid and contains all nutrients suitable for bacteria to grow (ILRI, 1995).The establishment of dairy processing industries thus helps to protect the product from damage and keep its quality. It also reduces cost of transportation associated with nature of the product. In addition, the development of agro-processing industries and the ruralization of such industries benefit the rural communities and the industrial sector.

2.4 Characteristics of Dairy Industry

Agricultural production is characterized by seasonality, bulkiness, variability and perishability. These characteristics make it necessary to process or consume it within short period of time. Poor

development of agro-processing industries negatively affects the development of agriculture and improvement of rural livelihood (Solomon, 2006).

Milk holds special position from agriculture. It is produced on a daily basis, unlike crops. Milk is a major source of income, wealth, and asset and in general, livelihood for small producers in developing countries (Stokk and Chantalakhana, 1999). Stockk and ChantalaKhana (1999) described the major characteristics of the dairy industry as follows:

i. Milk is a heavy and bulky commodity produced on a regular basis. It is also a perishable commodity. It has to be marketed, consumed or processed within short period of time. The perishable nature of milk makes transportation costly and dairy producers dependent on dairy processing industry.

ii. Small farmers, who hold a vulnerable position on the market in developing countries, produce milk. The business involves a high percentage of fixed cost. Market always changes but farmers could not easily adjust to market changes.

iii. Cooperatives hold a strong position in dairy processing and marketing. The nature of the product encourages farmers to form cooperatives. Today, large milk processing industries in Europe and other countries are owned by cooperatives.

iv. Milk is a valuable product. It is an input to produce different types of processed food and high quality products.

2.5 Dairy Manufacturing Industries

Milk was, as indicated earlier, produced for subsistence consumption in the distant past. It was not marketed. The surplus product was processed locally using traditional technologies. But with concentration of population in cities, increase in non-agricultural population and improvement in income increased the demand for milk on the market. Improve in technologies increases milk production. But the nature of the product (perishability, bulkiness and production on a daily basis), necessitated the supply of the product within a short period of time to consumers or process it. Otherwise, the quality of the product is reduced. Rather than benefiting, it harms the health of the society (Falvey and Chantalakhaa, 1999). In the past, to protect the product from damage, as indicated above, producers process the surplus milk they produce into butter and ghee

in a traditional way. This has a negative impact on the quality of the product and the development of the sector. Milk processing needs advanced skills and technology (Falvey and Chantalakhaa, 1999). Furthermore, increase in milk production makes difficult to process milk in a traditional way. This calls for the establishment of modern dairy processing industries.

Dairy processing industries are becoming larger today. In the past, the industries were small. Gradually the industries are getting fewer in number but getting larger in size. Unlike other manufacturing sectors, cooperatives, although being subjected to liberalization, play a significant role in dairy processing. For instance, in Europe large processing industries such as Arla Foods (Denmark), Nordmich (Germany) and others are owned and controlled by cooperatives (Oxfam international, 2002; Falvey and Chantalakham, 1999).

2.6 Dairy production and Manufacturing in Ethiopia

2.6.1 Livestock Production

The Ethiopian economy is dominated by agriculture: livestock and crop production. Agriculture is the major source of livelihood for the largest proportion of the population and foreign exchange like coffee, oilseeds, pulses, cotton, sugar cane, fruits, flowers, hides and skins. Livestock production, which is an integral component of agriculture, contributes a lot to food production, foreign exchange, wealth for farmers, food consumption, organic fertilizers (manure), fuel/energy and farming (Azage, 2004; Ayele et al, 2003).

The livestock species produced in Ethiopia include cattle, sheep, goats, camels, chicken and equine (horse, donkey and mule (hin). These are important sources of labor, food, income and wealth. Although livestock is produced in all ecological zones of the country, the livestock production system is divided into three ecological zones. These are the high land mixed farming system (covers areas above 1500m scale sea level), dry land pastoral and agro-pastoral production system (areas below 1500m sea level) and the private and commercial livestock production system (Alemayehu, 2004).

Livestock production is the source of food (milk and milk products and meat), foreign exchange, income, wealth and enable small farmers access to foods of cereal crops and support crop production (Ayele et al, 2003; ESAP, 2000). Livestock production and livestock product processing help small farmers to participate in the monetary economy. In addition to producing

"liquid assets", livestock production reduces risks associated with crop production in mixed farming system. The central highland Ethiopian farmers earn around 83% of cash income per year from livestock and livestock products. About 58 % of cash income was from the trade of animals and 31% from the sale of livestock products (Ehui, et al, 1998). It is the major source of livelihood for pastoral communities. Furthermore, the sector provides raw materials for agro-processing industries like tanneries, leather products manufacturing enterprises, industrial abattoirs, and milk processing industries. These all indicate that the sector is one of the major sources of livelihood for both urban and rural population. Thus the improvement of the sector has a significant impact on rural livelihood improvement.

2.6.2 Milk Production in Ethiopia

Milk is one of the livestock products. Milk production, like other agricultural production, was non-monetary in nature and produced for subsistence consumption (Amdetsion , 1973; Von Massow, 1989). It is not marketed in rural areas far away from major cities even today. The milk produced mainly comes from indigenous cows that provide only from 400-680 kilograms of milk per cow lactation period (Holloway G, et al 2000; ESAP 2000).

Data on the total production of milk in Ethiopia is unavailable. The data indicated here are taken from FAO. In 2001, the total milk produced was estimated to be 1.5 million metric tones and the growth rate was 3.5 %. The per capita consumption of milk and milk product is low, 16 kgs per year (FAO, 2003 as cited in Azage, 2004). The reasons advanced for low production include low productivity of indigenous cows, non-monetary nature of the sector, absence of dairy policy, shortage of forage, poor veterinary service, poor transportation service, poor development of the dairy processing industries and cooperatives among others (Belachew and Jemberu, 2002, Yacob, 2002). India is the leading milk producing country on the world followed by USA. India achieved this position due to the establishment of strong dairy collecting, processing and marketing cooperatives and industries and the establishment of strong marketing linkage. (India dairy. com/facts and figures/world's no.1 milk producer; Agriculture and Agri-Food, Canadian Dairy Information center). Advancement in technologies, improve in animal health, better management of herds, feed and adoption of modern dairy cows increase milk production and productivity (FAO, 1981; Nin A., 2002). But these are not sufficient conditions for the sustainable growth of

the sector. Linkage of the sector with the industry assists the sector and rural livelihood to be sustainable. It contributes to balanced development of agriculture and industry.

2.6.3 Dairy Manufacturing in Ethiopia

The development of dairy manufacturing industry in Ethiopia is a recent phenomenon. Milk is dominantly produced and processed in a traditional way by smallholder producers. The introduction of modern production and processing system was associated with the importation of modern dairy cattle to Ethiopia from abroad in the early 1950s. It was the United Nation Rehabilitation Administration (UNRA) that provided those dairy cattle to Ethiopia. As a result, large dairy farms began to produce milk for large cities, i.e. Addis Ababa and Asmara (Hizkias, 2000). The government, to improve the dairy sector, also intervened by providing high yielding dairy cows to highland areas around urban centers and milk processing and marketing facilities. In addition, to create conducive environment for the development of the sector, a public sector pilot processing plant at Shola was established in 1960s with the support of UNICEF. The pilot processing plant started processing milk produced by large farms and within a short period of time began to collect milk from smallholder producers. As a result, large farms further expanded. This increased milk production in Addis Ababa and the surrounding area (Ahmed M.M. et al. 2003).

The imperial government established the Addis Ababa Dairy Industry (AADI) in 1966 to control and organize the collection, processing and marketing of locally produced milk. And the Shola plant was expanded in 1969 with the help of UNICEF. In 1971, the government established the Dairy Development Agency (DDA). DDA took over the tasks of AADI and the responsibility for the development of the sector in Ethiopia. It involved in collection, processing and marketing milk. In addition, it provided technical advice and support for the formation of dairy cooperatives. As a result, milk production markedly increased during the 1960s.

The 1974 revolution changed the economic policy of the country to a centrally planned economic system. However, DDA continued to operate up to 1979. In 1979, it was merged with various nationalized dairy farms and re-named Dairy Development Enterprise (Ibid). During the Dergue's time, the government provided less attention to marketing and processing (Ahmed M.M et al. 2003). More attention was put on improving feed, breeding and health. The government also designed to develop the sector through producers' cooperatives (Ibid). During this time,

price per liter is low (controlled and determined by government), milk product import increased and priority was given to cooperative dairying.

With change in government, a policy reform took place in 1991. The policy is targeted to develop a market-oriented economic system. A strategy known as Agriculture Development Led Industrialization (ADLI), which aims to improve the livelihood of the majority of the population, was launched. The strategy aspires to improve the livestock sub-sector by improving veterinary service and forage among others (Benin, et al, 2002). The policy is toward market-oriented livestock development. Emphasis is also provided to small holder producers.

The liberalization of the economy induced the private sector to enter into milk production, processing and marketing. Sebeta Agro-Industry is one among these. However, the dairy manufacturing industry is not well developed in Ethiopia to-date. There are just three dairy processing industries employing more than 10 persons. One is owned by government out of the three , i.e. Dairy Development Enterprise, while the other two privately owned (CSA, 2006). Small dairy processing industries employing less than ten employees are not included in CSA's report.

The three processing industries process raw milk into pasteurized milk, butter and ghee. In 2004/2005, the total products the three processing industries processed were 135, 077 hecto liter milk, 394 tone butter, and 104 tone ghee (CSA, 2006). The total labor force employed by the three dairy manufacturing industries is insignificant. According to CSA report (CSA, 2006 statistical abstract), the industries provided employment opportunity for 646 persons in 2004/05. However, the data did not include those employed in small-scale dairy processing industries (industries employing less than 10 persons and cooperatives) and process in a traditional way. Although in a traditional way, milk production and processing participates so many individuals, especially women.

Table 1: Number of Dairy processing industries, employee and major products produced

Year	Number of establishment			Number of employee			Total products		
	Government	Private	Total	Government	Private	Total	Pasteurized milk in hector liter	Butter in tones	Ghee in tones
2002/03	1	2	3	365	362	627	107469	180	140
2003/04	1	2	3	490	267	757	121739	339	189
2004/05	1	2	3	332	304	646	135077	394	104

Source: CSA 2006 statistical abstract

2.7 Experiences of Some Countries

Kenyan Experience

Modern dairy farming was introduced to Kenya at the beginning of 20th century. It was begun with the introduction of modern dairy cows with European settlers. Thus European settlers controlled formal dairy production, processing and marketing up to independence. Smallholder Africans were prohibited to participate in modern milk production (www. fao. Org/; Raikes. 1981). But the 1954 Swynneton plan allowed small holder farmers to be involved in modern market oriented dairy production. The Black Africans involved in marketed milk production at large after independence (www.kdb.co.ke/info.Htm).

Smallholder farmers' participation in milk processing and marketing increased after the liberalization of milk in 1992. After liberalization, the Kenyan Dairy Board, a body that controls and organizes the development of dairy sector, licensed 52 milk processing industries, out of which 34 are presently active. But all of them are performing below capacity. The processing capacity of the actively operating industries is 2.5 million liters per day. But they are actually processing 1, 000,000 liters per day. These industries are producing fresh milk, Yoghurt, Ice cream, milk powder, ghee, cheese, butter, etc (www. Kdb. Co .ke/info. Htm).

However, the informal milk marketing still dominates in Kenya, controlling 75% of milk marketing. It is only 8% of milk that is directly sold to processors. But 55% supplied directly to

neighboring consumers and institutions and 38% to small traders and cooperatives (www. fao. Org.). Milk is collected from rural areas by small trader, cooperatives or other organizations. Thousands of people are involved in dairy trade.

Indian experience

India leads the world in milk production. In 2004, cow milk production reached 88000000 tones, while that of USA, the world's leading milk producer prior to 1997/98, was 77, 220,000 tones. In 1968 the total milk produced in India was 21 million tones. This has grown to 80 million tones in 2001 (IndianDairy.com / Facts and figures/ world's No. 1 milk producer). The "operation flood" that proclaimed to develop the dairy sector, started in Gujrat state through cooperativising contributed to increase in milk production not only in the state but also in the entire India (Nawani, N.P., 1994). Progressing in crossbreeding technologies, Extension service, improve in veterinary services, increase in the involvement of private sector increased milk production. In addition, the "operation flood" created marketing linkages. Various milk collection and selling fresh milk and milk products centers expended in India. This also contributed to the development of the sector Agro-processing industries provide farm inputs to the agriculture and agriculture supplies raw materials to transport, processing and marketing firms. Furthermore, the agriculture provides market for agricultural products. The forward and backward linkage between the two sectors positively contributed to the development of Indian dairy industry (Abdulai A., 2002).

