



**ST. MARY'S UNIVERSITY**

**SCHOOL OF GRADUATE STUDIES**

**INSTITUTE OF AGRICULTURAL AND DEVELOPMENT STUDIES**

**DETERMINANTS OF SMALL SCALE URBAN DAIRY FARMING  
THE CASE OF SEBETA TOWN OF OROMIA, ETHIOPIA**

**BY  
TESFAKIDAN ADMASU**

**JUNE, 2018  
ADDIS ABABA, ETHIOPIA**

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**A THESIS SUBMITTED TO INSTITUTE OF AGRICULTURE AND  
DEVELOPMENT STUDIES OF ST. MARY'S UNIVERSITY IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER IN AGRICULTURAL ECONOMICS**

**JUNE, 2018**

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**ST. MARY'S UNIVERSITY**  
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**INSTITUTE OF AGRICULTURE AND DEVELOPMENT STUDIES**

**Approval Sheet**

As members of the Examining Board of the final MSc, open defense, we certify that we read and evaluated the thesis prepared by Tesfakidan Admasu and recommend that it be accepted as fulfilling the thesis requirement for the Degree of Master of Science in Agricultural Economics.

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4. _____ Name of thesis advisor	_____ Signature	_____ Date

## **DECLARATION**

I declare that the thesis for degree of Master in Agricultural Economics at the Saint Mary's University, hereby submitted by me, is my original work and has not previously been submitted for a degree at this or any other university, and that all reference materials contained therein have been duly acknowledged.

Tesfakidan Admasu

Signature \_\_\_\_\_

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## **ENDORSEMENT**

This thesis entitled “Determinants of urban Agriculture the case of urban dairy farming in Sebeta town” has been submitted to Saint Mary’s University School of Graduate Studies for examination (defense) with my supervision and approval as a University Advisor.

Adviser's Name and Signature:

Wondimagegn Chekole (PhD.)

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## **ACKNOWLEDGEMENT**

I remain indebted to all individuals and institutions who gave me moral, financial and material support during my study and in the course of the research work. It was demanding, but made possible by different reference materials. I really want to thank my Advisor Wondimagegn Chekole (PhD) not only for his critical comment, supervision and advice but also for his willingness to consult him at any point of time, his patience and the experience he shared with me. Successful accomplishment of this research would have been very difficult without his generous time devotion from the early design of the proposal to the final write-up of the thesis by adding valuable, constructive and ever-teaching comments; and thus, I am indebted to him for his kind and tireless efforts that enabled me to finalize the study.

My sincere gratitude goes to the St. Mary's University for granting me the scholarship to undertake graduate studies. My exceptional thanks also go to my friends Wubshet Birhanu, Biruk Engida and Kumlachew who helped me in data collection. I would also like to express my appreciation to my beloved mother Haymanot Yesuf for helping me and showing me each and every direction throughout my life paths.

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## **ACRONYMS**

<b>ADLI</b>	Agricultural Development Lead Industrialization
<b>CSA</b>	Central statistics Agency
<b>HH</b>	House holds
<b>IAR</b>	Institute of Agricultural Research
<b>ILR</b>	International Livestock Research Institute
<b>MOFEC</b>	Ministry of Finance and Economic Corporation
<b>UA</b>	Urban Agriculture

## ABSTRACT

*This study aims to investigate the determinants of small-scale urban dairy farming in Sebeta Town. It also identified both internal and external factors that affect small scale urban dairy farming in the study area. This research used primary data that collected from 120 randomly selected small scale urban dairy farmers by using both open and closed ended questionnaire method and employed Binary logistic regression model. The study found that Age, experience, education level, access to credit, extension service, financial income from non-dairy source, feed availability and disease found to be statistically significant. According to the study's findings, barriers to urban dairy farming included a lack of money, a water deficit, urbanization, a problem with market prices, limited access, and a high cost of heifers or cows. The climate of Sebeta Town is woinadega, which is suited for urban dairy farming, and no signs of natural catastrophe have been seen in the study region, which offers the potential for urban dairy farming. In both the federal and local administrations, the idea of urban agriculture has received the appropriate attention. The establishment of veterinarian service center's is necessary to balance supply and demand, lessen the strain of the professionals, and decrease the obstacles that led small-scale dairy producers to abandon their businesses.*

**Key words:** *Urban dairy farming, binary logistic regression model, Urban Agriculture*

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

According to FAO, 2018 will see a significant increase in the demands placed on urban food supply systems due to the developing world's cities' rapid expansion. The practice of agriculture, which includes horticulture, cattle, fisheries, forests, and the production of fodder and milk, is increasingly being practiced in towns and cities. Urban agriculture increases cities' ability to withstand climate change while also providing fresh food, creating jobs, recycling urban garbage, and creating green spaces. In and around cities, it also refers to the breeding of animals and the cultivation of plants. Food products from various crops (grains, root crops, vegetables, mushrooms, and fruits), animals (poultry, rabbits, goats, sheep, cattle, pigs, guinea pigs, fish, etc.), and non-food items are produced by urban and peri-urban agriculture (e.g., aromatic and medicinal herbs, ornamental plants, tree products). Both urban and peri-urban areas have trees.

The rapid urbanization that is taking place goes together with a rapid increase in urban poverty and urban food insecurity. By 2020 the developing countries of Africa, Asia, and Latin America will be home to some 75% of all urban dwellers, and to eight of the anticipated nine mega-cities with populations in excess of 20 million. It is expected that by 2020, 85% of the poor in Latin America, and about 40-45% of the poor in Africa and Asia will be concentrated in towns and cities (RUAF Foundation, 2018).

Many scholars place emphasis on the severity of urban poverty, notably in African nations. Increasing numbers of rural poor people are moving to the cities, more people are being born in urban poor households, and more urban middle-class people are living below the poverty line, according to IDRC (1999). It is a massive undertaking to feed a city of millions of people, who need tons of food every day. Producers, transporters, market managers, and retailers on the street and in open-air markets must work in close synchronization (FAO, 1998). 2000 according to Drescher Urban areas are predicted to outnumber rural ones, with more than half of the truly impoverished residing there.

Urban agriculture exists in a variety of forms in modern African cities and towns, reflecting the availability of water, land, and the possibility of incorporating other resources into the production process (Elis and Sumberg, 1998). Despite having access to such vital resources, urban agriculture has long gone unnoticed

and operated on its own. Several African governments continue to prioritize rural agriculture while disregarding and undervaluing it in urban areas (African study center, 2006). Nonetheless, many governments are already setting up organizations to oversee urban agriculture. Examples of these are Ethiopia, Malawi, Kenya, Tanzania, Uganda, Nigeria, and Zimbabwe (FAO, 2002).

Ethiopia is one of the poorest countries in the world. GDP per capita is very low while life expectancy, educational enrolment, and other indicators of well-being are all extremely low. Agriculture remains the dominant economic sector contributing 45% of GDP. Over the last 30 years, life expectancy has shown little improvement, food production per capita has declined, and school enrolment has changed little (Bigsten et al 2003; IMF, 1999). According to the 1994–1995 agricultural sample survey, Ethiopia had a total of 29,825,030 cattle, of which 29,748,980 (99.74%) were indigenous cattle and 76,180 (0.26%) were hybrids. The average daily milk production per cow varies from 0.97 litres in Tigray to 1.5 litres in Addis Abeba, with 1.17 litres being the national average. From 5.46 months on average in Afar to 6.91 months on average in Dire Dawa, lactation lasts an average of 6.33 months nationwide. Butter output as a percentage of total milk production ranges from 2.05% in Harari to 54.08% in Addis Abeba, with the national average being 27.91%. (CSA, 1995).

Urban areas account for only 15 percent of the total Ethiopian population, but also have a high rate of incidence of poverty. Unlike the findings elsewhere in the developing world, urban and rural poverty levels in Ethiopia are not dramatically different from each other (Kedir, 2003; Bigsten et al 2003; Tadesse and Dercon, 1997). According to UN-HABITAT 2000, Ethiopia's current urban population of 12 million will triple by 2030, reaching 32 million. This rapid growth will have an impact on livelihoods, food security and the environment including in AddisAbaba.

In Ethiopia, market-oriented urban and peri-urban milk productions are emerging as main suppliers of milk and dairy products to the cities. They possess both indigenous and crossbred dairy animals ranging from 50% to high grade Friesian breeds in small, medium and large sized farms. They depend on purchased roughage and concentrate feeds with limited grazing for milk production ( Azage et al., 2013). The intensity of production has been very low; production is

lower per animal, per man employed and per unit area of land (Williamson, 1987). However, in a limited number of countries there have been a few specialized dairy farms intended to supply milk for consumers (Malcom, 1999).

There are evident shows that urban dairy farming methods is highly practiced in research area. Sebeta urban dairy farming was unable to have a substantial effect on the household or the local economy due to a variety of technical and non-technical issues. Consequently, the goal of this study was to evaluate the factors that contribute to small-scale urban dairy farming in Sebeta town.

## **1.2 Statement of the Problem**

Ethiopia holds large potential for dairy development due to its large livestock population and Urban and peri-urban livestock production constitutes an important sub-sector of the agricultural production system. Urban and peri-urban dairy production systems involve production, processing and marketing of milk and milk products that are channeled to urban centers (Azage et al., 2000; Mohamed et al., 2004). These market-oriented systems are emerging as important components of the milk production systems in Ethiopia. These systems are contributing immensely towards filling the gap between demand and supply for milk and dairy products in urban centers, where consumption of milk and milk products is remarkably high (Azage et al., 2000).

As Belachew et al. (1994) Investigated, despite large cattle population, the dairy industry in Ethiopia is untapped and has not yet developed. Milk production has remained too low and the perishable nature of fluid milk coupled with inefficient infrastructure in terms of transport, refrigeration facilities, collection centers and processing plants have inhibited the commercialization of dairying. Per capita consumption of milk and milk products has shown a declining trend. Contrary to this, there has been a sharp rise in imports. But the fact is that there is a high potential for domestic production to meet the excess demand and limited supply (staal and Shapiro, 1996; Alemu et al, 1998; Wondwosen, 1998). Irrespective of the work of urban agricultural management agency in Ethiopia, urban dairy farming is still a traditional practice and mostly under taking informally. However, it has been the most important part of income for urban farmers in Addis Ababa and nearby cities contributing more than 60% of their total household income (Tewodros, 2007).