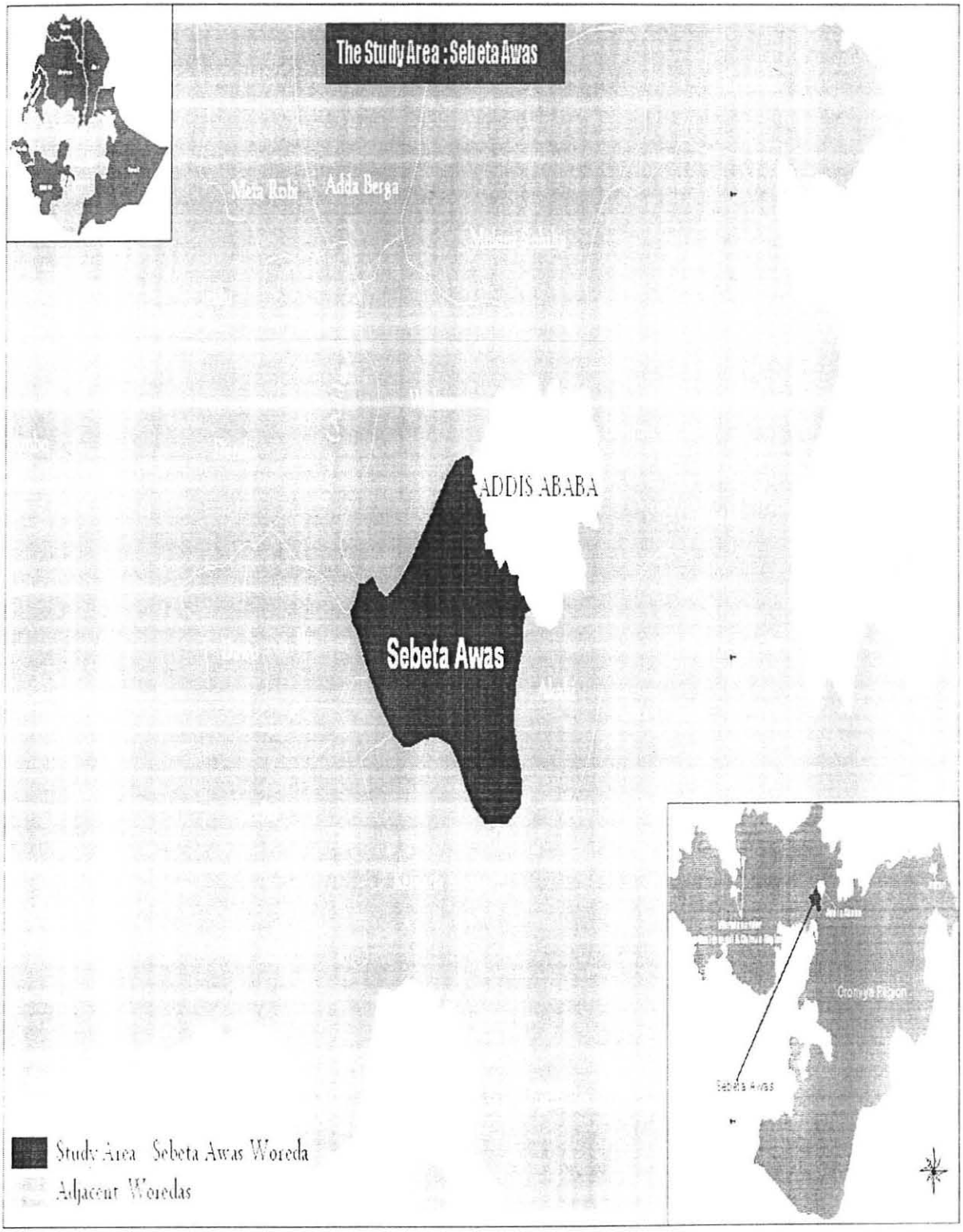
CHAPTER THREE

DESCRIPTION OF THE STUDY AREA AND HOUSEHOLD CHARACTERISTICS

3.1 Location

The study Area is *Sebeta Awas Wereda* (Previousily known as Alem Gena Woreda). Sebeta Awas is divided into 42 Peasant Associations. Each PA is again divided into Garees/locally called by the administrators "Zone", the smallest administrative unit. Towns like *Sebeta, Alem Gena, Tefki* and Awash are located in the Woreda. The Woreda is administratively located in South West Shewa Zone, Oromia National Regional state. It has a total population of 177107, of which 43581 live in towns and 133526 live in rural areas (CSA, 2006). It has a total area of 87532 hectare. Cultivated land constitutes 87.2% of the total area of the woreda. 619 hectares or 0.7% of the total area of the Woreda is occupied by investors (Woreda Agriculture and Rural Development Office).

Map 1 Study Area



3.2 Socio-economic Background of the Woreda

Agriculture is the dominant economic sector and the main source of livelihood for the rural population of the Woreda. Industrial sector, Agro- processing industries, steel and metal manufacturing, floriculture and other small enterprises are relatively well developed in the Woreda. This is due to the location of the Woreda being at short distance from Addis Ababa. But the majority of the rural population earns their living from agriculture, i.e. crop and livestock production. The major crops grown are Teff, wheat, barely, among others. Vegetables and fruits are also the major sources of livelihood for people living in some rural villages of the Woreda.

Crop production requires resources such as land, good weather conditions, ownership of oxen, access to fertilizer and credit facilities. Farmers of the area base themselves on animal and human labor in crop cultivation not on machines. Oxen are used for farming. Furthermore, livestock (milk, live animals, skins and hides) is an important source of cash income, social security and wealth. Thus it is possible to say that livestock production holds special position in the livelihood of the rural population of the Woreda. The major livestock produced include cattle, sheep, goat, donkey, horse (very few), mule (very few) and chicken.

Table 2: Total livestock population of the Woreda in 2005/06

No.	Type	Total livestock population
1	Cattle	875999
2	Sheep	11153
3	Goat	14707
4	Donkey	17343
5	Horse	1270
6	Mule	1822
7	Chicken	70,000*

Source: Agriculture and Rural Development Office of Sebeta Awas Woreda

* The number of chicken drastically decreased due to fear of bird's flue in 2005/06

The above table indicates that cattle constitute the largest proportion of the livestock population. And 41940 or about 48% of the total cattle population are oxen. According to the Agricultural

and Rural Development Office of the Woreda, cows, bull, heifer and calves all together constitute only about 52% of the total cattle population. The largest proportions of the cows are indigenous ones. There are only 1320 modern dairy cows, most of which are owned by commercial and medium farmers. For instance, three farmers own about 360 modern dairy cows. But small holder farmers own 1 or 2 to four either modern or local dairy cows.

3.3 Milk Production in the Woreda

The purpose of livestock production in the Woreda is not mainly for milk production. The primary objective is to use animals for crop cultivation (labor). Milk is produced to supplement household income, consumption and to use the by product, i. e. butter as cosmetics. It is produced dominantly in a traditional way. The majority of the product comes from indigenous cows. Small farmers, who own one or two cows, are the dominant producers. This does not mean that there are no modern dairy farms and commercial farmers in the Woreda. There are medium and commercial farmers who own from 20 to 200 modern dairy cows and involved in milk production. However, data regarding milk production in the Woreda is unavailable. The Woreda Agriculture and Rural Development Office claims that milk production increases during rainy season and decreases during dry season. This is because forage availability decreases for cows during dry seasons. The productivity of indigenous cows is also low, from 400-700 on average per cow lactation period and decrease during dry season (Azage, 2004).

The Woreda Rural and Agricultural Office indicated that the production and productivity of milk and milk products are low in the Woreda. Indigenous cows provide less than 4 liters a day and only for about 4-6 months. The reasons indicated for this are shortage of grazing land, absence of dairy development policy, low emphasis given to the sector, increasing price of forage and low price of milk and milk products compared to the price of forage. In addition, inability to get drugs in quantity and quality, dominance of traditional thinking and low awareness of farmers toward modern dairy production are the major problems indicated.

3.4 Milk Marketing in the Woreda

There are two ways of fresh milk marketing. These are informal and formal milk marketing. Staal (1995) indicated that the informal marketing system dominates milk marketing in the area. The formal milk market is dominated by the Dairy Development Enterprise, few dairy processing

industries like Sebeta Agro-Industry and Cooperatives. In the informal milk marketing, the producers directly supply their product to consumers or small traders. However, milk marketing is not well developed. It is in its infancy. Because of this the largest proportion of milk is not marketed in the country.

In a liquid form or butter and ghee, milk is marketed in the study area. Milk is important source of cash income for small holder producers. The largest proportion of small producers does not directly sell liquid milk. They process it in a traditional way and sell the milk products, butter and cottage ghee (ayibi) to small traders or local consumers. Females dominate the production, processing and marketing in this case. However, in the case of medium and commercial farmers, males participate in liquid milk selling. This is because milk production and income obtained from milk is high in the case of medium and commercial producers.

3.5 Household Characteristics of the Sample

The samples were taken from two PAs of Sebeta Awas Woreda, namely Dalati and Karabu. A total of 60 household heads, 30 from each PA, are selected.

3.5.1. Family Size

Agriculture requires large labor. In rural areas, large family size is an asset. It supplies labor required by agriculture. It is because of this that large family size is observed in the study area. But decrease in size of land holding and other factors made people to reduce their family size.

Table 3: Family Size

Size	Frequency	Percent
2 -4	22	36.7
5 -8	35	58.3
≥ 9	3	5
Total	60	100

The above table indicates that about 58.3% of the concerned population's family size lies 5-8. and about 5% have a family size of 9 and above. Another 36.7% have a family size of 4 and less. The average family size is 5.4.

3.5.2. Education and Occupation

Table 4: Educational Achievement and Occupation of Sample Households

Educational achievement		
	Frequency	Percent
Illiterate	15	25
Able to read and Write	12	20
Grade 1-8	22	36.7
Grade 9-10	6	10
Grade 11-12	5	8.3
other	-	-
Total	60	100
Occupation		
Farming	57	95
Trade	3	5
Total	60	100

Table 4 reveals that 25%, 20% and 36.7% of the sample population are illiterate, able to read and write and attended education from grade 1-8 respectively. Accordingly, those who reached grade 9-10 and grade 11-12 constitute about 10% and 8.3% of the sample population.

The largest percentages, about 95%, of the studied household heads depend on farming. Household heads who engaged in trade constitute about 5% of the sample size. This means that the main source of income and livelihood for the study population is agriculture, crop and livestock production in integration.

3.5.3. Land Holding

There is variation in land holding. Household heads located closer to the towns own relatively small size of land than households located far away. The average land holding near the towns ranges from 0.125 –0.5 hectare. Insecurity of land ownership is also very high around towns. There is always fear of displacement. This is due to the expansion of the towns and investment in

the area. However, as one moves away from nearby towns, the average size of land holding increases.

Table 5: Total size of land holding

Land owned by the household (in hectares)	Frequency	Percent
0.125 – 0.50	19	31.7
0.51 – 1.00	16	26.7
1.01 – 1.50	6	10
1.51 – 2.00	8	13.3
≥ 2	11	18.3
Total	60	100

Table 5 indicates that the size of land holding of the majority lies between 0.125-0.50 (31.7%) and 0.51-1.00 (26.6%) hectare. But 18.3% own more than two hectares of land. Average land holding in the two PAs is 1.06 hectare. The respondents indicated that the size of land holding has been decreasing from time to time. Increase in population, expansion of Sebeta and Alem Gena towns and investment in the area are some of the reasons advanced for the decrease of land holding. For instance, many Garees (villages) considered rural were included inside town demarcations in the beginning of 2007.

3.5.4. Livestock Holding

Livestock production is an important component of agriculture. It is the major sources of wealth, asset, income, labor, energy (fuel), fertilizers and social status. In the area, to be a farmer, one has to have oxen or other livestock types. But the size of livestock a household head owns has been decreasing from time to time. In the past, ownership of more than seven cows and 4 oxen were common. But at the time of the study, a household owned on average 1.95 oxen, 2.38 cows, and 1.05 calves. In the study area, the average number of cows a household head owns is more than the Woreda average. This is because milk is produced more in the study area than other PAs of the Woreda.

Table 6: Average livestock ownership by the household head (study population)

Type	Average Number
Oxen	1.95
Cows	2.38
Heifers	1.03
Bulls	0.7
Calves	1.05
Mules	0
Horses	0.05
Donkeys	1.12
Goats	1.22
Sheep	0.65

Table 6 indicates that the number of each livestock owned by a household head is very small. And the average number indicates as if all household heads own the same size of livestock. But the frequency distribution indicates that there are household heads who do not own all types of livestock.

Table 7: Frequency distribution of size of livestock holding

N	Oxen		Cows		Hiefers		Bulls		Calves		horses		Mules		Donkeys		Sheep		Goats	
	F	%	f	%	f	%	F	%	f	%	f	%	F	%	F	%	F	%	F	%
	17	28.3	5	8.3	24	40	34	56.7	26	43.3	57	95	60	100	23	38.3	47	78.3	47	78.3
1-2	24	40	30	50	33	55	23	38.3	27	45	1	5	-	-	29	48.4	5	8.3	2	3.3
3-4	17	28.3	20	33.3	3	5	2	3.3	6	10	-	-	-	-	8	13.3	7	11.6	2	3.3
5-6	2	3.3	4	4.7	-	-	1	1.7	1	1.7	-	-	-	-	-	-	1	1.7	3	5
≥ 7	-	-	1	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	10
Total	60	100	60	100	60	100	60	100	60	100	60	100	60	100	60	100	60	100	60	100

As the above table indicates the size of horse and mule per household is very small. The number of sheep and goats a household head owns is also small. However, the majority of the household heads owns donkey. This is because donkeys are used for various purposes, such as transportation and fetching water in the area.

3.5.5. Access to Social Services

Social services, relatively speaking, are well developed in the study area. The populations of the study area have access to various social services. These are electricity, telecommunication (both mobile phone and wireless phone), school (education), heath and road within 10 kilometers radius. Each PA has its own primary school. There is also Agriculture and Rural Development Office in or at nearby towns of the two PAs. The farmers can get extension services and others within shortest distance. But the major problem in the study area is getting potable water. Farmers residing in some villages of the two PAs are expected to travel long distance, 3 kilo meters and more to get water. Rivers and spring water supplies are few in the area. The respondents indicated that the water accessed in such long distances is not potable. Rather, it is polluted water. The factories operating in the area polluted some rivers and water sources of the area. This hampered not only livestock production but also the health of people living in the area

CHAPTER FOUR

RESULTS OF THE STUDY

4.1 Livestock Production and Rural Livelihood

4.1.1. Livestock Production

The livelihood of the study area population is based on agriculture. Crop and livestock productions are the main sources of food, income, wealth, manure (fertilizer), energy (fuel), social security and farming (labor). Although there is an opportunity to engage in non-farm activities in the area, the majority of the studied population earns their livelihood from agriculture.

Crop, vegetable and fruit production are more important sources of livelihood than livestock production. The major crops produced include wheat, Teff, barely, bean and pea. These crops are produced for both subsistence and source of cash income. Furthermore, vegetables and fruits such as cabbage, carrot and beet root are produced specially in Karabu Peasant Association, "Furi" village (Garee). In "Furi" village and some vegetable producing areas, the largest share of income comes from sale of vegetables and fruits. In addition to crop, vegetable and fruit production, livestock production plays a crucial role in rural livelihood. It is a source of cash income, animal labor, energy, fertilizer, social security and social status or privilege. The main livestock types produced in the area include cattle, sheep, goat, donkey, horse (very few), mule (very few) and chicken.

Table 8: Total livestock population in the study PAs

No	Types	Total number	
		Dalati peasant Association	Karabu peasant association
1	Oxen	415	421
2	Cows	501	562
3	Bulls	238	208
4	Heifers	100	372
5	Sheep	39	336
6	Goats	178	333
7	Donkeys	375	384
8	Horses	3	33
9	Mules	2	30

Source: The two PAs Rural and Agricultural Development Office

The household heads living in the two PAs own on average 3.5, 0.5, 0.6 and 0.9 cattle, sheep, goat and donkey respectively. In addition, an individual household head owns 1.04 and 1.6 oxen and cows on average. Livestock is produced in a traditional way. It is not intensified. For instance, there are only 88 crossbreeds or modern dairy cows in the two PAs. The rest was indigenous ones. Livestock is produced for plowing/ farming, source of income, wealth, asset and social and economic security in times of crop failure. Owning large size of livestock is a source of social status.

Farmers of the two PAs do not use machines to produce crops. Crop production is dependent on human and animal labor. Without having oxen, one is forced to enter into share cropping, rent land or rent oxen (on a yearly basis to produce crops). Otherwise, it is difficult for the household to produce crops for not sale but for subsistence. Having oxen is the foundation for surplus production.

However, as depicted during focus group discussion and interview, the purpose and ways of producing livestock varies among villages of the study area. In vegetable producing areas such as

"Furi" (Karabu PA) and along roadsides, there was a shift from producing livestock for farming to milk production and other livestock production. In addition, oxen, although practiced in all villages, are provided to other village farmers in exchange of two to three quintals of Teff, wheat, and other crops. But as one moves from roadside areas and villages nearby the town of Sebeta and Alem Gena, traditional livestock production system continues. The general purpose away from roadside areas is to use livestock for farming.

In general, livestock production has the following roles in rural livelihood of the area as indicated during focus group discussion and interview made with Agriculture and Rural Development office, livestock development department head:

- Oxen are used for plowing. Crop production is based on land holding, ownership of oxen, access to fertilizer, existence of rainfall and access to credit facilities or income to purchase agricultural inputs. Livestock production enables the farmers to have access to those resources.
- Livestock is one of the sources of cash income used to purchase agriculture inputs and consumable commodities, pay to get health and education services and to overcome miscellaneous costs. Income is obtained by selling live animals, livestock products (milk, skins and hides).
- Livestock products, butter and cottage ghee are sources of cash income especially for women. Females do not participate in sale of large live animals in the area. But they dominate the production and selling of milk and milk products such as butter and cottage ghee in the area.
- Livestock is the major source of wealth and asset. To get social respect or take loan from neighbors or local money lenders, having oxen or other livestock type is required.
- Livestock ownership allows farmers to overcome risks occurred due to crop failure. In Ethiopia, not only in the area, an insurance system that compensates farmers in times of crop failure is not developed.
- Livestock provides security. At times of crop failures, household heads sell live animals or livestock products to purchase consumption goods. It provides income that helps to overcome food shortage.

- Livestock is the source of fertilizer (manure) and energy (fuel).The people of the area use dung either for manure or fuel. As one moves away from road side areas to relatively remote ones, dung is used for fuel.
- Livestock plays a great role at times of festivals and ceremonies. Ritual ceremonies are performed by slaughtering animals.
- Livestock, especially donkeys, mules and horses are used for transportation. It is not a Lori or taxi or car that is used to transport various things but live animals.
- Livestock products, milk and meat are also used for home consumption. However, the consumption of meat and milk is not practiced on a permanent basis. Meat is consumed by farmers at the times of holidays and ritual ceremonies.

4.1.2. Major Problems in Livestock Production

Respondents were asked whether there are problems in livestock production or not. They claim that the livestock sub-sector is at risk in the area. The majority of the respondents, about 80%, claimed that there are problems in livestock production. They are 20% of the sample household heads that reported that there are no problems in livestock production (table 9).

Table 9: Frequency of household heads that has problems in livestock production

	Frequency	Percent
Yes	48	80
No	12	20
Total	60	100

The major problems indicated on the interview, focus group discussions and interview made with Woreda Agriculture and Rural Development office are linked with the increase in population, expansion of investment and the towns of Sebeta and Alem Gena (which resulted in shortage of grazing land). At the beginning of 2007, some villages of the two Peasant Associations were included to the territory of the towns of Sebeta and Alem Gena. In addition, shortage of grazing land, poor access to potable water (drinking water pollution) and low concern given to the livestock sector by all stakeholders: government, farmers and NGOs are indicated as the major problems in livestock production during focus group discussion.

In the past, during the imperial regime, land was not fragmented like it is today. There was not shortage of grazing land during imperial and at the beginning of Dergue's regimes. Thus a household head owned many cows, oxen, sheep, goats and other types of livestock. Having large size of cattle puts the household head at a higher social position. The total number of livestock a household owns was used to measure the wealth of a household. However, gradually the population of the area increased. In addition, after the liberalization of the economy, especially in the past few years, the economy opened ways for many investors to enter into the area. Increase in population and expansion of investment in the study area resulted in shortage of grazing land. This also affected livestock production.

The other problem is related to low or lack of intensification of the sector. Livestock is produced in a traditional way. There are only few household heads who are trying to intensify the sector. Low supply and high cost of crossbreed cows is the other factor hampering livestock production. Crossbreed cows were supplied to farmers by government (Agriculture and Rural Development Bureau). But the supply in both number and quality is below the demand. During focus group discussion, it was said that the cost of crossbreed cows or heifers is unaffordable for small holder producers. It needs a large capital. For instance, a farmer is expected to pay up to 7,000 Birr for a crossbreed heifer. This is beyond the capacity of small holder producers, whose yearly income is less than 5000 birr.

In the area, it is difficult to get in type, quantity and quality animal drugs. Farmers are sometimes forced to purchase from private rural animal drug stores. In these drug shops, it is not easy to get different types of drugs. The shops are limited in number and capacity. Finally, increasing price of processed animal forage from time to time is indicated as the major problem in livestock production. At the time of the study one quintal of processed animal feed was purchased at 120 Birr. This is beyond the purchasing power of farmers. However, the price of milk per liter, according to the respondents, was not increasing at the rate processed animal feed increased. Throughout one year liquid milk has been sold at 2.25 birr. But the price of processed animal feed in the same year increased from 60 to 120 Birr.

The factors indicated above have been constraining livestock production negatively, which holds an important position in rural livelihood. In other words, livelihood of farmers is negatively affected by the factors listed above.

4.1.3 Milk Production in the two PAs

Milk is produced in the two PAs. The largest proportion of milk is produced in a traditional way. In addition, it comes from indigenous cows. The Woreda Agriculture and Rural Development Office claimed that few small holder farmers, medium farmers and commercial farmers are producing milk in a modern way.

Table 10: Frequency of household heads engaged in milk production

	Frequency	Percent
Yes	53	88.3
No	7	11.7
Total	60	100.00

Table 10 indicates that 88.3 % of the sample household heads produce milk. But about 11.7% are not totally producing milk. This is due to lack of either indigenous or modern dairy cows. The milk produced in the area comes from cows: indigenous cows and crossbreed/modern dairy cows. The milk that comes from crossbreed /modern dairy cows is insignificant compared to milk that comes from indigenous cows. The largest proportion of milk comes from indigenous cows.

Table 11: Total milk produced by household heads before 1997/98 and in the past five years (in liter)

	Before 1997/98		2002/03		2003/04		2004/05		2005/06	
	N	%	N	%	N	%	N	%	N	%
Not producing	14	23.3	12	20.	12	20	11	18.3	9	15
Less than 120	-	-	1	1.7	1	1.7	1	1.7	1	1.7
120 – 360	21	35	24	40.0	24	40	22	36.7	23	38.3
361 – 601	7	11.6	9	14.9	9	14.9	9	14.9	5	8.4
602 – 241	8	13.4	3	5.0	5	8.3	2	3.3	3	5
842 -1082	4	6.7	3	5	1	1.7	-	-	-	-
1083 -1322	3	5.0	4	6.7	5	8.3	4	6.7	2	3.3
1323 – 1563	2	3.3	1	1.7	1	1.7	1	1.7	-	-
≥ 1564	1	1.7	3	5.0	2	3.3	10	16.7	17	28.3
Total	60	100	60	100	60	100	60	100	60	100

Source: own survey

Table 11 indicates that the level of milk production for the majority lie 120-360 and 361-601 liters a year. Before 1997/98, 23 % did not totally produce milk while 35 % produced 120-360 liters of milk. In the same year, the household heads that produced more than 1564 liters of milk constitutes 1.7 %. But in 2005/06 the household heads that produced 120-360 liters increased from 35% to 38.4% and the household heads producing more than 1564 liters of milk grew to 28.7 % from the level of 1.7% before 1997/98. The total number of household heads not producing milk also decreased from 23.3% before 1997/98 to 15% in 2005/06. These all indicate that the number of household heads producing milk in large volumes and total milk production increased in the past five years. Adoption of modern dairy cows, sustainable market created for milk and milk products, few training provided to improve milk production and increase in the demand of milk and milk products contributed to the increase. Sebeta Agro-Industry contributed to this.

4.1.4 Major Problems in Milk production

Milk production depends on a number of factors. These are size of land holding, owning cows, market, animal health services and other related resources. Lack of these resources constrains production. Access to these resources facilitates the development of the dairy sector. The respondents were asked whether they have problem in milk production or not. The result is described as below.

Table 12: Frequency of respondents has problems in milk production

	Frequency	Percent
Yes	38	63.3
No	22	36.7
Total	60	100

Table 12 indicates, 63.3% of the respondents claimed that there are problems in milk production. But 36.7% said that there are no problems in milk production. The major factors that constrained milk production stated during focus group discussion and interview are shortage of grazing land, shortage of access to potable water, increasing price of animal forage from time to time, unavailability of some drugs, low supply of crossbreed or modern dairy cows and low emphasis given to the sector. The increase in population made farmers to use grazing land for crop

cultivation. In addition, the liberalization of the economy paved the way for investors to enter into the area. As a result many investors entered into the area and displaced farmers. These factors created shortage of grazing land. Furthermore, increase in price of animal feed and low emphasis given to the sector by all stakeholders (government, farmers, and other institutions) constrained milk production. To purchase 100 kilo grams of animal feed (at the time of study), the farmers are expected to pay 120 Birr. The respondents said that the price of this commodity was 60 Ethiopian Birr a year ago. However, the price of raw milk per liter is not increasing at the rate the price of animal feed is increasing. In the 1950s, 1960s, 1970s, and 1980s; these problems had been low. But today the factors indicated are adversely affecting the sector. In general, the problems are associated with increase in population, expansion of urban centers, non intensification of the sector and expansion of investment in the area.

4.1.5 Milk Marketing in the two PAs

In one way or another, milk is marketed in the study area. It is an important source of cash income for the household head and members, especially for women among household members. But all farmers producing milk are not selling liquid milk. Some process it in a traditional way and sell milk products. Others sell liquid milk to consumers, small traders or Sebeta agro-industry.

Table 13: Frequency of household heads engaged in liquid milk selling

	Frequency	Percent
Yes	21	35.00
No	39	65
Total	60	100

As table 13 shows, about 35% of the respondents sell liquid raw milk. But 65% do not take part in sale of liquid milk. As indicated during focus group discussions, the majority of milk producers process milk in a traditional way into butter, cottage ghee and other milk products, and sell the milk products directly to consumers or to small traders. Household heads involved in raw liquid milk selling are those who adopted modern dairy cows and have linkage with Sebeta Agro-industry or towns and urban centers. They produce milk in large volumes.

The beginning of liquid milk selling among liquid milk sellers in the area was closely linked with various factors as the interview and focus group discussions show. The first factor is the introduction of crossbreed or modern dairy cows and increase in milk production. It is impossible to process high quantity of milk in a traditional way. The second factor that contributed to the beginning of milk selling was increase in the price of milk. Five years ago, the price of a liter of milk was less than one Ethiopian Birr. This is a very low price and milk is the cheapest commodity. But at the time of the study, the farm gate price of liquid raw milk was 2.25 Ethiopian Birr per liter. In addition, a kilo of butter can be sold at 32 to 42 Birr. The price of milk and milk products continue to increase. Such increase in the price of milk and milk product has instigated farmers to intensify and adopt market-oriented dairy cows. This increased milk production at a household head level.