Sebeta is one of the major suppliers of milk and milk products to Addis Ababa city. There are numerous dairy farms in the area, which ranges from small to large-scale and most of them keep local dairy cows. The area considered as one component of Addis Ababa milk shed (Yoseph, 1999). The study area is suitable for urban dairy farming however; unemployment and food insecurity is one of the major problems in the study area. Despite its significant contribution for urban economy and environment, urban agriculture in the study area has been given less attention and unrecognized, unassisted from concern bodies. The rate of urban dairy farming practice in the area is low and the number of actors who involved in the sector is declining in the last few years.

Empirical studies that have been done on the Determinants of urban dairy farming are few and most of the studies used descriptive statistics to identify and examine factors affecting urban dairy farming. For instance Zena (2011) conducted his research on challenges and opportunities of urban dairy farming the case of Harar city. The study indicated that major limitations of the sector are found to be lack of sustainable source of feed and water, inadequacy of health care centers and professionals, lack of access to AI, poor attention and lack of intervention from the government officials and lack of access to credit. Tefera (2003) also studied on urban agriculture: The Case of Small-Scale Urban Dairy farming in selected areas of Addis Ababa. The study found factor that affects the productivity of the dairy cows and profitability of the dairy farms is choice of breeds followed by feed resources and improved feed system, and veterinary services and animal health care. The major problems in managing the dairy farms include shortage and high cost of animal feed; diseases like mastitis, pneumonia, anthrax, tick related, foot and mouth; low production potential of indigenous cattle; lack of adequate space for dairying; lack of labour, credit and veterinary and extension services. According to Alemayehu, Gashahun and Mengie, 2017 has done on Practices, Roles and Challenges of Urban Agriculture in South Western part of Ethiopia: The case of Bedelle town. The result of the study reveals that the major challenges of urban farming practices in the area includes; lack of access to credit, shortage of inputs, land granting system, lack of technical support from concerned bodies/less contact with agricultural sectors, planting of non edible trees, lack of enough space/land shortage for cultivation, disease, problem of market are the major challenges of farming practices in the area.

There are no studies that provide clear explanation of the cause and effects relationship among each determinant factor which affects small scale urban dairy farming. Empirical studies are hardly available on the issue of urban dairy farming in the case of Sebeta town (one of the main milk shed areas) there is an information gap on the issue of urban dairy farming. Therefore, this study was conducted to investigate determinants of small scale urban dairy farm in Sebeta town.

### **1.3 Research Questions**

- What are the challenges and opportunities of urban dairy farm in Sebeta town?
- What are the determinants of urban dairy farm?

### **1.4 Objective of the study**

#### **1.4.1. General Objective**

The overall objective of this study is to assess the determinants of urban dairy farm the case of Sebeta town.

#### **1.4.2 Specific Objective**

The specific objectives are:

- To identify challenges and opportunities of urban dairy farm in the study area
- To investigate determinants of urban dairy farm in study area

### **1.5 Significance of the Study**

According to FAO, 2001 reported urban agriculture has given attention as an alternative means of reducing urban Unemployment and poverty, consequently changing the life of the society to a better standard. Urban farming appeared as the prior solution for the situation. Producing food in urban areas will support the rural production of food which is increasingly depleting. Rural migrants are out numbering the urban poor. Farming in urban area can be the coping strategy for such migrants and the urban poor (Alemayehu, et.al. 2017) .Urban dairy farming has a

significant role for the livelihood of the household. The research is believed to contribute to the existing literature by find out the challenges of urban dairy farming that hinder the performance of the farmers. This study will be anticipated to offer an additional input for policy intervention in urban dairy farming areas and other researchers can also use for further study since this study identify the problem areas in urban dairy farming sectors.

## **1.6 Scope and Limitation of the Study**

Dairying is one of the livestock productions which are practiced in urban, pre- urban and rural areas. However, this study was delimited to small scale urban dairy farming on selected kebeles of Sebeta town. The study focused on determinants of small scale urban dairy farming. It aims also for identifying the internal and external determinants of urban dairy farming by using binary logistic regression model. In order to identify effect of each explanatory variable on the dependent variables the researchers identified more than ten variables. The main limitations of this study were constraints of time and secondary data sources. The fact that the study was only conducted in one town and on selected respondent which limits the study to be more generalizable. In addition, the other limitations some respondent refused to participate in this survey.

## **1.7 Organization of the Study**

The study is organized in five chapters. The first chapter included background of the study, statement of the problem, the objectives, research questions and the significance of the study among others. The second chapter dealt with a review of related literature on the topic whereas the third chapter covers the detailed methodology. The fourth chapter covers the result and discussion. The summary, conclusion and recommendations are provided in the fifth chapter

## **CHAPTER TWO**

### **LITERATURE REVIEW**

The aim of this chapter was to discuss current knowledge on urban dairy farming and an account of what has been published on a topic by accredited scholars and researchers. The points that was discussed under this chapter is the concepts of Urban Agriculture, urban dairy farm in Ethiopia, challenges and opportunities urban dairy farming, Empirical studies and conceptual frame work.

#### **2.1 Concepts of Urban Agriculture**

The world population is becoming highly urbanized rapidly, with urban poverty growing at a higher pace in the developing world. Food and fuel absorb a large share of urban poor Household incomes, and household food insecurity has been worsening in recent years (Dubbeling, 2001). People tend to move to cities in order to improve their lives, find better jobs and have access to goods and services that are not available in rural areas (FAO, 1998). Hence, urbanization is most likely to be one of the major problems of human kind in the near future (Dresher, 2000).

According to FAO, 2018 most cities in developing countries have difficulties to cope with and are unable to create sufficient formal employment opportunities for the poor. They also have increasing problems with the disposal of urban wastes and waste water and maintaining air and river water quality. Urban and peri-urban agriculture can make an important contribution to household food security, especially in times of crisis or food shortages. Produce is either consumed by the producers, or sold in urban markets, such as the increasingly popular weekend farmers' markets found in many cities. Because locally produced food requires less transportation and refrigeration, it can supply nearby markets with fresher and more nutritious products at competitive prices. Consumers - especially low-income residents - enjoy easier access to fresh produce, greater choice and better prices. Vegetables have a short production cycle; some can be harvested within 60 days of planting, so are well suited for urban farming. Garden plots can be up to 15 times more productive than rural holdings. An area of just one square meter can provide 20 kg of food a year. Urban vegetable growers spend less on transport,

packaging and storage, and can sell directly through street food stands and market stalls. More income goes to them instead of middlemen.

Urban agriculture provides employment and incomes opportunities for poor women and other disadvantaged groups. Horticulture can generate one job every 100 sq m garden in production, input supply, marketing and value-addition from producer to ultimate consumer. However, in many countries, Urban and per-urban goes unrecognized and gives less attention in agricultural policies and urban planning. Most of the farmers often operate without legal permits. Since it is officially "invisible", the sector receives no public assistance or oversight in many cities. Urban agriculture carries health and environmental risks – potential use of contaminated land and water smells and noise pollution, and inappropriate use of pesticides and of raw organic manure that can leak into water sources. These issues require proper attention (FAO, 2018).

According to Jacobs 1970, Smith 1994 and Tinker, 1994 explained urban agriculture is not a recent phenomenon which is started by ancient Civilizations Fieldwork and aerial images of archaeological Sites are unraveling agricultural practices of urban settlements, for the production of food, feed and fodder; fuel, building, shade, fencing, Wind-break trees, ornamental and medicinal plants and livestock for food, transport. The early cities of hunters required food storage and this led to the selective domestication of animals and to the regeneration of seed stock. The need for food and non food supplies explains the coincidence of ancient city sites for farming. Those cities provided the incentive and testing grounds for innovations and more intensive and productive farming systems (Reader's Digest, in Mougeot 1994). Hence urban agriculture is neither a new nor a declining activity in towns; in fact, agricultural goods produced in cities can be the cornerstones of many urban economies. The capacity of governments to manage urban growth is threatened in many developing countries; providing food, shelter, and basic services and creating sustainable cities are challenges to many city authorities (Drescher, 2000). Hence, feeding urban populations adequately is a major problem in developing countries. Rural areas do not produce enough food to feed both rural and urban people and there has been poorly organized production and distribution system in rural areas, and food import is constrained by lack of foreign exchange and escalating food prices. Imported food stuffs also degrade the local food production base and introduce foreign food tastes (Sawio 1994, Haight 1999) hence, much of the rapidly growing population in developing countries participates in the

informal sector which produces and distributes basic goods and services in unregulated but competitive markets (Holmer, 2002).

Over the last few years, Urban Agriculture has increased in popularity due to concerns about climate change and sustaining food security in urban areas (Hardman, M., & Larkham, P, 2014). The effects of climate change has induced crop reductions and affected optimal environmental growing conditions through rising temperatures and changes in rainfall patterns (Germer, J., Sauerborn, J., Asch, F., de Boer, J., Schreiber, J., Weber, G., & Müller, J. (2011) Although, agriculture contributes to 30% of anthropocentric greenhouse gas (GHG) emissions, 10% of vegetation in urban areas can lower temperatures and GHG emissions (C. Rosenzweig, S. Gaffin, and L. Parshall (2006). An environmental Life Cycle Assessment (LCA) of Urban Food Growing in London found urban farms could potentially reduce food related GHGs, such as CO<sub>2</sub> by 34 tons per hectare.<sup>12</sup> Increasing urban food deserts in many parts of the world has motivated the improvement of methods of UA in order to complement urban food needs (Wallimann, I. 2014).