The third factor that contributed to the beginning of liquid milk marketing is the introduction of milk collection, processing and marketing industries. Sebeta Agro-industry is one of the few industries take part in milk collection, processing and marketing. Although liquid milk selling started before the introduction of the establishment of the factory, it has created sustainable market for milk producers in the study area. Thus it has induced some farmers to adopt crossbreed or high yielding cows. The majority of those who own modern cows adopted after the introduction of Sebeta Agro-Industry.

Furthermore, increase in the demand for milk in cities, Addis Ababa and other major and smaller ones, is indicated as the major instigating factor for the beginning of liquid milk selling. The demand for milk in the country is greater than the product supplied (Azage, 2004). The demand continues to increase in the next 20 years (Delgado et al 1998). To fill the gap between demand and supply, like other developing countries, Ethiopia imports milk and milk products from abroad. Delgado et al (1998) indicated that developing countries expend above five percent of the income they earn from export of agriculture on import of milk products. According to Central Statistics Authority's report (2006), in 2003, Ethiopia imported 2,012 tones of milk products. bird's egg, natural honey, and edible oil. This costs about 49,569,000 Ethiopian Birr. Although the figure is not clearly indicated, the largest proportion of the indicated figure was for milk and milk products.

Milk producers, who sale liquid milk, sell it to various customers. These are Sebeta Agro-Industry, local consumers, small traders, tea and coffee bars and urban consumers. Others process the milk they produce and sell milk products to small traders or tea and coffee bars.

Table 14: Frequency of household heads and their customers (milk sellers)

	Customer/client	N	%
1	Sebeta Agro-industry	11	18.3
2	Local consumers	5	8.3
3	Small traders	4	6.7
4	Tea and coffee bars	-	-
5	Do not sale	40	66.7
	Total	60	100

The largest proportions of liquid milk sellers, about 18.3% of the total sample population, supply liquid raw milk to Sebeta Agro-Industry. The rest, 8.3% and 6.7%, sell the raw milk to local consumers, tea and coffee bars and small traders respectively. Liquid milk sellers sell milk on a daily basis or twice a day. However, the largest proportion, about 66.7%, of the sample, do not sell liquid milk but process in a traditional way and market the milk product (butter and ghee) in a week or in two weeks like other commodities. This is because milk production per day among this group is low. Distance from Sebeta Agro-industry and the towns are also the factors for the majority for not to sale milk.

The product of milk, butter, is not only source of income. It is also used as cosmetics. Females, especially in the past, did not use body lotions and hair creams but butter. In addition, it is consumed and used for various purposes at the time of ritual ceremonies.

There are no specific milk collection centers in the two PAs. The factory collects raw milk following Addis Ababa-Jima road. It collects milk twice a day, in the morning and in the evening. The amount each milk producer supplies each day is registered on the producer's supply card and payment is made every two weeks. In the case of local consumers, milk producers do not take the milk to consumers. The consumer him/herself goes to producer's house and purchases either in the morning or in the evening and pay for the amount of milk he/she or the household consumed at the end of the month or on a daily basis, according to their contract.

However, the producers themselves take the milk to their client and receive their money each day for the amount they supplied in the case of Tea and coffee bars. To ensure continuity of supply of milk, tea and coffee bars provide some motivations to producers, for instance, increasing price of milk per liter.

The producers who process milk process and sell milk products like butter and cottage ghee during market days. They sell their product to small traders or directly to consumers. The price of these products is set on bargaining. The income obtained from this can be used to purchase various commodities such as salt, coffee (not roasted) needed at household level. Females dominate the processing and marketing in this case.

4.1.6 Problems in Milk marketing

Milk marketing is not well developed in Ethiopia and the study area. The informal milk marketing system dominates. The majority of milk producers sell milk and milk products in the informal way. There are also a number of problems in milk marketing.

Table 15: Frequency of household heads has problems in milk marketing

	Frequency	Percent
Yes	35	58.3
No	25	41.7
Total	60	100

About 58.3% of the total sample indicated that there are problems in milk marketing. According to the perception of milk producers, Sebeta Agro-Industry is not paying proper price for the product. The factory sometimes reduces the amount it purchases from producers. For instance, at the times of fasting, since the demand for milk is reduced, the factory reduces the amount it collects from the farmers. In addition, it returns the milk supplied due to quality problems. Of course, key informants indicated that farmers sometimes add water to milk they supply to the factory. This is to increase income obtained from milk by increasing the amount of milk they supply to the factory. But this has an impact on quality. The other constraining factor is lack of training and technical advice on how to improve the quality of the product. The farmers indicated that training on improving the quality of the product is not given.

Furthermore, the factory has no permanent collection centers constructed for that purpose. The farmers are expected to take their product to temporary collection centers located on the main road. The other problem is related to the price of animal feeding. The price of processed forage and grass has been increasing from time to time. About 120 Birr is required to purchase 100 kilo or one quintal of processed animal feed. Absence of other organizations engaged in milk collection, processing and marketing is also another problem. The presence of such organizations improves the collection, processing and marketing and participate farmers in production. It triggers competition and improves the quality and quantity of milk. Finally, lack of milk producing, collecting, processing and marketing cooperatives reduced the bargaining power of farmers. There is no cooperative engaged in milk collection, processing and marketing in the area.

4.2. Income and Income Sources

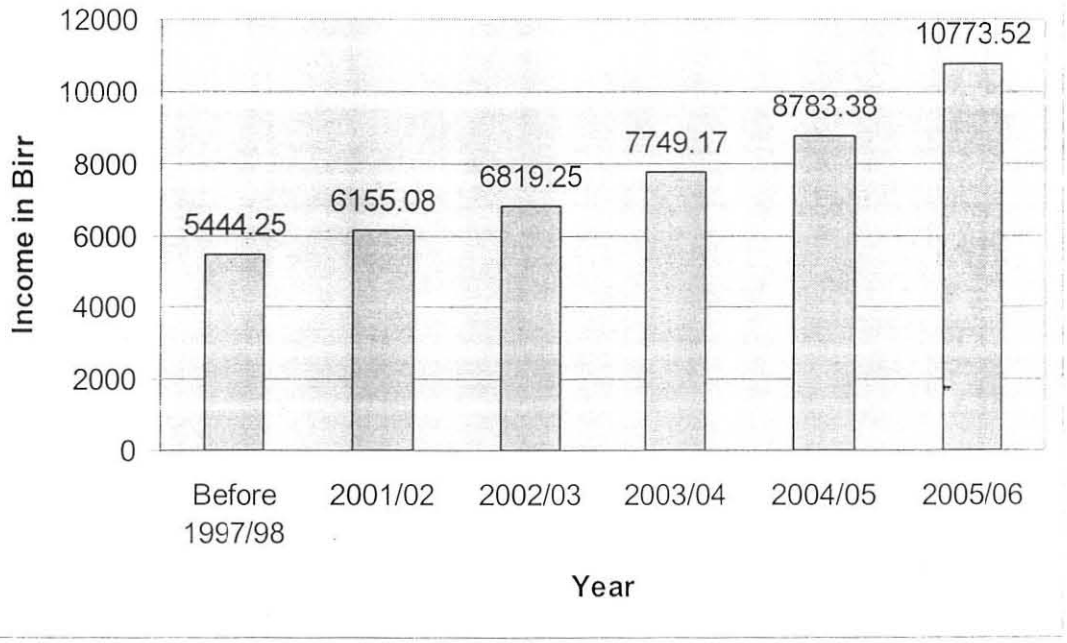
4.2.1. Income

The income of the farming population is dependant on the size of land holding, size of livestock holding and availability of relatively high paying non-farm employment opportunities. Household heads who own large size of livestock (cattle, sheep, and goat) are considered rich. They are able to overcome risks by selling live animals or by products. Milk and milk products, the major product of livestock, are also the source of income for farmers. It is a regular source of income. Intensification of the sector thus benefits the farming population. In general, livestock and livestock products are the dominant sources of income. Thus improve in livestock production, other agricultural products and selling price of their output significantly improves the income of the households.

It is difficult to know exactly the income of the rural population. Farmers do not tell the total income they obtain in a year. These are for two reasons. The first one is due to inability to remember yearly income. There is no habit of registering income in the study area. Crops consumed at household level are not considered as income. They consider cash income obtained from sale of live animals, crops, grasses and eucalyptus tree as income. The second reason is ignorance. The majority do not want to provide information regarding income. This is due to fear

of increase of tax by government based on such information. The problems indicated above were alleviated by explaining the objective of the research before interview started and in the middle when it becomes necessary. I also waited on the field for 45 days to collect data on income. I also continually visited the area from the beginning to completion of final draft proposal. In, addition, a separate note pad was prepared to register income obtained from different sources at different times of different years. This is because there observed that farmers remember income they obtain from different sources. Finally, it was added together and then taken as annual income.

Figure 2: Average income of a household head obtained in the past five years and before1997/98



Source: own survey

The above figure shows that on average income at a household head level increased in the past five years. Before 1997/98, yearly income of a household head was 5444.25 birr. This increased to 10773.52 Birr in 2005/06. But the average income growth does not show improvement in income at a household level. The frequency distribution describes more the distribution of income at a household level as shown below.

Table 16: Frequency distribution of income in the past five years and before 1997/98

Income (Birr)	Year											
	Before 1997/98		2001/02		2002/03		2003/04		2004/05		2005/06	
	N	%	N	%	N	%	N	%	N	%	N	%
≤2000	20	33.3	13	21.8	9	15	9	15	7	11.8	8	13.3
2001-5000	25	41.7	27	45	28	47	25	41.7	24	40	14	23.4
5001-800	4	6.7	9	15	10	16.7	11	18.3	13	21.5	18	30
8001-11000	4	6.7	4	6.7	4	6.7	6	10	4	6.7	5	8.3
11001-14000	3	5	2	3.3	2	3.3	3	5	4	6.7	3	5
≥ 15000	4	6.7	5	8.3	7	11.8	7	11.8	8	13.3	12	20
Total	60	100	60	100	60	100	60	100	60	100	60	100

Source: own survey

Table 16 shows that before 1997/98 and in 2001/02, 33.3% and 21.8% of the household earned income less than or equal to 2000 birr respectively. However, household heads earning less than or equal to 2000 Birr decreased to 13.3% in 2005/06. In 2004/05 and 2005/06, 13.3% and 20% earned income greater than or equal to 15,000 Birr. Before 1997/98 and in 2001/02 the household heads earned income more or equal to 15,000 Birr were 6.7% and 8.3 % respectively. This indicates the increase in income of the studied population. However, it should be noticed that the majority's income lies between 2000 and 8000 Birr.

The respondents were asked to express whether their income shows increase or not. Table 17 indicates that about 76.7 % claimed that their income increased in the past five years. The rest, about 24.3 %, responded that their income did not show increase.

Table 17: Did your income increase in the past five years?

	Frequency	Percent
Yes	46	76.7
No	14	24.3
Total	60	100

The reasons for the increase of income of the household heads are increase in agricultural production due to the use of agricultural inputs (fertilizers, chemicals), improvement in the prices of agricultural products and diversification of income sources (animal fattening, vegetable production, milk production). The price of agricultural products per quintal is doubled since 2004/05. For instance, the price of 'Teff' per quintal in 2002/03 was 200 Birr and less before. This increased to 450-520 Birr in 2005/06. This contributed a lot to increase in income of farmers.

4.2.2. Income Sources

The study was conducted in rural areas. The major source of income and livelihood for the rural population is agriculture, both crop and livestock production. Crop, milk, live animals, fruits, vegetables, trade, sale of eucalyptus tree and employment in non-farm activities are the principal sources of income. Household heads were asked to indicate the major source of their income. The result is described below.

Table 18: Sources of income (major ones)

	Sources of Income	Frequency	Percent
1	Sale of crops	35	58.3
2	Sale of milk	5	8.4
3	Sale of live animals	-	-
4	Sale of fruits and vegetables	13	21.7
5	Trade	3	5
6	Employment in factories or non-farm activities	4	6.7
7	Total	60	100

Crop production is the dominant source of income. About 58.3% obtain their income dominantly from sale of crops. Their sources of income are, of course, not only limited to sales of crops. Sale of milk or milk products, sale of fruits and vegetables, sale of live animals and non-farm employment activities are the major sources of income. For 21.7% of the sample household heads, fruits and vegetables are the foremost sources of income as they replied. It is only 8.4% of the sample who claimed that their major source of income is sale of liquid milk. But they do not

depend only on sale of milk. Farmers have diversified income sources such as crop, vegetable, fattening animals, sale of egg, non-farm employment and milk and milk products.

4.2.3. Non-farm Income Sources

The existence of non-farm sectors in rural areas provides employment opportunity for the rural population. It also links the agricultural community with the urban population and other economic sectors. Furthermore, it provides agricultural inputs, technologies and market for agricultural products. The possibility to engage in non-farm activities for the study area population is high. The location of the Woreda, at short distance from the capital city (Addis Ababa) and on the main road of Addis Ababa-Jima, attracts many investors. A number of constructions (for manufacturing and service sectors) are underway. In addition, various manufacturing industries have started operation. This opened employment opportunity for the residence of Dalati and Karabu PAs, Sebeta Awas Woreda, other neighboring Woredas and Addis Ababa.

However, the majority of the respondents replied that non-farm income sources are limited. They are only about 40% of the sample that claimed that there are opportunities for the household members to engage in non-farm activities and earn income. The rest, about 60%, claimed that there are no non-farm income sources in the area.

Table 19: Non-farm income sources: Is there any opportunity for your family to engage in non –farm activities?

	Frequency	Percent	Cumulative percent
Yes	24	40.0	40
No	36	60.0	100
Total	60	100	

The major non-farm activities included employment as unskilled and skilled laborers in factories, trade and making of tools used by the agricultural society. But most of the respondents claimed that the wage earned by being employee of factories as daily laborer is very low. It is on average about 200 Ethiopian birr. The low payment may be the reason for most household heads to say

there are no non-farm income sources as interview responses and talks during focus group discussion shows.

Most of the farmers lack technical skills to earn more income. They are involved in activities that require low skill such as daily laborer and guard, which are low paying. This dissatisfies the farmers or their family members to work in manufacturing or service giving industries. It was indicated on the focus group discussions held that they are individuals who lack options for survival who work in such organizations. The organizations themselves have no interest to hire unskilled individuals in large numbers. Most farmers are illiterate. It is a cost to train them. Organizations objective is to minimize their cost and maximize their profit as indicated on focus group discussion. Thus, they need to hire skilled personnel.

4.3 The Linkage between Agro-Processing and Milk Producers

The nature of the product, milk, makes transaction cost and unit cost of production high (Stokke and Chantalakhana, 1999). It is also easily susceptible to damage within hours. Thus, the presence of dairy processing industries reduces the problems associated with milk production and promotes the development of the sector. Sebeta Agro-Industry is one of the few agro-processing industries involved in such activities. It is involved in collection, processing and marketing of milk. In other words, the factory is using agricultural products supplied by small farmers, medium farmers, commercial farms surrounding Addis Ababa, and own farm and process as by adding some values. It has been created market opportunity for milk produced in the area. Table 14 shows that 18.3% of the sample population supplies milk to the factory. It is also indicated during focus group discussion that the factory opened market opportunity for milk producers surrounding Addis Ababa. Thus it is possible to say that there is linkage between the farming population of the Woreda and the factory. During focus group discussions held, it was indicated that the largest proportion milk sellers in the two PAs supply to the factory. The factory also instigated some farmers to adopt high yielding modern dairy cows and produce milk in large volumes. However, it is indicated during focus group discussion that the linkage between the factory and the rural milk producers is not strong. Rather, a weak integration between the two prevails. The factory involved less in transferring technologies to the farmers. It simply collects milk. For instance, some household heads, who previously supplied raw milk to the factory, stopped supplying milk to the factory. Various reasons were indicated for this. These are:

- The price of milk is set by the factory but not by the market. Producers do not have the power to negotiate. As a result, the selling price of milk is low, while the price of animal feed is high and increasing from time to time. Thus the farmers obtain relatively less and non-motivating benefit from milk production and selling.
- Training on how to improve the quality of milk is not provided by the factory to producers. The factory is simply engaged in collection, processing and marketing of milk. Without providing training, the factory expects to supply quality milk. Milk, considered by the factory collectors below standard, is not purchased by the factory.
- There are no milk collection centers in the two PAs. A producer is expected to take the product to main roads and sell to those collectors that collect milk by car following the main road.

4.3.1 Dairy Processing

The first dairy processing industry was established at shola (a public sector pilot processing plant) by the assistance of UNICEF in 1960. The plant began processing milk produced by large dairy farms. The government also intervened to develop the sector by providing modern dairy cows, designing projects and implementing it and establishing an organization known as Addis Ababa Dairy Industry (AADI) that controls and organizes the collection, processing and marketing of milk. To further develop the sector the government established, an autonomous organization, Dairy Development Agency (DDA) in 1971. DDA, taking over the task of AADI, engaged in milk collection, processing and marketing. Both DDA and AADI collect milk during the imperial period dominantly from large farms, small farmers and medium farmers (Ahmed. M.M. et al, 2003).

The imperial government was overthrown in 1975 and Dergue took over power. Dergue declared socialistic economic system. Large dairy farms were nationalized like other sectors. The various dairy farms nationalized merged with DDA in 1979 and called Dairy Development Enterprise (DDE). In addition to milk collection, processing and marketing, DDE provided power to lead the development of the dairy sector. The Dergue tried to develop the dairy sector through cooperatives. Dairy processing industries, however, did not develop as such (Ibid).

In 1991, the Ethiopia economy, with the change of government, was liberalized. Like other sectors, private sectors started to invest in the area. Two dairy processing industries employing more than 10 employees established. Many small dairy processing industries also started operation.

Sebeta Agro-Industry is one of the few industries involved mainly in milk collection, processing and marketing. This helped farmers supply their product to the factory rather than process it in a traditional way.

However, milk is dominantly produced, processed and marketed in a traditional way using traditional tools in the study area. Modern and hand operated machines developed by ILRI and other organizations are even not used in milk processing.

Table 20: If you do not sale liquid milk, do you process it?

	Frequency	Percent
Yes	42	70
No	18	30
Total	60	100

Table 20 indicates that 70% of the sample process milk in a tradition way. The rest, about 30%, either sell liquid milk or do not produce milk at all. Traditional hand operated tools developed by the community are used in milk processing. These tools are time consuming, reduces quality of the product and influences production and productivity. But they argued that there is no option. There is no supply of hand operated modern dairy processing machines. In addition, Sebeta Agro-Industry has no collection centers in rural areas located at distance from Addis Ababa-Jima road. The only option is thus to process milk and sale the by product. In general, absence of cooperatives, intensification and distance from major roads are the major reasons weakened the integration.

4.3.2 Linkage between Sebeta Agro-Industry and Milk Producers of the Study Area

Sebeta Agro-Industry is located in Sebeta town, the capital city of Sebeta Awas Woreda. It received investment license on November 1995 and started production and marketing on April 9.

1998. The time between 1995 and 1998 was the time of construction and installing the plant. The factory is established to process agricultural products, mainly dairy. Its main objectives are processing and marketing dairy products, fattening and marketing animals, and processing and marketing animal feeds to both internal and external markets. It has a processing capacity of 30, 000 liters of liquid milk per 8 hours shift (Sebeta Agro Industry pamphlet). The company manager said that it is expanding further its capacity.

The factory opened up employment opportunity for over 170 permanent and different types of temporary workers. It also provided market opportunity for smallholder producers, cooperatives and commercial milk producers in and around Addis Ababa. In general, it opened market opportunity for about 2000 milk producers. Furthermore, it supplies safe and nutritious dairy products to consumers, saves, to same extent, foreign exchange earned by export of agricultural products expend on import of milk and milk products. It also supplies processed animal feed to dairy producers to overcome shortage of animal feed (Sebeta Agro-Industry pamphlet).

The above mentioned things indicate the existence of linkage between Sebeta Agro-Industry and Milk producers. The factory involved in milk collection, processing and marketing. It alleviated the fear of producing milk in large volumes due to absence of milk market. It created sustainable market for milk produced in and around Addis Ababa (including the study area). However, strong linkage between the studied population and the factory is not created. It is a weak and a one sided integration that prevails between the two. Milk producers supply milk to the factory. The factory collects, processes and markets milk. There is no crossbreed or modern dairy cows, technical advice and training the factory is providing to milk producers as indicated during focus group discussion. As one moves away from Addis Ababa-Jima road, milk producers have no linkage with the factory. During focus group discussions held with these groups, the participants indicated, "We have no connection with the factory. We are producing and processing milk like our fathers and grand fathers do, using traditional tools. No change is observed in milk production and processing." This indicates the inexistence of linkage. They are those who are living nearby Addis Ababa-Jima road and in towns of Sebeta and Alem Gena that have linkage with the factory.

4.3.3. Benefit of the Linkage

Although weak, there is linkage between Sebeta Agro-Industry and milk producers. Milk producers do not fear about absence of milk market. Sustainable market is created for milk produced in the area by the factory. It commences, although few, farmers to adopt crossbreed or modern dairy cows. This contributed to increase in milk production, especially among farmers who have linkage with the industry and improved in income obtained from milk. The factory is the main customer for those engaged in liquid milk selling.The farmers were asked whether they benefited from the introduction of the factory or not. Most respondents, about 76.7%, claimed that they did not get any kind of benefit from the introduction of Sebeta Agro-Industry. It is about 23.3% that claimed that they obtain various benefits from the introduction of Sebeta Agro-Industry (table 21).

Table 21: Attitude of farmers toward the benefit of the factory

	Frequency	Percent
Yes	14	23.3
No	46	76.7
Total	60	100

Furthermore, those respondents who get benefit were asked to specify the major benefits they obtain from the introduction of Sebeta Agro-Industry. They claimed that the factory created sustainable market for milk produced in the area and employment opportunity (dominantly for the population of Alem Gena and Sebeta towns). It also commences farmers to adopt modern dairy cows.

In general, the market opportunity created and the increase in the demand of milk from time to time in the country encouraged some farmers to increase milk production. This in turn increased income obtained from milk and consumption of milk at household level. Increase in income and consumption is believed to improve rural livelihood.

Table 22: Some of the benefits of Sebeta Agro-Industry

No	Types of benefits	Frequency			
		Yes		No	
		N	Percent	N	Percent
1	Employment opportunity creation	5	8.3	55	91.7
2	Market for milk	11	18.3	49	81.7
3	Feed for animals	4	6.7	56	93.3
4	Technical advice	-	-	-	-
5	Increase in milk production	4	6.7	56	93.3
6	Increase in income	4	6.7	56	93.3
7	Increase in milk consumption	4	6.7	56	93.3
8	Increase in food consumption	4	6.7	56	93.3
9	Improve in health	4	6.7	56	93.3
10	Initiating adoption of cross breed cows	4	6.7	56	93.3
11	Send children to school	4	6.7	56	93.3

Table 22 indicates that about 18.3 % claimed that the factory created sustainable market for the milk produced in the area. And 6.7 % replied that the factory contributes to increase in milk consumption, increase in income and consumption of milk and milk products. The above table reflects that there are few people who have linkage with the factory and getting benefit. The majorities do not have linkage with the factory and do not benefit from the introduction of the factory.

4.3.3.1. Impact on Adoption of Crossbreed Cows

The majority of respondents does not have modern dairy cows or crossbreed cows. It is only about 38.3% of the total sample size that have modern dairy cows.

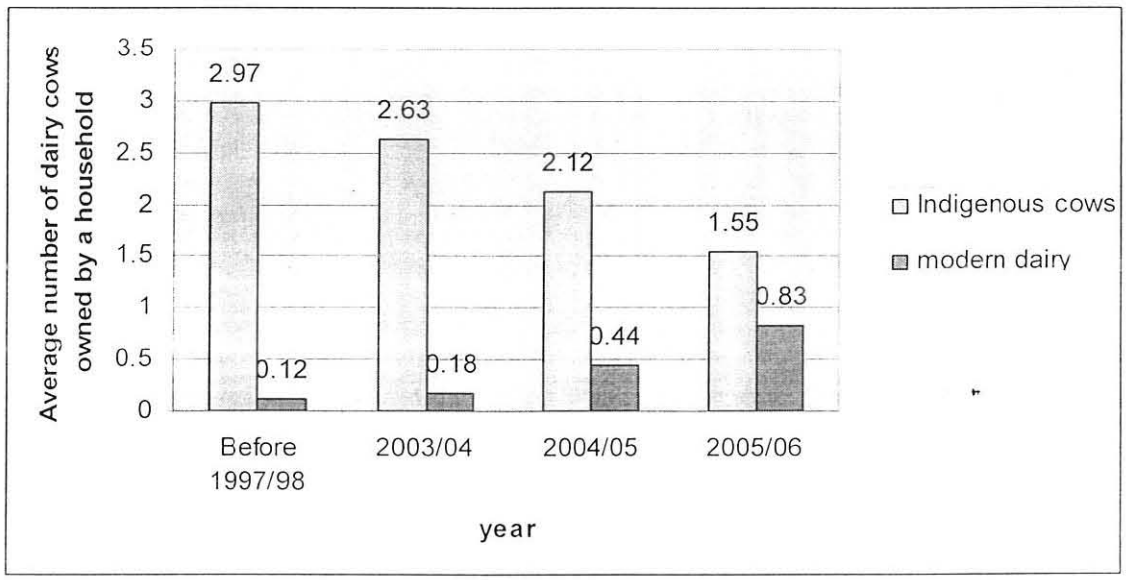
Table 23: Frequency of household heads having modern dairy cows

	Frequency	Percent
Yes	23	38.3
No	37	65.7
Total	60	100

Most of those who own crossbreed or modern dairy cows adopted them after the introduction of Sebeta Agro-Industry. The reasons indicated for the adoption of modern dairy cows are shortage of grazing land created to produce indigenous cows in large numbers, sustainable market created for milk and milk products, increase in milk and milk products, increase in price of milk per liter and awareness created on the importance of intensifying milk production. Furthermore, the interest to increase income and continued training provided by development agents on the role of diversifying income sources motivated farmers to invest on modern dairy cows. In addition, increase in income of farmers who already adopted initiated other farmers to have crossbreed cows.

It is due to these factors that most farmers entered into the business very recently. Before 2004/2005, there were few people who owned modern dairy cows. But it is after the establishment of the factory that many farmers adopted modern dairy cows. However, high price of crossbreed or modern dairy cows or heifers, low supply of those cows and in general required fixed costs constrained the development of the sector.