Many studies in Asia shows urban farmers are less exposed to the potential problems arise in the sector as they are nearer to the markets, output prices and marketing of agricultural outputs are less serious problems for them and access to drainage water reduces the seriousness of water shortages on urban farmers (Mubarik, 2004). In addition to the above facts, urban agriculture has also been used as a tool to empower women; in some cases in Southern Africa urban agriculture is even synonymous with "farming by women", indicating that it is a very typical female work (FAO, 2001). Documents on urban and peri-urban agriculture emphasizes the benefits of this practice in relation to providing food, fodder, fuel and building material, furthermore considers recreational and environmental benefits it immensely contributes to the quality of life in towns and cities (FAO, 2001). Urban agriculture is taking advantages where Rural Agriculture (RA), the primary producer of food in cities, failed to achieve urban food security. It complements RA in terms of self-provisioning, marketing flows and market supply flows. Also, there is a growing concern that RA will deprive lands (through land grabbing) from rural populations and trigger its movement toward cities thereby reducing rural populations (Wallimann, I, 2014) However, UA is unlikely to turn any city or most households fully self-sufficient in all of the food which they may require (Mougeot, 2000).

## **2.2 Urban dairy farming in Ethiopia**

The researcher tried to review a different material that has been done on urban dairy activities in different part of the world. Under this sub titles the study was briefly discussed about urban dairy farming.

Ethiopia harbors an extraordinarily rich agro-biodiversity resulting from its geography, climatic differences, ethnic diversity and strong food culture. Unique is the great variation in climate, due to the great variation in altitude ranging from sea level up to 4500 meters. Altitudes between 500 meters which is normally warm and 2600 meters, cool nights and mild day temperatures, and all altitudes in between, are common (NABC, 2010). Ethiopia has set a poverty reduction strategy named as Sustainable Development and Poverty Reduction Program (SDPRP) that shows the country's dedication to engage in the combat against poverty. Conversely, the annual progress report of 2003/04 by MoFEC depicts that pressure of population growth and in-migration is fueling urban poverty as the number of new town-dwellers exceeds the capacity to create employment opportunities or provide services (MoFEC, 2005). This fact was also acceptable in the period 2005-2010 where the urban population growth rate was registered to be 4.06% (MoFEC, 2006). It is also found that poverty in urban Ethiopia is rather high with a head count index of 41% in 1994 and 43% in 2000 (Tesfaye, 2006). In 2003/04 the headcount poverty index was expected to fall down by about 3.8% (from around 40% to about 36.2%), however the short run poverty varies widely from year to year in Ethiopia as a result of rainfall (and hence crops), making it difficult to generalize from annual data (MoFEC, 2005).

Dairy production is an important part of livestock production system in Ethiopian. The Country has a huge potential to be one of the key countries in dairy production for various reason (Pratt et al., 2008). These includes a large population of cows in the country estimated at 9.9 million (CSA, 2009), a conducive and relatively disease free agro-ecology, particularly the mixed-crop livestock systems in the highlands that can support crossbred and pure dairy breeds of cows (Ahmed et al., 2003), a huge potential for production of high quality feeds under rain fed and irrigated condition, existence of a relatively large population with a long tradition of consumption of milk and milk products and hence a potentially large market (Holloway et al.,

2000) existence of a large and relatively cheap labor forces and opportunity for export to neighboring countries and beyond.

According to Azage et al., 2013 investigated in Ethiopia Urban dairy systems which under take in cities and/or towns and focuses on production and sale of fluid milk, with little or no land resources, using the available human and capital resources mostly for specialized dairy production under stall feeding conditions. When it compares with other systems they have relatively better access to inputs (e.g. feeds) and services (e.g. artificial insemination) provided by the public and private sectors, and use intensive management. The urban system mainly based on cattle, both improved dairy cattle genotypes (crossbreds or high-grade) and indigenous cattle. Marketing of fluid milk in these towns is arranged through direct contact between producers and consumers, and/or involves wholesalers/processors, cooperatives, and retailers. Urban dairy farming is characterized by intensive management; use separate house; milking predominantly handled by household wives; combination of early weaning and partial sucking; informal and formal marketing of dairy products; market-oriented.

According to Tsehay, 2009 investigated urban dairy farming system which are mainly concentrated in major cities of Ethiopia involving highly specialized, state or businessmen owned farms, in major cities of Ethiopia. They have no access to grazing land. Currently, a number of smallholder and commercial dairy farms are emerging mainly in the urban and peri-urban areas of the capital and most regional towns and districts. Smallholder rural dairy farms are also increasing in number in areas where there is market access. Urban dairy farming is a labor-intensive activity. As Girma, 2012 found the result in his study farmers use no mechanical power for farm activities. Instead, they practice hand-powered farming, meaning that all tools are operated by human power. Simple farming equipment consisting mainly of forked hoes, pickaxes, spades, and rakes are used to work the land. Farmers make use of family labor and paid daily workers. The family labor force consists of spouses, adult children, and extended relatives residing in the household. Children work after school, on weekends, and during vacations. Hiring labor for cash is a common practice, especially among households with an insufficient labor force.



## **2.3 Challenges of Urban Dairy Farming in Ethiopia**

The study previously discuss about historical background of urban dairy farming and its implementation in Ethiopia. Under this sub topic the researchers was reviewed different materials regarding the challenges of urban dairy farming in different perspective.

Dairy production is constrained by multifaceted factors, though the nature and magnitude of the problems vary between production systems and agro-ecologies. Some are cross-cutting that can have influence on dairy production regardless of dairy production system and agro ecologies; others are system specific (Azage et.al, 2013).

### **Feed and water**

Feed shortage in terms of quality and quantity is the major constraint regardless of the dairy production system and agro-ecology. Feed constraints could be seen from different dimension in terms of quality and quantity and seasonal feed supply to meet the nutritional requirements of dairy animals. Both roughage and concentrate feeds are either too expensive or unavailable in sufficient quantity and quality to improve dairy production. The general belief that feed is abundant during the wet season is not true in all production systems and agro-ecologies. For example, in the rural highland dairy system of Bure about 35% of the farmers reported feed shortage between July and September, the main rainy season. In Fogera, farmers face severe feedscarcity during the wet season due to flooding of the natural pastureland. In addition, grazing lands in Fogera have been shrinking due to expansion of large-scale rice cultivation and the invasion by the noxious weed (*Asracantha longifolia*, amykila), overgrazing and miss management due to the free and uncontrolled use. In the rural lowland dairy production system, feed shortage is associated with low moisture availability and poor feed harvesting, conservation, management and utilization practices. For instance, in the rural lowland system like Metema, poor management and absence of proper conservation practices has created feed shortage during the dry season, although natural pasture seems abundant during the wet season. In the rural lowland dairy system of Mieso, unpredictable and unreliable rain, expansion of croplands and poor feed conservation techniques are the major problems for the shortage of feed. Access to water during the dry season is a major constraint in most of the study sites. Besides, in the rural highland system such as Bure, infestation of rivers and ponds by leech (alkit) challenges dairy

development in the area. In the low rainfall areas like Mieso where there is plenty of underground water resource, water resource development is crucial to dairy production (Azageet, .al 2013).

### **Shortage of land**

According to Azage et al, 2013 found in their study Shortage of land and feed is a major problem in urban and peri urban dairy farming system of Shashemene–Dilla milkshed. Dairy farms under this system are under tremendous pressure to expand dairying mainly due to rapid urbanization and population growth. Most urban producers (97%) keep their cattle within their own residence compound. Although urban expansion creates great opportunity for commercialization of dairy production, it has to be supported with appropriate policy framework to promote dairy development. Shortage of land is also the major constraint in the rural highland dairy production system. Farmers’ most common concern is the fear of losing the land they cultivate at any moment without advance warning or notice. Land is constitutionally a public good, and it can be taken away by the state or the municipality for residential or other urban uses (AbdouMaliq, 1994).

### **Genotype related constraints and reproductive wastage**

In Ethiopia, indigenous cattle breeds are the dominant source of milk and milk products. The number of crossbred cows is very low and is mainly concentrated in and around major urban and peri-urban centers. Indigenous cattle breeds are generally characterized as multi-purpose animals and managed in low input production system. These animals have been naturally selected for adaptive and not for functional traits, and they are inherently low milk producers. There is no controlled breeding method. For example, the indigenous Fogera cattle breed, a good dual purpose breed, is being indiscriminately crossed with other zebu cattle breeds. Similarly, dairy producers in most PLWs breed their cows with any available bulls in the herd. There is also shortage of crossbred dairy animals in urban and peri-urban areas where the demand for milk and milk products is high. There is no breeding policy in place in the country to curb genotype related problems and thereby make genetic resource utilization sustainable. Delayed age at first calving, low calving rate and long calving interval in improved dairy genotypes have been reported as important problems in the urban and peri-urban dairy systems. With regard to breed

type, out of the total 27.1 million cows about 99.2 % are indigenous breeds and the remaining are cross and exotic breeds that accounted for about 0.61 % and 0.11% respectively. Less than 1 percent of cattle are exotic or cross-bred. 128,745 grade cattle and pure dairy cattle. Of this amount 32,204 are with small holders. The improved breeds are distributed only in Tigray, Amhara, Oromia and SNNP regions. With regard to regional distribution improved breeds are distributed only in the four big regions of the country. Accordingly Oromia constitutes the largest share of improved breeds of cows followed by Amhara and SNNPRRS having 135.6, 38.5 and 37 thousand cows respectively. The small numbers of improved breed in the country is an indication of the low level of the usage of modern technological packages like artificial insemination and bull services. Change in milk production in herd size explains 60% of the increase, but only 20% from technology change. This is why there needs to be increased numbers of cross-bred cows (Ethiopia dairy chain, 2010).