Figure 3: Cows on average owned by a household in the past five years and before 1997/98



Source: own Survey

The above figure indicates that the total number of cows a household head owns has been decreasing form time to time. On average a household head owned 2.97 indigenous cows before

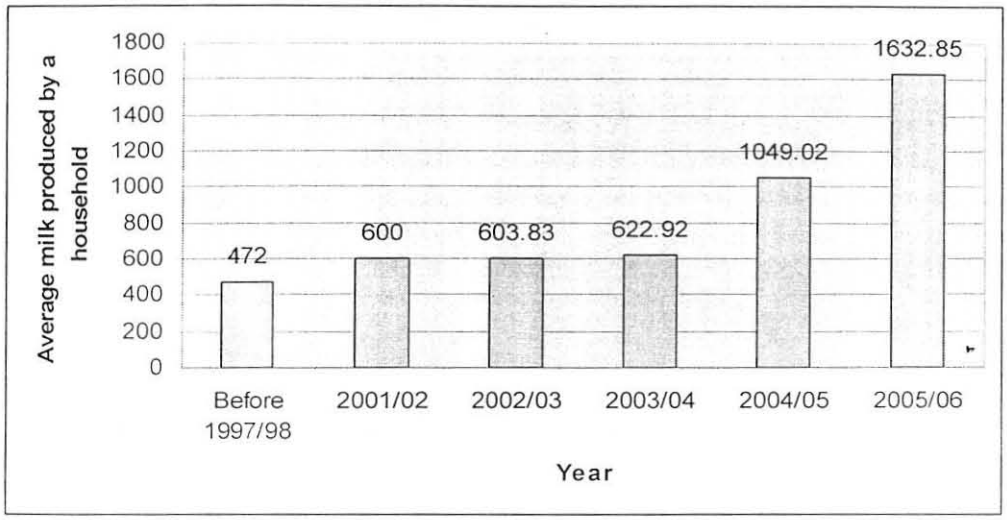
1997/98. This decreased to 1.55 in 2005/06.This was a high decrease in size (number) of cows a household head owns compared to that of before 1997/98 ownership. On the other hand, the figure indicates that the size of crossbreed or modern dairy cows per household head has been relatively increasing. Farmers are adopting modern or crossbreed dairy cows. But they claimed that there is shortage of supply of crossbreed or modern dairy cows. In addition, increasing price of animal feed hampered farmers to enter into the business extensively. In general, what is observed from the figure is decrease in size indigenous cows per household head and increase in size of modern dairy cows.

4.3.3.2. Impact on milk production and Income

The income obtained from milk and milk products has increased on average in the past five years, i.e. after the introduction of Sebeta Agro-Industry. The introduction of the factory contributed a lot to increase in milk production. It commences some farmers to adopt modern dairy cows. This in turn put at increase in milk production.

No respondent remembers exactly the total amount of milk produced by his/her household for longer period of time. Measuring and registering the amount of milk produced is not practiced regularly. However, most of them said that the total milk production of some household heads has been increased for some and almost remains constant for others in the past years. It also decreased for others. The reasons are many. Decrease in the size of indigenous cows a household head owns due to shortage of grazing land is one among others. In 1960s -1970s and 1980s, a household head owns on average 5 to 7 or 8 cows as an interview made with elder indicated. However, the size of indigenous cows a household head owns decreased and reached one or two per household head. The decrease in the size of indigenous cows could be compensated with adopting high yielding dairy cows. But this is at its infancy in the two PAs. Those who adopted crossbreed or modern dairy cows constitute about 38.3% of the total household populations of the two PAs (table 23). The majorities do not adopt. Milk production has increased for farmers who adopted crossbreed cows and have contact with dairy processing industry, Sebeta Agro-Industry. They constitute about 6.7% of the total sample size (refer table 22).

Figure 4: Average milk production by a household annually (in liter)

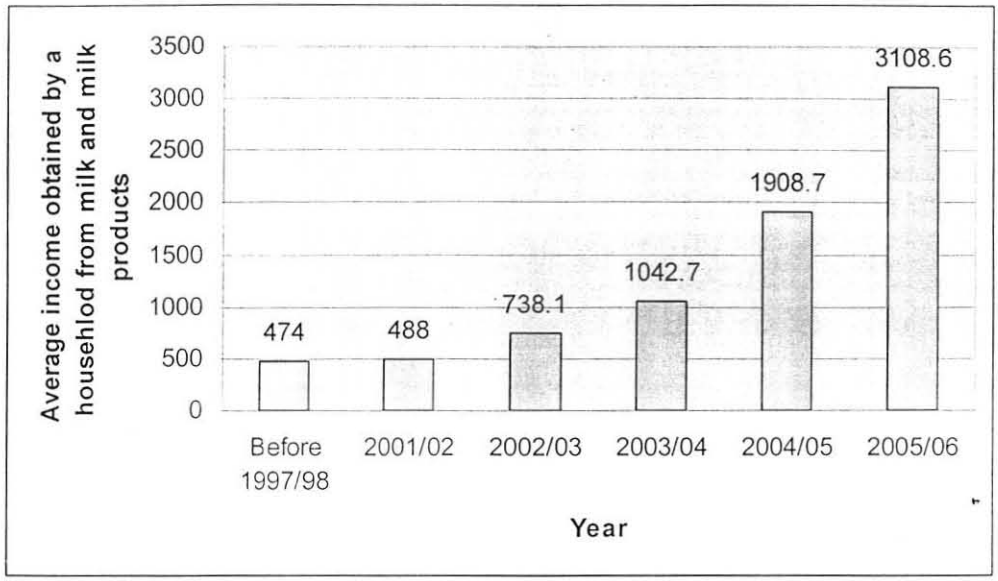


Source: Own Survey

The reasons indicated for the increase in milk production are the shift to highly productive technologies, i.e. adoption of crossbreed or modern dairy cows; the benefit obtained by household heads who adopted modern dairy cows, and the increase in size of modern dairy cows. In 2004/05, a household heads owns on average 0.44 modern dairy cows. This increased to 0.83 modern dairy cows per household head in 2005/06. It was said during focus group discussion that cows do not give always milk. Milk is produced during lactation period. If a household has many cows providing milk, milk production increases. In 2005/06 most farmers produce milk. This is also the reason for the increase in milk production. In addition, the sustainable market created for milk, although the farmers claimed that the price of milk per liter is low, was also indicated as the major factor for the increase in the production of milk through initiating adoption of modern dairy cows.

The income a household head obtained from milk and milk products increased in the past five years. It increased very slowly up to 2002/03. But after 2002/03 very fast growth was observed. The average figures also show the same increase. In 1997/98 the income a household received on average from milk and milk product was 474 Birr. This increased to 3108.6 Birr in 2005/06. This was a great increase observed within ten years.

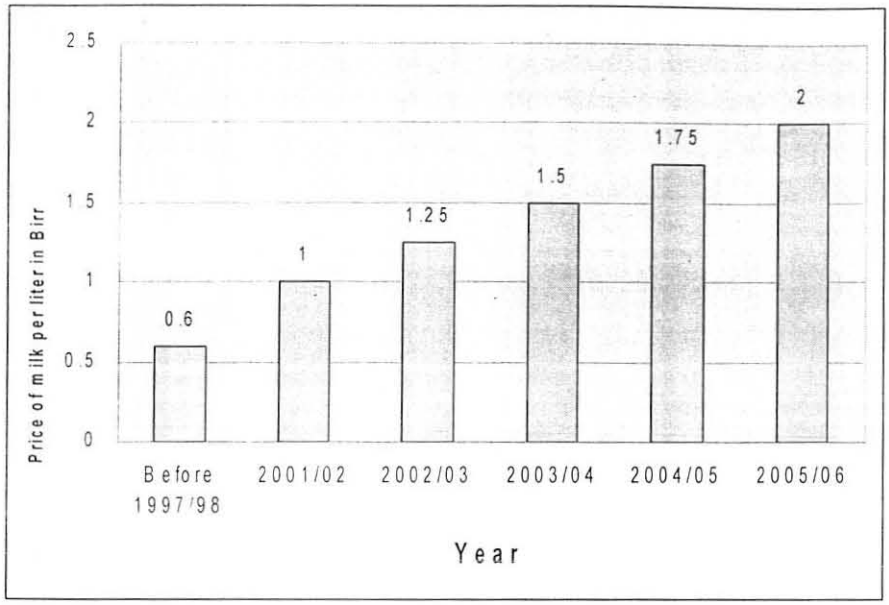
Figure 5: Average income obtained from milk by a household head (annually)



Source: own field survey

Figure 5 shows increase in income obtained from milk and milk products. Many factors contributed to the increase in income obtained from milk and milk products. Increase in milk production due to adoption of high yielding modern dairy cows is the major factor. However, the increase in income obtained from milk and milk product is not only linked to increase in production. Increase in price of milk per liter is also another factor. In the past five years, the price of milk doubled. In 1997/98, the price of milk per liter was less than one birr, ranging from 0.5 to 0.8 Birr. Increase in the demand of milk and milk products in the country raised the price of milk per liter. The price of milk per liter at the time of study was 2.25 birr per liter. It is increasing even further.

Figure 6: Price of milk per liter (in Birr)



Source: Own field Survey

The respondents claimed that the price of milk and milk products increased in the past five years. But they are not satisfied with the increase. They argued that the increase in price of milk does not compensate the rise in price of animal feed.

The introduction of Sebeta Agro- Industry in the area and the rise in the price of milk are other factors. The introduction of the factory contributed to both the increase in milk production and the increase in the price. Finally, high inflation observed especially in the past two years added to rise in the price of milk and milk products, and raised in the income obtained from milk. In general, increase in milk production, the creation of sustainable market for milk, increase in price and increase in size of modern dairy cows are the reasons for the improvement of income obtained from milk and milk products.

As indicated above the income obtained from milk increased. But not all household heads believe that the increase in the income resulted from milk. The next table reflects the responses of household heads toward increase in income obtained from milk and milk products.

Table 24: Attitude of respondents toward increase in income obtained from milk and milk products

	Frequency	Percent
Yes	25	41.7
No	35	58.3
Total	60	100

About 41.7% of the total respondents indicated that the income they obtained from milk increased in the past five years. But the rest, 58.3%, do not believe that the income they obtain from milk and milk products has increased. Increase in income acquired from milk is observed only among household heads that have linkage with the industry and urban centers.

4.3.3.3. The Role of the linkage in Improving Health and Education

Health: Health of a society can be improved when consumption, access to better health services and sanitation improve. This can be possible if better health services are provided on subsidies, if awareness of community is raised in keeping sanitation or income of the household improve in the way it improves consumption and access to better health services. The objective of this section is not to consider all these. Rather, it is to see the role of the linkage between Sebeta Agro-Industry and milk producers in improving health of households and their family through increasing milk production, income and consumption.

Table 25: Household ability to get better health service: Are you able to afford to get health services?

	Frequency	Percent
Yes	42	70.00
No	18	30.00
Total	60	100.00

Table 25 indicates that the majority, about 70%, are able to afford to get health services. The maximum threshold set, however, during the focus group discussions was 5000 Birr. The majority of the respondents are not able to afford 5000 birr. But they said that their potential

expenditure ranges from 200 to 5000 birr. The rest, about 30%, lack financial power to pay for health services. This is because their income and production is very low. Low income and production have exposed them to poor health status. The income this group obtain from sale of crops, sale of live animals, sale of milk and milk products, sale of fruits and vegetables, sale of eucalyptus trees and being employed as daily laborers in factories and other farm and non-farm activities is low. It fails to meet their basic needs.

Milk contributes to better health in two ways. The first one is by increasing income of households. Increasing income enables the households to increase consumption of other commodities. In addition, it improves the ability of the farmers to pay for and get better health services. But the majority of the populations are not obtaining sufficient income from milk and milk products. About 6.7 % replied that the income obtained from milk helped them to have access to health services. About 6.7% of the sample population's income was increased after the introduction of Sebeta Agro-Industry. The same proportion said that this improved their financial leverage to pay for to get better health services. Secondly, consumption of milk significantly improves a household's and individual's health. Milk is a nutritious food. But the majority of the respondents believe that their consumption of milk did not improve with the introduction of Sebeta Agro-Industry. It is about 6.7% who reported that their consumption of milk and milk product increased (refer to table 22). In general, milk is a regular source of income, especially for women. The income, then, is used for household expenditure and to get health services at times of illness.

Education: Education is a key to the development of a country. Universal Primary Education is one of the Millennium Development Goals to be achieved in 2015. In Ethiopia, education is provided tuition free up to the level of grade 10. This does not mean that the government covers the whole cost. The family is expected to cover costs of clothing, educational materials (exercise book, pen, pencil, etc), food and housing. Thus having minimum income is a necessary condition for the family. It enables the household to meet the basic needs of all family members: health, education, housing, sanitation and food.

Most of the household heads, about 71.7%, are sending all of their children to school (refer to table 26). Increase in income of a household and the awareness created towards the importance of education contributed to this. For most of the household heads, increase in income is not directly

related with income obtained from milk. Of course income obtained from milk increased in the past years. However, the income the majority of the household heads are obtaining from milk is very small, less than 1500 birr a year.

Table 26: Are you sending all of your children to school?