### **Poor access to inputs and services**

According to Adebabay2009 examined access to inputs and services includes extension, animal health, credit, market information, AI and dairy inputs. However, service delivery in the studied areas is not as effective and not up to the satisfaction of dairy farmers because the services rendered are very limited, untimely and irregular. The extension service has not satisfied the needs of farmers in terms of providing need-based service, hands on training and subject matter coverage tailored to different dairy production systems and market orientation. The livestock extension service is by far secondary to crop extension. Although most dairy farmers get information on dairy cattle management practices, it was not supported with practical skills and demonstrations due to absence of demonstration sites. In the urban and peri-urban dairy system of Shashemene–Dilla milkshed, some dairy producers receive dairy production extension services, but it was not supported with practical demonstration. In the rural lowland agro pastoral system of Mieso, most of the farmers reported that no regular visit was made by veterinarians. In the rural system of Fogera, farmers have limited awareness about improved dairy and forage production technologies. In fact most dairy producers started dairy farming without prior knowledge and skill in dairying as reported in the urban and peri-urban system.

Access to animal health service as well is low since the service is ill-equipped. In the rural lowland production system of Mieso and Metema, herdsmen often equip themselves with common drugs and other supplies that are required to treat their animals. In Mieso, due to limited veterinary service, almost all the households use traditional treatments, herbs, to treat sick animals. There is also a serious shortage of veterinary experts and limited access to veterinary service. Poor veterinary service has also been reported in urban and peri-urban system of Shashemene–Dilla milkshed. In Fogera, shortage of veterinary experts, shortage of drug particularly at a time when diseases are rampant, long distance to access veterinary service, lack of laboratory and skilled personnel were reported to be the major problems. Credit services offered to dairy production, in general, is by far minimal compared to crop production. In the rural highland system of Bure milk producers have little or no access to credit. In urban and peri-urban system of Shashemene–Dilla milkshed, only 12.5% of the dairy producers have access to credit. On the other hand, about 25% of butter and milk traders in the same milk shed have shortage of working capital and need credit to expand and improve their business. In fact there is also lack of awareness on importance of credit among dairy producers as demonstrated in the rural dairy system of Bure and the urban and peri-urban dairy system of Shashemene–Dilla milk shed (Adebabay, 2009 and Azage et al 2013).

In general, the credit system for dairy development is not well developed in all the PLWs. Although AI service is available in most urban areas of Shashemene–Dilla milkshed, it is less available for most peri-urban dairy producers in the same milkshed. Currently, AI service has been expanding to different parts of the country. However, the efficiency and effectiveness of AI service in general is quite low due to various constraints. For example, dairy producers in Fogera and Bure reported that pregnancy rate to AI is low and they prefer to breed their animals naturally using crossbred bulls. There is no record keeping tradition at AI centers and thus information on pregnancy rate, number of calves born to AI etc. is not available (Belete et al. 2010). Farmers in Bure are reluctant to use AI and they reported that AI yields in high incidence of male animals than females (Adebabay, 2009 and Azage et al 2013).

Urban farmers lack access to formal credit services. Due to the small-scale nature of their operations most require short-term finance which is not available to them through conventional lending institutions. The Ministry of Agriculture and other formal institutions have never

extended such services to urban farmers. This is because urban farmers are not considered real or full time farmers; they are simply seen as urban dwellers. They are thus forced to purchase inputs like seeds and fertilizers on the market at higher costs. Extension services are not extended to urban farmers for similar reasons (AbdouMaliq, 1994).

### **Diseases and parasites**

Diseases in dairy animals affect reproduction, milk production, milk quality and cause mortality and morbidity. In the rural lowland dairy production system of Mieso and Metema, disease and parasite were ranked as the major problem by most of the farmers (about 66–86%). Thus, mastitis followed by anthrax was reported to be the major diseases in Mieso, while babesiosis and FMD were the major diseases in Metema. Similarly, tick infestation was reported to be severe in the rural lowland dairy production system of Metema. However, information on the list of specific diseases was not available from other dairy production systems. The major diseases and parasites in the rural highland system of Fogera included trypanosomiasis, schistosomiasis, fascioliasis, gastro-intestinal tract parasites and lung worms. Similarly, the major disease in the highland dairy system of Bure included respiratory diseases, pasteurulosis, lumpy skin disease, anthrax, malignant fever, tuberculosis, black leg and trypanosomosis (Azage, Berhanu, Dirk, Berhanu and Yoseph, 2013).

### **Marketing related constraints**

The Ethiopian dairy production system was criticized to be too traditional by the Netherlands Development Organization in a study conducted on dairy investment opportunities in Ethiopia, and moreover the study has suggested that moving out from the traditional subsistence mentality and develop a more market-oriented approach is one of the radical changes to be taken (SNV, 2008). Improving market access to dairy products creates an opportunity for enhanced dairy production. However, marketing and access to market have been reported to be the major problems in IPMS PLWs. Thus, in the rural highland dairy system of Bure and Fogera, milk marketing is a common problem, being the highest for Fogera (66.7%) than Metema. Distance to markets, shortage of milk and seasonal fluctuation in milk supply have been reported to be the major determinant across all the production systems. Besides, lack of training in milk handling and marketing (24.9%), lack of access to market (21.2%), cultural taboo to sell milk (20.8%),

spoilage of milk (19%), and high transport cost have been identified to be the major reasons for weak market access (Azage, Berhanu, Dirk, Berhanu and Yoseph, 2013).

## **2.4 Opportunities of Urban Dairy Farming**

### **Livestock Genetic Resources and Production System**

Ethiopia is endowed with large and diverse dairy animal genetic resources, which are widely distributed across various agro-ecologies and climatic conditions prevalent in the country. The country with different breeds of cattle, indigenous animals have evolved over time through natural selection and adaptation to the existing diverse ecological conditions of their habitat (Dagris, 2007). Consequently, dairy production system in forms a continuum with postural form of production system dominating the lowland agro-ecological set up (livestock production is dominant to sustain the livelihood of society) to market-oriented urban and per-urban dairy production system that exists in mid to upper highlands (ILCA, 1993). There are indications that milk yield among the indigenous animals is improving that there are opportunities for improvement (Belete, A., 2006).

### **Accesses Services and Land Inputs**

Dairy development depends on reliable inputs and service such as artificial insemination, health service and improved forage seeds supply (Muriukia, H.G. And W. Thorpe, 2001.). Currently, the numbers of AI service centers has been increasing cover most urban and per-urban areas and some parts of rural highlands (Ibrahim, H. and E. Olaloku, 2000). This is the opportunities to improve the genetic potential of indigenous dairy animals in the areas where there is critical shortage of milk and milk products (Solomon-Bekure, DeLeeuco and Grahdin 2003). Cognizant of the fact that diseases and parasitic infestations are economically important to reduce production, several public veterinary clinics have been established across the different dairy production systems in the country, although its efficiency of operation is low (Kedija, H.H., 2008).

## **Demand for and consumption of milk**

Although, the contribution of cow milk is dominant, milk from camels and goats are also consumed in Ethiopia, especially in pastoral and agro-pastoral systems of production. In Ethiopia there is long standing and strong culture of consumption of dairy products. In addition to raw milk, milk products, such as butter, cottage cheese, fermented milk (yogurt) and whey are also commonly consumed (Yoseph, M., 1999).

## **Indigenous Knowledge**

The existence of diverse production system and agro-ecologies coupled with diverse flora of species rendered the country to have indigenous knowledge, specially the areas of livestock production and dairy processing. For instance, strong indigenous knowledge exists in the perseveration of milk in the agro-pastoral dairy system and milk products in the rural highland dairy system using various sources of herbs (Belete, A., 2006).

## **Income Generation and Employment Opportunities**

Dairy farming supports livelihoods of society under low input production systems, generate income and create employment opportunity under market-oriented production system. Dairy farms in urban, peri-urban and rural dairy production system demonstrated strong interest to expand dairying as one of the means of income generating activity (Payne, W.J.A. and J.Hodges, 1997).

## **Service Provider**

Currently, the number of public universities has reached 31 compared to 9 universities. Ten years ago and most of them have programs to train students in the area of animal science and animal health at under graduate level. Agricultural and technical, vocational education training (ATVET) colleges are producing quite a large number of development agents to work grass root levels to meet the demands of farmers (Tilahun, F., 1995).

## 2.5 Empirical Review

Zena (2011) examined opportunities and challenges of urban dairy farming Harar city. This research is aimed to analyze the urban dairy farming sector in Harar city which investigate constraints and opportunities through a cross sectional survey in which 100 urban dairy farmers were involved (N=100). The finding has shown that 46% of the dairy farms are established on the area ranging from 100m<sup>2</sup>-300m<sup>2</sup> situated in the backyards of the farmers residences. Merits granted from the current dairy farming sector in Harar city are sustainable market demand for dairy products, suitable climatic conditions contributing to less shock, availability of labor force, availability and intervention of agricultural academic institutions. Whereas the major limitations of the sector are found to be lack of sustainable source of feed and water, inadequacy of health care centers and professionals, lack of access to AI, poor attention and lack of intervention from the government officials and lack of access to credit.

Teferee (2003) did his research on small-scale urban dairy farming in selected areas of Addis Ababa. The aim of this research was to identify some of the major problems and constraints faced by the urban dairy farmers, and investigate and explain the character and role of urban agriculture with emphasis to small scale dairy farming. It also tries to see the types of assistance needed and suggests possible solutions to the problems. The major problems in managing the dairy farms include shortage and high cost of animal feed; diseases like mastitis, pneumonia, anthrax, tick related, foot and mouth; low production potential of indigenous cattle; lack of adequate space for dairying; lack of labor, credit and veterinary and extension services. Most of the producers have fear of eviction and do not know government's attitude towards urban dairy farming and its recognition, and most of them have never received assistance from the government. As the findings of the study reveal, the need to feed family as the major factor that motivated dairy farmers to start the activity and business at residence as the major consideration in site selection. Most of the dairy farmers initially purchased dairy cows to start operation using their own money and acquired information and skills to run activity mainly from relatives/friends.

Alemayehu, Gashahun and Mengie (2017) investigated Practices, Roles and Challenges of Urban Agriculture in South Western part of Ethiopia The case of Bedelle tow. The result of the study



also reveals that the major challenges of urban farming practices in the area includes; lack of access to credit, shortage of inputs, land granting system, lack of technical support from concerned bodies/less contact with agricultural sectors, planting of non edible trees, lack of enough space/land shortage for cultivation, disease, problem of market are the major challenges of farming practices in the area.