	Frequency	Percent
Yes	43	71.7
No	17	28.3
Total	60	100

As the above table indicates, the majority, about 71.7%, send all of their children to school. But 28.3% fail to send children to school. This is due to low income a household head earns.

Income earned from milk and milk products, sale of eggs and chickens is used to cover educational materials (Pen, pencil, exercise book, etc.), clothes, cost of house rent (for those who rented house in towns and attend their education) and the weekly and daily expenditure of children. Thus income earned from milk is used to cover educational costs. And the introduction of Sebeta Agro-Industry increased income obtained from milk for 6.7% of the total sample. And 6.7% claimed that the introduction of the factory helped to send children to school (refer to table 22).

4.3.3.4. Impact on Consumption of Milk

Most of the rural populations consume milk. But adults do not consume milk, like children, on a regular basis. Adults consume milk at times of religious festivals/ceremonies, at the beginning and ending of fasting and infrequently. On the other hand, children under age 2 consume milk and milk products on a regular basis. It is a regular food for them.

Table 27: Milk Consumption

	Frequency	**Percent**
Yes	54	90
No	6	10
Total	60	100

The majority, about 90 percent consume milk. However, 10% did not consume milk and milk products at all. The consumption is not on a regular basis as indicated during focus group discussions. The introduction of milk processing industry in the area did not improve the quality and quantity of milk consumption. They are only 6.7% that reported that their consumption increased as a result of the introduction of the factory (refer to table 22). It remains constant or even reducing for the rest of the population. The increase in the economic importance of milk and milk products compels them to sell it and purchase other products for consumption.

4.3.3.5. The role of milk in overcoming crop failure

Crop production is dependent on size of cultivated land, good weather conditions, access to inputs (fertilizers, high yielding variety seeds, etc) and having oxen. In Ethiopia, uneven distribution of rainfall, shortage of rainfall, frequent climatic change, drought, low or untimely supply of agricultural inputs and other related factors precipitate crop failure. A household has to possess accumulated wealth or assets to overcome such failure since there is no insurance system developed in the country. The factors that cause crop failure also affect milk production. But this question is asked by assuming that it is possible to produce milk like urban milk producers importing inputs required from other areas. In addition, it is to see whether farmers obtain sufficient income from milk or not.

It is difficult for the majority to live even for one month at times of crop failure unless there is some other source of income. This is because their production is merely subsistence and low. Their livelihood is also dominantly depending on crop production. If the income obtained from milk is large, it helps to overcome shocks in crop production. The study conducted on the role of intensified dairy production on achieving food security indicated that intensifying milk production helps to achieve food security by improving consumption (Ehui M.M. et al 2003). But the income obtained from milk and milk product is insufficient for the majority of the household heads to overcome crop failure in the study area. It does not satisfy the basic needs of household members. This is because the majorities obtain less than 1000 birr per year from milk and milk products.

Table 28: If crop failure occurs in the area, are you able to meet your basic needs?

	Frequency	Percent
Yes	19	31.7
No	41	68.3
Total	60	100

About 31.7%, as the above table indicates, are able to meet their basic needs in times of crop failure. But the rest, about 68.3%, fail to meet their basic needs .Those who fail to meet their basic needs dominantly depend on crop production. The income they obtain from other means and crop production itself is inadequate to be saved and used at times risks. Their production is merely subsistence. There is no saving at all or saving is very low. The income obtained from milk and milk products assists but is low to cope up with risks created by crop failure. On the other hand, there are household heads that are able to meet their basic needs at times of failure in crop production. These are those who built up resilience by way of accumulating money or other assets. They are also those who have relatively large size of land, livestock and diversified income sources. Some of these farmers have linkage with the factory and have started producing milk in large volumes.

Table 29: Is the income you are obtaining from milk and milk products sufficient to meet basic needs in times of crop failure?

	Frequency	Percent
Yes	7	36.8
No	12	63.2
Total	19	100

About 63.2% of those who meet their basic needs at times of crop failure claimed that the income they obtain from milk and milk products is not enough to meet basic needs. The major sources of livelihood for this group are fruits and vegetables production, crop production, livestock production and milk production. On the other hand, 36.8% of the respondents who are able to cope up with crop failure or 11.7% of the total sample size responded that the income obtained from milk and milk products is sufficient to overcome crop failure. There are household heads

that earn about 130 birr per day from sale of raw liquid milk to the factory and to other customers. These are household heads that adopted modern dairy cows and intensified the sector. They have also a linkage with Sebeta Agro-Industry and engaged in liquid milk selling.

4.3.3.6 Impact on Housing and Household Utensils

The largest proportion of households, except few household heads, are living in houses made of corrugated iron roof. The households living near the major roads get electricity, telecommunications and supply of water services. Having two to three houses is common and considered a sign of improvement in living conditions in the area. They were the most destitute groups who were living in poorly constructed houses. Such change had occurred during the 1980s and 1990s. And in the past five years, i.e. since 2001/02, access to various services was recognized. Increase in prices of agricultural products, increase in production and the market created for milk induced the change or facilitated for the majority to improve their housing and household utensils. The income obtained from milk does not, however, contribute as such to the improvement for the majority household heads. This is because the largest proportions of household heads earn less than 1000 birr a year from milk and milk products. The income gained from milk and milk products covers daily household expenditures. However, this does not mean that there are no household heads that earn high income that induced change in his/her life. Those who intensified milk production are earning income that even enables to cope up with risks created due to various reasons.

Table 30: Change in housing and household utensils

	Change in housing		Change in household utensils	
	Frequency	Percent	Frequency	Percent
Yes	55	91.7	54	90
No	5	8.3	6	10
Total	60	100	60	100

About 91.7% and 90% of the sample household heads changed their house to house made of corrugated iron roof and household utensils respectively. This has occurred since 1980s. The changes are due to various factors. These are access to market, rise in income, diversification of production and increase in selling price of agricultural products. Shortage of local materials

(grasses) and rise in the cost of local materials used in house construction also contributed. The overall situation observed shows the improvement of the living conditions in the area. The location of the area, improvement in price of agricultural products, rise in production and diversification of income sources are also the factors that induced the change.

4.3.3.7 The Role of Dairy on Women's Life

In Ethiopia, sale of large live animals such as oxen, horses, donkeys and cows and crop in large volumes are the responsibilities of men. The management and control of the overall property has been the domain of males. However, milk is one of the few sectors dominated by females. Unlike crops, milk production, processing and marketing are dominantly controlled by females. Increase in milk production and income obtained from milk thus improves not only household income and consumption but also the financial capacity of women which directly influences their decision making power.

During focus group discussion, it was indicated that except for those who adopted modern dairy cows, the dairy business has been dominated by women in the study area. It is an important source of income for women. It covers household expenditures. But the introduction of Sebeta Agro-Industry and the adoption of modern dairy cows increased milk production beyond the processing capacity of women. The end result was the beginning of liquid milk selling by the household. This diminished to some extent the economic power women have in the dairy sector. Men entered into the business, i.e started selling the liquid milk and controlling the income obtained from milk. However, the dairy sector is still controlled by women in the study area.

Benefit of the Factory to Women

The introduction of Sebeta Agro-industry provided market opportunity for milk produced by all household heads including females. However, except one female headed household, six female headed households said that they did not get benefit with the introduction of Sebeta Agro-industry.

Table 31: Frequency of Female Headed households supply (Sale) raw milk to the factory

	Frequency	percent
Yes	1	14
No	6	86
Total	7	100

The majority of female headed households, about 86%, do not supply milk to Sebeta Agro-industry like all household heads. That means they do not have linkage with the factory. They process it in a traditional way and sale milk products to local consumers, coffee and tea bars or small traders.

Table 32: Frequency of female headed households that benefited with the introduction of Sebeta Ago-industry

	Frequency	percent
Yes	1	14
No	6	86
Total	7	100

During focus group discussion and interview, it was indicated that the factory opened market for milk and employment (especially for town women) opportunity. It also contributed, although low, to increase in milk production and income obtained from milk and milk products. In addition, together with increase in price and demand, it initiated farmers to adopt crossbreed or modern dairy cows. This, with an attempt made by female to improve cows' productivity through improving cows feeding, raised milk production among female headed households.

Table 33: Average milk production among female households (in liter)

Household head	Year					
	1997/98	2001/02	2002/03	2003/04	2004/05	2005/06
Female HH	460	568	600	622	990	1345
Male HH	484	632	607.66	623.84	1095.84	1920.7
All sample HH	472	600	603.83	622.92	1049.92	1632.85

Source: own survey

Table 33 shows increase in milk production among female headed household heads. However, increase in milk production is relatively low in 2004/05 and 2005/06 compared to the overall average and male headed households. This is because, as indicated during focus group discussion, male headed household heads adopted crossbreed cows more than females. Increase in milk production raised income of female headed household heads. But the income of female headed household heads obtained from milk and milk product is low. It ranges from 455 to 1655 Birr (table 34).

Table 34: Average income of female headed households obtained from milk compared to the average income of total household heads (in Birr)

Household head	Year					
	Before 1997/98	2001/02	2002/03	2003/04	2004/05	2005/06
Female HH	455	470	735	933	1732.5	2690
Male HH	493	506	741.2	1152.4	2084.9	3524
All sample HH	474	488	738.1	1042.7	1908.7	3107

Source: own survey

The above table shows that the average income of female headed households is 455 Birr Before 1997/98. This increased to 1655 Birr in 2005/06. But compared to income of all sample households and male headed households, the income female headed household heads obtain on average from milk is low. This is because production of milk among female headed household heads is relatively low. The income female headed household heads, as explained during focus group discussion, failed to meet basic needs of their family. They argued that they obtain low income from milk and milk products. However, the income female headed households obtain from milk and milk products cover cost of cost of educational materials, health, and day to day household expenditures. It helps to cover household expenditures expected from milk.

In general, the majority of female headed households producing milk do not have linkage. Most of female headed households also do not get benefit with the introduction of the factory. The linkage that prevails with the few is also weak and involves supply of milk by producers and receiving of money. Female headed households use outputs of the factory less, as depicted during focus group discussion, as inputs to produce milk.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Agriculture, both crop and livestock production in integration is the main stay of the studied population. Crop, vegetable, fruits, sale of eucalypts tree and livestock are the sources of financial income, wealth, asset and consumption. In addition to livestock and crop, the studied populations earn income from non-farm income sources such as trade, employment in factories as daily laborers and involvement in small non-farm enterprises.

Rural population earns income from sale of live animals or livestock products such as milk and milk products, meat, hides and skins. Livestock is also a source of labor (input) in crop production. These make the livestock sector to hold special position in rural livelihood. Milk is one of the livestock sub-sectors produced in the study area. Since it is produced on a daily basis, it is a constant source of income for the studied population. But the dairy industry is not well developed there. It is dominantly produced and processed in a traditional way. Milk production is not intensified. Only few household heads have intensified milk production. But if the sector develops very well, it can significantly improve the livelihood of the rural population.

The poor development of the sector is due to various reasons. Milk is a heavy and perishable commodity. It has to be processed or consumed within short period of time. The nature of the product resulted in high transaction and transportation costs. The poor development of the dairy industry is also due to low emphasis given to the sector. Shortage of grazing land, increasing price of processed animal feed, shortage of supply of crossbreed or modern dairy cows are also the factors adversely affecting the sector.

Weak linkage between dairy processing industries and milk producers, absence of sustainability on the milk market (in the past), low selling price of milk (few years back), shortage of grazing land and high and increasing price of processed animal feed are among the factors that are affecting the development of the sector.

The introduction of Sebeta Agro-industry in the area brought so many changes. It created sustainable market for milk produced in the area and other areas surrounding Addis Abeba. The industry's dairy farm was used as a demonstration site especially at initial stage. Milk production and productivity increased. Some households' production increased from 472 liters before 1997/98 to 1632.85 liter in 2005/06. The income a household head obtains from milk was also increased from 474 birr in 1997/98 to 3108.6 Birr in 2005/06. The introduction of the factory motivated household heads to adopt modern dairy cows. The sustainable market created by the industry for milk producers initiated them to adopt modern dairy cows. This enabled them to increase milk production and income obtained from milk. This in turn helped, although few, those household heads to overcome crop failure and risks created due to crop failure. About 6.7% of the respondents claimed that increase in milk and the income obtained from milk improved access to health and education. In addition, it improved milk consumption. Thus the introduction of the industry in one way or another improved the livelihood of the involved population.

However, this does not mean that all household heads have benefited from the introduction of Sebeta Agro-Industry. The majority of the rural milk producers do not have linkage with the industry as the users of each others product. It is only few household heads residing along the major road of Addis Ababa-Jima that has linkage with the industry. They constitute about 18.3% of the sample population. The linkage with these groups of people is also not strong. It is rather weak and only one sided. Milk producers supply milk and receive money for their product. There is not any input of technology the factory transfers to milk producers. The majority of milk producers, who have linkage with the factory, indicated that the factory does not provide technical advice, feed for animals, crossbreed or modern dairy cows and other technologies targeted to improve milk production, productivity and quality. Furthermore, price of milk is set by not the market but by the factory. Absence of other factories or cooperatives engaged in milk collection, processing and marketing provided opportunity for the factory to control the sector in the area.

As one moves away from the major road, there is no linkage between the industry and milk producers. Milk producers produce and process their product, milk, in a traditional way into butter and cottage ghee and market it. There is not any benefit milk producers in that area obtain

from the introduction of the industry. The industry even does not create the market opportunity it created for household heads residing nearby and along the major road.