Tewelde, Tesfatsion and Kibrom (2015) investigated determinants for the attraction of urban dairy farm investment in Mekelle city, Ethiopia. The study was analyzed by using ordinal logistic regression model. Finding of the study revealed that age, year of experience, access to finance, health care service, training, distance, infrastructure and governmental policy were found to be statistically significant determinants of the urban dairy farm investment attraction.

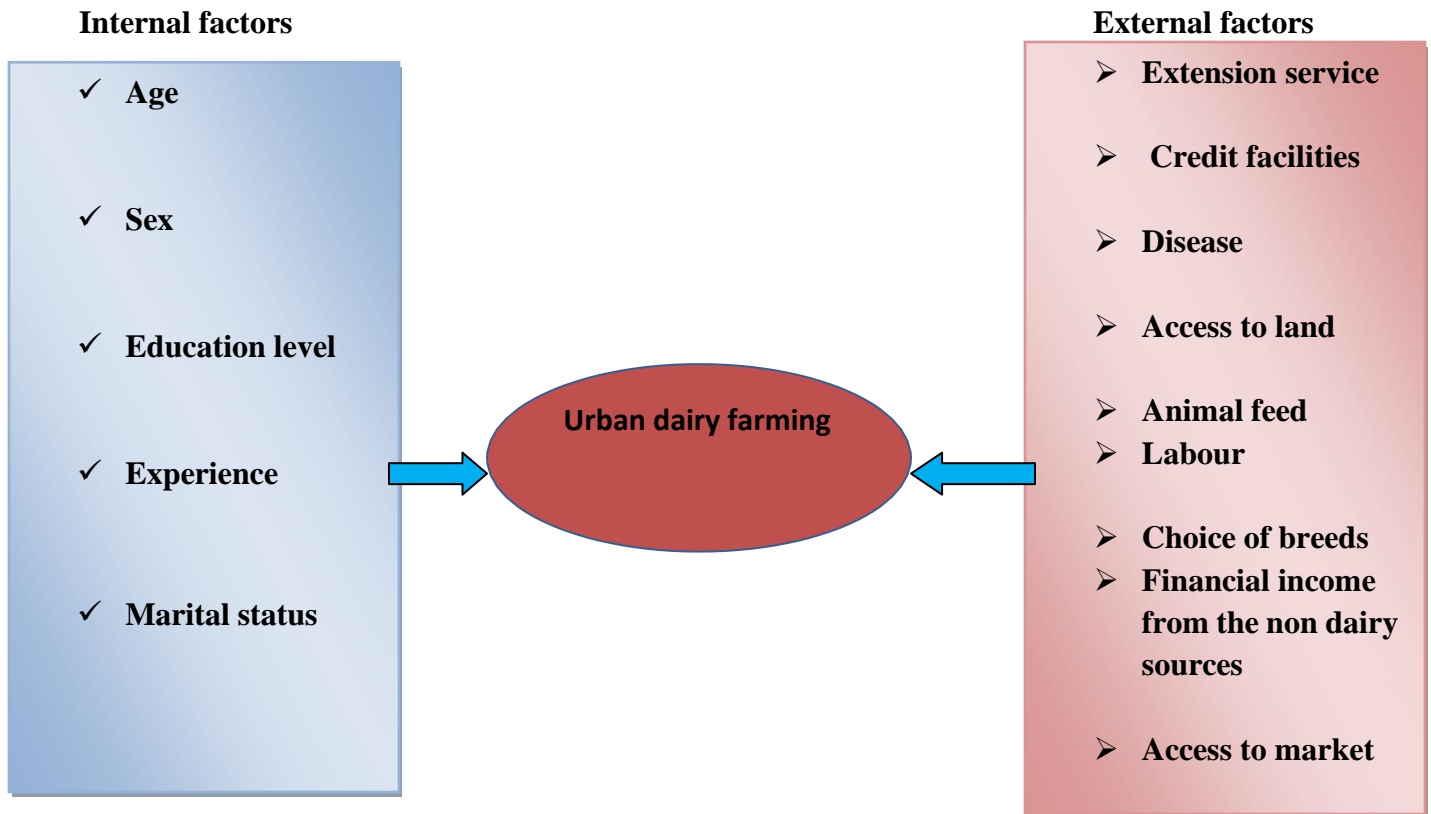
Tadesse and Mengistie (2016) examined Challenges, Opportunities and Prospects of Dairy Farming in Ethiopia: A Review. The aim of this seminar paper were to review; the challenges, opportunities and prospects of dairy farming in Ethiopia. The study revealed that the challenges can be technical like, health problems, reproductive problems, institutional like inadequate extension and training services, policy and socio-economic challenges like environmental problems and marketing linkage problems. In line with dairy farm development prospects, getting accesses to services and inputs that could help promote dairy production and productivity is high; as it promotes the motto of government policy in creating employment opportunities at house hold level. The provision of credit facilities and insurance for dairy farms should be encouraged and promoted.

Kamau and John (2014) investigated factors affecting the growth of small and micro enterprises dairy farmers in Kenya: Case of Gatundu South farmer's dairy cooperative society LTD. The study also used regression method to test the nature of influence of independent variables on a dependent variable. The findings of the study show that access to markets affected the growth of small and micro dairy farmers while access to finance affected highly the operations of the enterprises. There exists informal social networking among the small and micro farmers which affects the price and incomes hence the growth of the small and micro dairy farmers.

Bragg and T. J. Dalton (2004) examined Factors Affecting the Decision to Exit Dairy Farming: A Two-Stage Regression Analysis. A binary choice logit regression model, based upon the

dependent variable decision to exit or remain in the industry was used as part of a two-stage regression process to ascertain why dairy producers are choosing to leave the industry. Demographic, efficiency, and opportunity costs variables were revealed that significantly influence the exit decision.

## 2.6 Conceptual Frame Work



**Fig. 1: Conceptual frame work for determinants of urban dairy farm**

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

This chapter deals with methodology of the study, including the type of data collected, sampling method used and techniques adopted for data analysis as well as explanation of variables.

#### **3.1 Description of the Study Area**

Sebeta is a town and special district in oromia National Regional state. It is a town and separate woreda in central Ethiopia. Located in the oromia special zone surrounding finfinne of the oromia Region. It is located 24 km south- west of Addis Ababa. With regard to relative location, it shares common boundaries with Addis Ababa in North, North east and east, Burayu town in the north, and rural villages of Sebata Awas district to the south and west. Sebeta located between 8°55'N latitude and 38°37'E longitudes and it is established in the highland of Ethiopia with the altitude of 2,356 meters (7,730 feet) above sea level. Sebeta town is situated on a fertile area known for natural resources. The area is surrounded by different chain of hills and mountains like Wachacha, Hoche and seasonal marshy plains including Furi-Gara-Bello, Gejja Ballachis and Jammo (OUPI, 2008). The total area that is covered by the current topographic map of the town is estimated to be 7.41 sq Km (CSA, 2010).

The town has five Kebeles which includes Sebeta (01), Alemgena (02), Walete (03), Furi (04) and Dima (05). The population and housing census of CSA of 2010 estimated the total population of Sebata town to be 61,461. However, the report obtained from Sebata town Finance and Economic Development Office indicate that the total population of the town and rural village administrated under municipality is 114,674 (FEDO, 2011). The majority of the inhabitants said they practiced Ethiopian Orthodox Christianity, with 71.1% of the population reporting they observed this belief, while 16.87% of the populations were Muslim, and 11.18% were Protestant (CSA, 2010).

The Sebeta School for the Blind is located in Sebeta. It became part of the Haile Selassie I Foundation in 1959, and construction on a new building began on 4 October 1962. The Ethiopian Institute of Agricultural Research opened a research station in Sebeta in 1967, which operates as the national center for research into improving fishing yields (CSA, 2010)

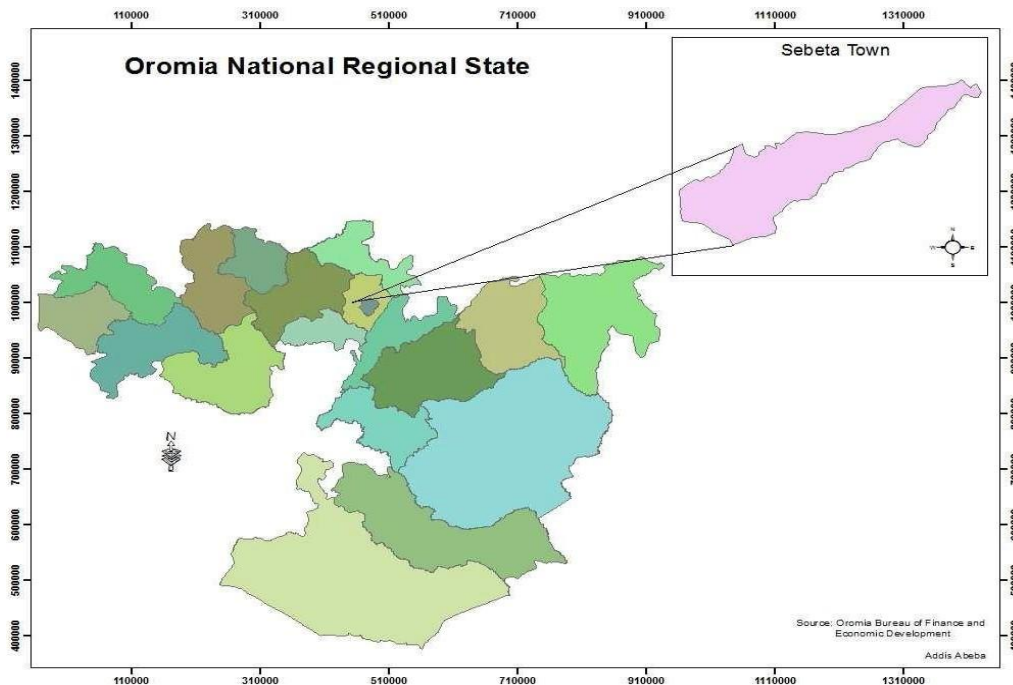
### 3.1.1 Climate and Soil Condition

**Table 1: Mean monthly rainfall data of Sebeta (1980-2013) [National Metrology Agency]**

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Mean Rainfall	165.3	167.1	216.0	238.3	226.5	272.3	375.0	413.7	234.0	134.4	120.1	113.0

According to the Ethiopian Metrology Agency the town has favorable climatic condition with an average annual temperature of 12.7°C and means annual rainfall of 120 - 450mm. Maximum rainfall is occurs in July and August (Table 1).

In nature, soil can exhibit a wide range of color: gray, black, white, reds, browns, yellow and under the right conditions green (Alemayehu and Mesfin, 1999). The nature of soil found in Sebeta town is different in color and type.



**Fig. 2: Map of the Study Area**

## **3.2 Research Design and Approach**

Research design is the blueprint for fulfilling research objectives and answering research questions. It ensures that the study would be relevant to the problem and that it uses economical procedures (John et al, 2007:20-84).

Quantitative research approach was adopted to identify the key factors that affect. Furthermore, descriptive research was used to describe the characteristics of the population and inferential statistics was employed to generalize the finding. Furthermore, causal/explanatory research design was adopted to identify the variables that affect urban dairy farming. The researcher used quantitative technique as the major method of analysis. Quantitative surveys were designed to fit a questionnaire schedule.

## **3.3 Target Population and Sampling**

### **3.3.1 Population**

Target population is a population which is planned to be studied. The target population of this research was small holder urban dairy farmers in the study area. The total population that has been considered in this study were 300 who are still engaged in the business and 102 who pulled out from the business.

### **3.3.2 Sample size and sampling techniques**

According to Solomon, (2011, cited in Gupta and Gupta, 2002) explained determination of sample size is an important decision that has to be taken while selecting appropriate sampling techniques. There are various factors that affect appropriate sample size determinations like the time aspect, the cost aspect, the degree of accuracy desired, etc. According to Solomon (2014, cited in Kothari, 1990) explained if sample is too small, it might be difficult to achieve the objectives of analysis. But if it is too large, it may result in resource wastage when dealing with the sample. Sample error will arise because of not studying the whole population. Whenever sampling, it is usual to miss some helpful information about the population.

According to Solomon (2014, Cited in Yemane, 1967) in order to make the study more accurate and viable, determination of appropriate number of sample size is important for the researcher. As a result, the researcher proposes (sample size determination formula as the best method of calculating sufficient amount of sample size for the study.

The research was applied multi-stage sampling techniques. Firstly the researchers selected Sebeta town by using purposive sampling techniques. Secondly, it was stratified dairy farmers in to two based on their current status: those who are still in the farming and those who stopped dairy farming. Thirdly, random sampling technique was employed and the required samples are drawn from each stratum. According to Yemane, the best formula for sample size determination in case of finite population that would implement survey methods is as follows

$$n = \frac{N}{1 + N(e)^2}$$

Where N=Population size,

e=expected error (level of precision) and

n= sample size

$$n = \frac{402}{1 + 402(0.05)^2} = 134$$

Yamane (1967:886) stated that if the exact level of precision is unknown, it is possible to take 0.05 as a value of precision. Hence,  $e = 0.05$

**Table 2: Sample taken from each groups**

<b>Groups</b>	<b>Total population</b>	<b>Sample taken from the population</b>
<b>Who are involving in the business</b>	<b>300</b>	<b>100</b>
<b>Who get out of the business</b>	<b>102</b>	<b>34</b>
<b>Total</b>	<b>402</b>	<b>134</b>

The sampling frame contains all small scale urban dairy farmers in Sebeta town who are involving in business and get out of business. Total sample size of 134 respondents was selected from both groups. List of sample respondents was identified in the group using probability proportional to size (PPS) random sampling techniques from the total population.

### **3.4 Data Type and Sources**

The study employed both primary and secondary data sources. As to the primary sources, data was collected from small scale dairy farmers with a focus on general information and demography, Education, socio-economic characteristics of households and other vital information related to the research objectives.

The primary data was collected from the household by structured questionnaire and observation. In support of the primary sources, secondary data was collected from books, journal, newspaper, and Sebeta town concerned government offices. Both quantitative and qualitative data were used to triangulate the methodology for further strengthen the research findings.

### **3.5 Data Collection Techniques**

For the purpose of this research study self- administered instruments was designed. Pre-testing of the questionnaire was conducted to get accurate and relevant information in advance from the participant of the research. The revised questionnaire was distributed to the sample respondents and relevant information was captured during the month of April.

### **3.6 Method of Data Analysis**

In this section, both descriptive and econometric data analysis methods were discussed; econometric model which used in this study was also discussed.

#### **3.6.1 Descriptive Data Analysis**

In descriptive method of data analysis, descriptive statistics such as frequency, percentage and cross tabulation was applied to perform data analysis tasks. Tools such as percentage and

frequency distribution are widely presented in tabular forms. Furthermore, the data were encoded, processed and analyzed using STATA version 13.

### **3.6.2 Econometric Analysis**

For this research study inferential statistics was employed to focus strictly on regression just to analyze which and how much the hypothesized regressors were related to the factors affecting small scale dairy farming in Sebeta town. To measure the relative importance of significant explanatory variables on small scale urban dairy farming in the study area: specifying the model is an important step in this research.

#### **3.6.2.1 Model Specification: Logistic Regression**

An analysis of a likelihood that a given characteristics threaten those households who engage and leave the business in small scale urban dairy farming is non-linear. Estimation of this type of relationship requires the use of qualitative response models. In this regard, the non-linear probability models, via logit and probit models are the possible alternatives. Probit and logit models are similar and yield essentially identical results and are commonly used in studies involving qualitative choices (Amemiya, 1973).

The choice between them therefore, revolves around practical concerns such as the availability and flexibility of computer programs, personal preference, experience and other facilities. The probit probability model is associated with the cumulative normal probability function whereas, the logit model assumes cumulative logistic probability distribution and for non-linear relationship between dependent and the explanatory variables. And Logit model is a powerful and easy to interpret statistical technique that allows researcher to explore the influence of multiple numeric and/or categorical variables on a binary outcome of interest. The normal and logistic CDFs are very close in the mid-range, but the logistic function has slightly fatter tails than the normal function. This binary outcome is most often thought of as whether an event occurs or not, but any outcome that represents the presence or absence of a characteristic, success or failure, in a group can be examined using binary logistic regression (Maddala, 1983).



Depending on the nature of the variables we can use different forms of logistic regressions: for example if the dependent variables with more than two categories it can be handled using multinomial logistic regression. While ordered outcome variables can be examined using various forms of ordinal logistic regression. Based on the above discussion, binary logistic regression (logit) will be preferred and specified with small scale urban dairy farming as a function of series of characteristics. The dependent variable was the function of internal and external related factors.

### **Logit Model**

The logit models become popular in 1974 after Daniel McFadden's derivation of the conditional logit analysis used on his theory of discrete choice, which was the subject of his Nobel Prize in Economics in the year 2000. Logit model are used to model a relationship between a dependent variable Y and one or more independent variables X. The dependent variable, Y, is a discrete variable that represents a choice, or category, from a set of mutually exclusive choices or categories. The independent variables are presumed to affect the choice or category or the choice maker, and represent a priori beliefs about the causal or associative elements important in the choice or classification process /[www.setscholars.org/](http://www.setscholars.org/).

According to Gebissa (2014, cited from [www.statisticssolutions.com](http://www.statisticssolutions.com)) explained linear regression uses the Ordinary Least Squares (OLS) approach but Binary logistic regression is estimated using Maximum Likelihood Estimation (MLE). MLE is an iterative procedure that it starts with a guess as to the best weight for each predictor variable (that is, each coefficient in the model) and then adjusts these coefficients repeatedly until there is no additional improvement in the ability to predict the value of the outcome variable (either 0 or 1) for each case. While OLS regression can be visualized as the process of finding the line which best fits the data, logistic regression is more similar to cross tabulation given that the outcome is categorical. Logistic regression does not make many of the key assumptions of linear regression and general linear models that are based on ordinary least squares algorithms – particularly regarding linearity normality, homoscedasticity, and measurement level.

## Estimation Techniques

According to Gebissa (2014, cited in Hosmer and Lemeshew, 1989) explained the advantage of logistic distribution in the analysis of dichotomous outcome. Therefore, the logistic function is selected for this study. The cumulative logistic probability is specified as follows:

$$\text{prob}(y = 1) = \frac{1}{1 + e^{-zt}} = \frac{1}{1 + e^{-(\alpha + \beta x_i + z)}}$$

Where: Y=1 if the respondents still working in the dairy farming and 0 when the respondent are out of the business; P= is the probability of identifying determinant factors of small scale urban dairy farming and  $\beta$  is a parameter ;  $X_i$  are various characteristics considered as independent variables. This is the method by which the outcome of certain event can be calculated by having a measure of odds against and odds in favor in a logarithmic based relation. If p is a probability then  $P/(1 - p)$  are the corresponding odds, and the logit of the probability is the logarithm of the odds. Once the logit model has been estimated, then transformed the logit in to a probability, first it is required to exponentiate the logit, then find the odds and convert the odds in to probability (i.e. Odds=  $P/(1 - P)$  Or  $P = \text{Odds}/(1 + \text{Odds})$ ); where: p= a probability of event

The unknown parameters ( $\beta$ s) are estimated by likelihood function. The statistics of primary interest in logistic regression are the  $\beta$  coefficients ( $\beta_1, \beta_2$ , and  $\beta_3$ ), their standard errors, and their p values. Like other statistics, the standard errors are used to calculate confidence intervals around the beta coefficients. The interpretation of the beta coefficients for different types of independent variables is as follows:

According to Gebissa, 2014 explained if  $X_j$  is a dichotomous variable with values of 1 or 0, then the  $\beta$  coefficient represents the log odds that an individual will have the event for a person with  $X_j=1$  versus a person with  $X_j=0$ . In a multivariate model, this  $\beta$  coefficient is the independent effect of variable  $X_j$  on  $Y_i$  after adjusting for all other covariates in the model. And also if  $X_j$  is a continuous variable, then the  $e^\beta$  represents the odds that an individual will have the event for a person with  $X_j=m+1$  versus an individual with  $X_j=m$ . In other words for every one unit increase in  $X_j$ , the odds of having the event  $Y_i$  changes by  $e^\beta$ , adjusting for all other covariates in a multivariate model. It is a non-continuous dependent variable that does not satisfy the key

assumptions in the linear regression analysis. To examine the factors affecting the dairy farming, discrete choice model should be used. Thus, the most widely used and appropriate qualitative response models are the logit and probit models (Verbeek, 2008).