In general, the majority of milk producers do not have linkage with the industry. The linkage is also weak and one sided. Milk producers supply milk and the industry collect it. In return milk producers get money and the factory gets raw materials. But the factory does not provide any technical advice or other technologies or inputs to milk producers.

5.2 Recommendation

Milk is an important source of income and consumption for agricultural community of the studied population. However, as explained in the previous sections, the sector is not well developed. A number of measures required to be taken.

- Strong linkage between milk producers and processing industries has a role in the development of the dairy sector. Linkage does not only refer to supply of milk and obtaining money. It involves forward, backward and consumption linkage. But the linkage between Sebeta Agro-Industry and milk producers do not involve transfer of technologies. Farmers need technical advice, feed for their animals, crossbreed or modern dairy cows and other important technologies to improve milk production, productivity and quality. The factory needs to provide technologies, forage, technical advice, and others required to improve the sector for milk producers.
- Supply of modern dairy cows in the area is very low. Modern dairy cows have to be provided in both quantity and quality to farmers. To do so strong coordination work between extension workers, research institutions, Agriculture and Rural Development Office, credit and saving institutions, NGOs and the factory is required. They have to plan together to improve coordination and provision of modern dairy cows. This helps to reduce constraints such as low supply of modern dairy cows, high capital required, traditional thinking and its consequence on milk production among others.
- The major problems in intensifying milk production among small and poor farmers are financial and capital constraints. To purchase a modern dairy cow or heifer, up to 7000 birr is required. This is beyond the purchasing power of poor farmers. Thus not short but long term loan has to be facilitated by both government and microfinance institutions for poor and small farmers.

- There are no specific milk collection centers in the two PAs. The factory is collecting milk following Addis Ababa-Jima road. But the developments of milk collection centers not only following road but also in some villages of the two PAs motivate many farmers to adopt modern dairy cows and intensify the sector. The extension workers either have to assist farmers to develop milk collection centers or situation has to be facilitated to the industry to develop it. The factory has to also take initiatives to develop milk collection centers.
- The linkage between milk producers and the industry is weak. But the Government aims to develop the economy of the country focusing on agriculture and strengthening the linkage between the agriculture and the industrial sector. Thus practical measures have to be taken by responsible government office to promote and strengthen the linkage.
- Providing continues training on the importance of intensifying milk production, how to keep the quality of milk, the importance of using technologies in milk production and involving the poor is very important. NGOs, government and Research Institutions have to provide training in coordination.
- The majority of poor farmers and those reside far away from the roadsides are processing milk in a traditional way using traditional tools. They do not have linkage with the factory. Provision of modern hand operated tools and locally manageable technologies thus significantly contribute to the development of the dairy sector. Research institutions and extension workers have to provide this technology to small farmers on long term loans. In addition, training on how to use those tools has to be provided.

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Annex

Questionnaires

The main objective of the research is to collect data on the linkage between Dairy Processing and Producers and to assess the impact of the linkage on rural livelihood. The research is conducted for the partial fulfillment of Masters of Arts Degree in Development Studies. The information obtained from you is used for only the intended purpose and not shared by any body without your consent.

I. Household Information

Name of the respondent_____

1. Kebele _____ Garee/Got/Mender/ _____
2. Sex: Male ☐ female ☐
3. Family size (number of persons in the household)

   Male _____ Female _____Total _____
4. Occupation of the household head

   Farming ☐ Civil servant ☐ other ☐

   Trade ☐ Hand craft ☐

   Unskilled laborer ☐ skilled laborer ☐
5. Level of education

   Illiterate ☐ grade 9-10 ☐ Other ☐

   Read and write ☐ Grade 11- 12 ☐

   Primary school competition (1-8) ☐

   College diploma (certificate) ☐
6. Level of education of family members

No.	Name	Sex	Age	Level of education
1				
2				
3				
4				
5				
6				

7. Total size of land the household owned

_____ Hectare or in local unit _____

II. Livestock Production

8. Please, provide the type and numbers of livestock owned by the household

No.	Type	Total number
1	Oxen	
3	Cow	
3	Heifer	
4	Bull	
5	Calves	
6	Horses	
7	Mules	
8	Donkey	
9	Goats	
10	Sheep	
11		
12		

9. What is/are the role(s) of livestock in rural livelihood?

_____

_____

_____

10. Do you have any problem in livestock production? Yes ☐ No ☐

11. If yes to question number 10, indicate the major problems in livestock production

11.1. Before the introduction of Sebeta Agro-Industry

_____

_____

_____

11.2 After the introduction of Sebeta Agro-industry

_____

_____

12. In your view what must be taken to alleviate problems in livestock production?

_____

_____

III. Milk production

13. Do you produce milk? Yes ☐ No ☐

14. Total Milk produced by the household (on average annually in liter)

	Year (E.C)	Total milk produced by a HH daily	Lactation period (months)	Annual production
Before the introduction of Sebeta Agro-Industry	1997/98			
After the introduction of Sebeta Agro industry	1995			
	1996			
	1997			
	1998			

15. If milk production increased, what is/are the reason(s)?

_____

_____

_____

16. If milk production decreased, what is/are the reason(s)?

_____

17. Do you have crossbred or modern dairy cow that provide high milk?

Yes ☐ No ☐

18. If yes to question number 17. indicate the number and type of cows you have before the introduction of Sebeta Agro-Industry and in the past five years

No.	Types of cows	Before the introduction of Sebeta Agro industry	1995 E.C	1996 E.C	1997 E.C	1998 E.C
1	Indigenous cow					
2	Crossbreed cow					

19. If you adopted more number of crossbreed or modern dairy cows after the introduction of Sebeta Agro-Iindustry, what is/are the reason(s)?

_____

_____

_____

_____

20. If you couldn't adopt more crossbreed or modern dairy cows, what is/are the reason(s)?

_____

_____

_____

21. What are the benefits you obtained by adopting crossbreed or modern dairy cows?

_____

_____

_____

22. Do you have a problem in milk production? Yes ☐ No ☐

23. If yes to question number 22, indicate the major problems?

_____

_____

_____

24. What have to be taken to alleviate the major problems in milk production?_____

_____

Milk Marketing

25. Do you sell liquid milk? Yes ☐ No ☐

26. If yes to question number 25, indicate your customer(s)

	Client/ customer	
1	Sebeta agro-industry	
2	Local consumers	
3	Small Traders	
4	Cooperatives	
5	Local Market	
6	Others	

27. When did you start selling milk (indicate approximate period of time)?

_____

_____

_____

28. What is/are the reason(s) for the beginning of milk selling in your locality?

_____

_____

_____

29. What is/are the benefit (s) you obtained by selling milk?

_____

_____

_____

30. Is there any problem in milk marketing? Yes ☐ No ☐

31. If yes to question number 30, specify the major problems?

_____

_____

_____

32. What measures have to be taken to improve milk marketing?

_____

_____

_____

33. If you do not sell liquid milk, do you process it locally? Yes ☐ No ☐

34. Why did you process rather than selling liquid milk?

_____

_____

V. **Sources of income**

35. Please, indicate the total income you obtained in the past five years and before the introduction of Sebeta Agro-Industry?

Year (E.C)	Total income(in birr)
Before the introduction of Sebeta Agro-industry (before 1997/98)	
1994	
1995	
1996	
1997	
1998	

36. Did your income increase in the past five years? Yes ☐ No ☐

37. If yes to question number 36, what is/are the reason(s) for the increase of your income?

_____

_____

38. If no to question number 36, why not?

_____

_____

39. What is/are the major source(s) of income for your household?

No.	Source	
1	Sale of crops	
2	Sale of live animals	
3	Sale of milk	
4	Sale of Butter	
5	Sale of fruits	
6	Sale of hides and skins	
7	Sale of eggs	
8	Trade	
9	Employment in factories or others' farm land	
10		
11		
12		

40. Is there any opportunity for your family to engage in non-farm activities?

Yes ☐ No. ☐

41. If yes to question number 40, specify the major ones

_____

_____

_____

42. Please. indicate the major non-farm activities viable to the rural communities of the area?

_____

_____

_____

V. Benefit of the factory

43. Did you get benefit with the introduction sebeta Agro-industry

Yes ☐ No ☐

44. If yes, specify the level of benefit of the factory

No	Types of benefit	Yes	No
1	Employment opportunity creation		
2	Market for milk and milk products		
3	Feed for animals		
4	Technical advice		
5	Increase in milk production		
6	Increase in income		
7	Increase in milk consumption		
8	Increase in food consumption		
9	Improve in health		
10	Send children to school		
11	Initiating adoption of cross bread cows		
12	Others, specify		
13			
14			

45. Are you sending all of your children to school? Yes ☐ No ☐

46. If no to question number 45, Why not?

_____

_____

_____

47. Is there any farmer specialized in milk production in the area? Yes ☐ No. ☐

48. If yes to question number 47, what is/are the reason(s)?

_____

_____

_____

49. If no to question number 47, why not?

_____

_____

_____

50. Total income you obtained from milk and milk products

	Year (E.C)	Total income (annually)
Before the introduction of Sebeta Agro industry		
After the introduction of Sebeta Agro industry	1994	
	1995	
	1996	
	1997	
	1998	

51. Did the income you obtained from milk and milk and milk product increase in the past five years?

Yes ☐ No ☐

52. Did the price of milk per liter increase in the past five years? Yes ☐ No ☐

53. If yes to question number 52, indicate the price of milk in the past five years

	Year (E.C)	Price per liter)
Before the introduction of Sebeta Agro industry		
After the introduction of Sebeta Agro industry	1994	
	1995	
	1996	
	1997	
	1998	

54. Are you able to afford to get better health services? Yes ☐ No ☐

55. If yes to question number 54, how much do you afford?

Minimum _____

Maximum _____

56. If no to question number 54, why not?

_____

_____

_____

57. Do you consume milk? Yes ☐ No☐

58. If yes to question number 57, indicate your consumption of milk and milk products per liter per day?

Before the introduction of Sebeta Agro industry_____

After the introduction of Sebeta Agro industry

Year (E.C)	Consumption of milk (liter per day)
1994	
1995	
1996	
1997	
1998	

59. Do you believe that your consumption of milk and milk products increased in the past five years?

Yes☐ No☐

60. If no to question number 59, indicate the major reason(s)

_____

_____

_____

61. Do you consume more of other commodities? Yes☐ No☐

62. If yes to question number 59, what is/are the reason(s) for the increase?

_____

_____

_____

63. If crop failure occurs in the area, are you able to meet your basic needs?

Yes☐ No☐

64. Is the income you are obtaining form milk sufficient to meet basic needs at the times of crop failure? Yes☐ No☐

65. If no to question number 64, why not?

_____

_____

_____

66. Is there any change in your housing facility?

Yes☐ No☐

67. Did you make a change in household utensils? Yes☐ No☐

68. In what type of house you lived before the introduction of Sebera Agro-Industry?

_____

_____

_____

69. In what type of house you are living now?

_____

_____

_____

70. If there is/are (a) change(s), what is/are the reason(s)?

_____

_____

_____

Sebeta Agro processing industry

1. Year of establishment _____ year
2. Total number of employee at the time of establishment and now

No.		Male	Female	Total
1	At the time of establishment			
2	Now			

3. Total milk processing capacity of the factory _____ litre
4. Total milk the factory is processing _____ litre
5. Please, indicate reasons for the deviation between the processing potential actual one

_____

_____

_____

6. Source of input/milk/ for the factory

No.	Source	Measurement (litter)
1	Small farmers	
2	Medium farmers	
3	Commercial farms	
4	Cooperatives	
5	Own farm	
6	Other	

7. What are the major problems of the factory?
8. What are the benefits the industry brought to the surrounding rural areas?
9. Is there any support from government the factory is obtaining?

   Yes ☐ No. ☐

10. If yes, indicate some of the benefits?_____

_____

_____

Discussion topics (for focus group discussion)

- The role of livestock in rural livelihood
- The major problems of livestock production (in relation to forage, disease, land, and market)
- What should be done in the future to improve livestock and milk production
- Milk production, processing and marketing in the area (status, problems and prospects)
- The advantage and disadvantage of the existence of dairy processing industry in the area
- Major benefits of the rural people obtained by the introduction of Sebeta Agro- industry
- The role of milk production in improving the live of women

Questionnaire for Ministry of Agriculture and Rural Development

1. Total milk production of Ethiopia in the past five years

Year	Total milk produced (in million tones)
2002	
2003	
2004	
2005	
2006	

2. Why milk and milk products imported from abroad?
3. What are the major problems in milk production?
4. Is there any specific policy designed by government to increase milk production? If there is. specify the status.
5. How many milk processing industries are found in Ethiopia?
6. What is the role of Dairy processing industries in improving milk production in Ethiopia?
7. What is the role of livestock in rural livelihood?
8. How improvement in milk production is related with improvement in rural livelihood, in general and women's life in particular?

Questionnaire for Woreda Agriculture and Rural Development Office

1. Total milk production of the Woreda in the past five years

Year	Total milk produced (in million tones)
2002	
2003	
2004	
2005	
2006	

2. What is the role of livestock in general and milk production in particular in rural livelihood?
3. What are the major problems in livestock and milk production?
4. What is the role of Dairy processing industries in improving milk production, income obtained from milk, milk consumption, education, health, etc. in the area?

Declaration

I, the undersigned, declare that the thesis is my original work, has not been presented for a degree in any other university and that all sources of material used for the thesis have been duly acknowledged.

Declared by:

Tarikua Ayele

Candidate

Confirmed by:

Getachew Tesfa

Advisor