### **3.7 Explanation of Variables and Working Hypothesis**

#### **3.7.1 Dependent Variables**

Urban dairy farming (y), it is a dependent variable for logit model since it has a dichotomous value representing determining factors for small scale urban dairy farming. The logit model estimates a value of 1 for those who are engaged in the farming and 0 for the respondent who are out of the business.

#### **3.7.2 Independent Variables**

After defining the dependent variables the next step was identifying and clearly explaining the independent variables that affect urban dairy farming in the study area. The explanation of those explanatory or independent variables (the Xs), which specified in the logit model each explanatory variable was explained based on research findings, literature review, authors and expert's assessment as indicated in section that follows:

##### **a. Age of the respondent**

As Tewelde, Tesfatsion and kibrom (2015, cited in Dehinet et al., 2014) explained as age of the respondent is believed to be positively related with urban of dairy farm. This is noted that with increase in age the respondent may acquire stability as well as a business experience. Relatively older farmers are assumed to be more experienced and risk avert due to social and personal characteristics, than younger dairy farmer. Therefore, it is believed that as the age increases it is least likely to fall in bankruptcy. Age is a continuous variable.

**X1: Age of dairy farmers has a positive effect on the dairy farming.**

**b. Sex of the respondent**

According to Sikawa & Mugisha, 2011 investigated it is expected to have positive impact on dairy farming. It is a dummy independent variable which assumes a value of 1 if the sample farmer is male and 0 otherwise.

**X2: Female dairy farmers have positive effect on urban dairy farming.**

**c. Education level of the respondent**

This could be a possible contributor to the difference in dairy productivity as learned people tend to be innovative and they may be in a better position to implement best practices in the industry while people who are not learned may not be capable to understand or implement the best practices without the strict assistance of experts or extension officers (Kamau, 2013). According to Tewelde, Tesfatsion and kibrom ( 2015, cited in Jaisridhar et al., 2013 ) explained when educational level increases from primary to secondary and tertiary level, this stems from the assumption that those who have attended more of formal education than who have not shall plan and evaluate their business well. It was found that more educated beneficiaries tend to use dairy farming for the intended purpose than less educated or non-educated farmers. Educational background as categorical variable and it is expected to have a positive effect on dairy farming.

**X3: Dairy farmers who have better education level will have a positive effect on the urban dairy farming.**

**d. Experience on dairy farming**

The emphasis of experience in any undertaking cannot be over-emphasized; in the dairy sector experience is especially important for improving of the breed and feeding. Any farming has its own challenge and the more the farmer has experience the more he/she is in a better position to overcome challenges and this gives out explanation (Kamau, 2013). Experience is a continuous variable and expected to have a positive effect on dairy farming.

**X5: Having better experience on dairy farming has a positive effect on the effectiveness of the business.**

**e. Marital status of the respondent**

According to Belay et.al, 2012 investigated that married farmers have greater influence than that of unmarried. It is categorical variables and expected to have a positive effect on dairy farming.

**X6: Marital status of the farmers has a positive effect on dairy farming.**

**f. Extension service**

According to Shambuddoha and Edwards, 2018 explained that extension service like training on dairy production and research has a significant effect on dairy farming.

**X7: having access to extension service will have a positive effect on dairy farming**

**g. Credit facilities**

According to Dehinenet et al., 2014 investigated the importance of establishing credit facilities is crucial step to the countries dairy sector. It is also indicated as one of the significant factors that determine urban dairy farm.

**X8: If there is an access to credit service it will have a positive effect on dairy farming.**

**h. Access to land**

As Tewelde, et.al.(2015, cited in Dehinenet et al., 2014) examined land holding is found out as one of the major determinant factors in dairy farming in urban area.

**X9: if there is enough land holding size it will have a significant and positive effect on dairy farming.**

**i. Choice of breed**

The urban dairy farm owners are free to choose cattle breeds the one they think is best or canuse both options alternatively Zena, 2011. Breed choice has direct effect on the effectiveness of the business.

**X10: Cattle breed choice will have a positive effect on dairy farm business**

**j. Financial Income From non Dairy Sources**

As Belay et al., 2012 assessed the total annual income which earned from non-farm sources is reported to have a positive impact on urban dairy farming. It is expected to have a positive impact on dairy farming.

**X12: Financial income from non dairy farm sources will support dairy farm business so it will have positive sign.**

**k. Access to Market**

Market access to dairy product creates a managed opportunity for enhanced dairy production. However, it is the major challenges for urban dairy farming (Gebremedhin, et.al. 2007). It is expected to have a positive sign.

**X14: If the dairy market is increasing, then it will have a positive effect on the urban dairy farming.**

**l. Animal Feed**

According to Kamau, (2013) most of the urban dairy farmers claim that the animal feed and nutritious diet for the cattle has become a determinant to run the dairy farms. It is expected to have positive sign.

**X11: if there is available animal feed it will have a positive effect on dairy farming.**

**m. Disease**

According to Getachew et al., (2012) Animal and lack of aggressive livestock disease control are a major determinant for health and dairy farming business. These variables are found to have significant impact on dairy farm.

**X13: if there is disease infestation it will affect dairy farming negatively.**

**a. Labour**

As Melesse et al., 2012 investigated labour indicated the number of persons involved in a business. It is assumed that if the family size is small in number, the flow of work sharing will be more across the members. Hence, the problems will arise when the family size would be less so they will be enforced to hire labour force for dairy farm. It will be expected to have a positive sign.

**X4: having more family size has a positive effect on the urban dairy farming**

## CHAPTER FOUR

### RESULT AND DISCUSSION

Under this Chapter the results from the descriptive and econometric analyses was clearly discussed. The descriptive analysis used a tool such as percentage and frequency distribution. Econometric analysis was carried out to examine the major factors that affect urban dairyfarming. In order to answer the specific objectives the researchers distributed 134 questionnaires but 120 questionnaires were returned.

#### 4.1 Descriptive Result

##### 4.1.1 Demographic characteristics of the respondent

**Table 4.1: Sex of the respondent**

			Urban dairy farm		Total
			Still on farming	stop farming	
Sex	Male	Frequency	62	22	84
		%	73.8%	26.19%	100.0%
	Female	Frequency	28	8	36
		%	77.77%	22.2%	100.0%
Total		Frequency	90	30	120
		%	75.0%	25.0%	100.0%

**Source:** own survey 2018

According to the above table majority of the respondents who still engage in the business were male 62 (73.8%) and the remaining 28 (77.7%) were female. From another category those who has stopped the business 22 (26.19%) were male and the rest 8 (22.2%) were female. Moreover, the analyzed information in the Table shows that, there are more males than females in the target population who engaged in urban dairy farming.



**Table 4.2: Marital Status of the respondent**

		Urban dairy farm		Total
		Still on farming	stop farming	
<b>Single</b>	Frequency	25	18	43
	%	58.13%	41.86%	100.0%
<b>Married</b>	Frequency	65	10	75
	%	86.66%	13.33%	100.0%
<b>Divorced</b>	Frequency	0	2	2
	%	0.0%	100.0%	100.0%
<b>Total</b>	Frequency	90	30	120
	%	75.0%	25.0%	100.0%

**Source:** own survey 2018

As it is shown from descriptive statistics table three marital categories were indicated. From the finding of the study the respondents who is still engaged in the business 25 (58.13%) were single and from another category who stop the farm 18 (41.86%) were single. From those respondents who still engaged in the farming 65(86.66%) were married and from those who stopped the farming 10 (13.33%) were also married. As we can see from the research finding from the first group who engaged in the farming no one is divorced and the other category that has stopped the business 2 (100%) were divorced.

**Table 4.3: Age of the respondent**

		Urban dairy farming		Total
		Still on farming	Stop farming	
<b>&lt;20 years</b>	Frequency	0	0	0
	%	100.0%	0.0%	100.0%
<b>21-30 years</b>	Frequency	20	5	25
	%	80%	20%	100.0%
<b>31-40 years</b>	Frequency	31	10	41
	%	75.609%	24.39%	100.0%
<b>41-50 years</b>	Frequency	39	15	54
	%	72.3%	27.7%	100.0%
<b>Total</b>	Frequency	90	30	120
	%	75.0%	25.0%	100.0%

**Source:** own survey 2018

The age of the respondent is one of the major demographic characteristics to discuss urban dairy farming activity in the study area. According to the table discussed above the age of the dairy farmers in Sebeta town those who still engaged in urban dairy farming and who has stopped the farming there were no respondent less than 20 years. The age category from 21-30 years who still engaged in the business was 20 (80.0%) and those who have stopped the business whose ages are in between 21-30 were 5 (20.0%). As we can see from the descriptive table those respondents 31 (75.6%) still engaged in the farming ranges from 31-40 years and those who stopped the business were 10 (24.39%). The remaining respondents 39 (72.3%) still engaged in the business whose ages fall in between 41-50 and the second group who has stopped the business were 15 (27.3%) ranges in between 41- 50 years.

**Table 4.4: HH size of the respondents**

		Urban dairy farming		Total
		Still on farming	stop farming	
<b>One</b>	Frequency	2	4	6
	%	33.33%	66.66%	100.0%
<b>Two</b>	Frequency	43	5	48
	%	89.58%	10.41%	100.0%
<b>Three</b>	Frequency	12	8	20
	%	60%	40.0%	100.0%
<b>Four and above</b>	Frequency	33	13	46
	%	71.739%	28.26%	100.0%
<b>Total</b>	Frequency	90	30	120
	%	75.0%	25.0%	100.0%

**Source:** own survey 2018

According to the table discussed below it describes number of persons living together in one house in both two groups. As it shown in the table the respondents who still engaged in the business 2 (33.33%) have one family members and those respondents who has stopped the business 4 (66.6%) have also one family sizes. From the descriptive results majority of respondents who have still engaged in the business 43 (89.58%) have two family members and the other groups who has stopped the business 5 (10.41%) have also two family members. The

respondents those who engaged in the business 12 (60.0%) have three members of families and the other group who has stopped the business 8 (40.0%) also have three family sizes. Finally majority of respondents who have four and above family sizes from the first groups were 33 (71.739%) and those who has stopped the farming 13 (28.26%) have four and family members.

**Table 4.5: Education background of the respondent**

		Urban dairy farming		Total
		Still on farming	Stop farming	
<b>Illiterate</b>	Frequency	15	13	28
	%	53.57%	46.42%	100.00%
<b>Elementary (1-8)</b>	Frequency	21	2	23
	%	91.30%	8.7 %	100.00%
<b>Secondary school(9-10)</b>	Frequency	18	14	32
	%	56.25%	43.75%	100.00%
<b>Preparatory school(11-12)</b>	Frequency	27	1	28
	%	96.42%	3.57%	100.00%
<b>Diploma and above</b>	Frequency	9	0	8
	%	100.00%	0.00%	100.00%
<b>Total</b>	Frequency	90	30	120
	%	75.00%	25.00%	100.00%

**Source:** own survey 2018

From the descriptive results educational status of respondents in Sebeta town is indicated in Table 4.6. As we can see from the above table respondents who still engaged in the farming 15 (53.57%) illiterate (unable to read and write) and the other groups who has stopped the farming 13 (46.42%) are also illiterate ( can't read and write). When we see the second row the first group who are still engaged in the farming 21 (91.30%) learned up to elementary school and the second groups who have stopped the farming 2 (8.70%) also learned up to elementary schools. According to the table discussed above majority of the first groups 27 (96.42%) were learned up to preparatory school and the second groups who has stopped the farming 1 (3.57%) were

Preparatory complete. The last category shows us the first group (who still engaged in the farming) 9 (100.0%) were learned up to diploma and above.

## 4.2 Breed Types that has been Used in the Study Areas

**Table 4.6: Types of breeds**

		Urban dairy farming		Total
		Still on farming	Stop farming	
<b>Local breed</b>	Frequency	51	25	76
	%	67.10%	32.89%	100.0%
<b>Cross breed</b>	Frequency	6	3	9
	%	66.66%	33.44%	100.0%
<b>Exotic pure</b>	Frequency	33	2	35
	%	94.3%	5.7%	100.0%
<b>Total</b>	Frequency	90	30	120
	%	100 %	25.0%	100.0%

**Source:** own survey 2018

According to the numerical outputs shown in Table 4.7 majority of the urban dairy farmers those who still in the farming 51 (67.10%) has been using local breeds for daily milk production and the second groups (who has stopped the business) 25(32.89%) has been used local breed. It was clearly indicated that majority of the respondents from both groups are using local breeds for their urban dairy farm. As we can see clearly from the table the first group (who still engaged in the business) 6 (66.7%) were used cross breed for their milk production and the other group (who has stopped the business) were used cross breeds. The last category shown us the first group who still engaged in the business 33 (94.3%) were used exotic breeds for their production and the remaining group who has stopped the farming 2 (5.7%) were used exotic breeds for their dairy farm. According to Kinsey 1993 investigated an important aspect that needs to be considered by way of undertaking a sustainable and profitable dairying enterprise is the careful selection of breeding stock. When one chooses a breed, it is advisable to choose a breed according to one's preference, ability to feed and manage and availability of stock.

### 4.3 Challenges and Opportunities of Urban Dairy Farming in the Study Areas

Under these sub topics the study tries to discuss challenges that affect urban dairy farming in the study area by using descriptive statistics.

#### 4.3.1 Challenges of Urban Dairy Farming in Sebeta town

**Table 4.7: Challenges of urban dairy farming**

		Urban dairy farming		Total
		Still on farming	stop farming	
<b>Lack of capital</b>	Frequency	16	17	33
	%	48.48%	51.52%	100.0%
<b>Water shortage</b>	Frequency	21	2	23
	%	91.3%	8.7%	100.0%
<b>Urbanization</b>	Frequency	18	10	28
	%	64.28%	35.71%	100.0%
<b>Market price problem</b>	Frequency	27	1	28
	%	96.4%	3.6%	100.0%
<b>Limited access and high cost of dairy heifers / cows</b>	Frequency	8	0	8
	%	100.0%	0.0%	100.0%
<b>Total</b>	Frequency	90	30	120
	%	75.0%	25.0%	100.0%

**Source:** own survey (2018)

As we can see from the cross tabulation results challenges of urban dairy farming in Sebeta town was clearly discussed. From the table discussed above the first group (who are still engaged in the farming) 16 (48.48%) were responded that lack of capital as a challenge for their dairy farm. The other group (who has stopped the farming) (15.5%) also mentioned that lack of capital were as constraints that leads them to get off the business. From the cross tabulation table the first group (still engaged in the farming) 21 (91.3%) water shortage were mentioned as a major challenges that affect their farms and the other groups (who has stopped the farming) 2 (8.7%) were also mentioned water shortage as a determining factors that affect dairy farm. The first group (still engaged in the farming) 18 (64.28%) were mentioned urbanization as a challenging factors that affect their dairy farm business in different ways. Due to expansion of urbanization different farms are forced to perform their business in limited areas. The other groups (who has

stopped the farming) 10 (35.71) were also mentioned that urbanization had an impact on urban dairy farming. According to the data which was collected from the respondents the first group 27 (96.4%) were mentioned that market price problems as a challenge which affects their dairy farm in the study area. The other group who has stopped the farming 1 (3.6%) was also mentioned that price for their products are discouraging and even it couldn't cover their cost of productions. As we can clearly see from the descriptive table the first group who has still engaged in farming 8 (100%) mentioned that limited access and high cost of dairy heifers/ cows were the major challenges that affect their productions.

Different studies were also supports the finding of this researches. According to dereje, (2013) the majority of the respondent's ranked feed shortage as 1st most challenging problem responsible for low milk yield and low productivity of dairy cows in urban (20.6%) and peri- urban (20.8%) production systems. The second serious problem in the area was milk market problem, there was no problem of bulk collector, but price related to milk market problem was the serious one. Among the interviewed respondents, 19.2% and 18.51% of the urban and peri- urban indicated that there was no milk price increment as the feed price was continuously increasing consequently they spent high cost for milk production on feeds and feeding. It means that there was no adjustment of milk price with the seasonal increment of feed cost.

According to Sintayehu, (2008) indicated the availability and costs of feeds were a limiting factor to dairy production. Though there might be availability of crop residues and access for grazing lands in peri-urban farms than the urban farms, the majority of respondents in both cases complained about the high cost of feed. The second serious problem in the area was milk market problem, there was no problem of bulk collector, but price related to milk market problem was the serious one.

#### **4.3.2 Opportunity of Dairy Farming in Sebeta Town**

The climate of Sebeta town is woinadega which is suitable for the urban dairy farming and no threats of natural disaster have been observed. The concept of urban agriculture have given due attention in federal and regional governments. Those actors who engaged in the sectors has global acceptance. Urban dairy farming helps the poor person who lives in the city or town as alternative sources of income and reduces the urban employment in the study area. In the study area there is a surplus demand for milk and other dairy products, as a result the sector needs a

many more new actors to satisfy the demand. Furthermore, the existence of various Academic institutions who involved in dairy development in different parts of the country is an opportunity to bring a solution for challenges that constrain urban dairy farm and for low adoption of agricultural technologies in the country. Such kinds of institutions can be a source of innovations and training services for urban farmers. The byproducts of dairy farms used as a source of energy or income if it is used through relevant innovations like bio gas. The existence of indigenous knowledge of the urban farmers is also an input for further investigations in the sector and it also helps to maximize their own dairy productions

#### **4.4 Results of Binary Logistic Regression Analysis**

Before the study discuss about binary logistic regression analysis, it is mandatory to see the performances of the model in terms of test of multicollinearity and also it is important to test whether the model is fit or not.

##### **Test of Multicollinearity**

According to Gujarati, (2003) explained the data were subjected to the analysis of tolerance and variance inflation factor (VIF) following to examine if the presence of multicollinearity inflates the variance of an estimator. The results of the test indicate the highest VIF is 2.066 or tolerance, 0.905; which indicates the model performed with no high degree of correlation problem among the explanatory variables (table 4.9).

##### **4.4.1 Estimation Results**

This section discusses and presents the characteristics that influence or correlate to small scale urban dairy farming using binary logistic regression model (logit model). The likelihood that a given characteristics threaten the urban dairy farming was analyzed. The unknown parameters ( $\beta$ s) are estimated by likelihood function. Results or outputs of econometric analysis and discussion based on the logit model are presented in the following section. The logit regression model was analyzed by using the maximum likelihood estimation method. The measure of goodness-of-fit used in the binary choice model is the pseudo  $R^2$ . According to fikir, (2011) pseudo  $R^2$  is a measure that has the same kind of interpretation as the  $R^2$  in the linear model; and so at least lies in the [0, 1] interval. Usually not very high value in range (0.1 - 0.5) is normal in binary models.

**Table 4.8: Binary logistic regression Stata output**

<b>Logistic regression</b>		<b>Number of obs =120</b>	
		<b>LR chi2(10) =98.62</b>	
		<b>Prob &gt; chi2 =0.000</b>	
<b>Log likelihood =</b>		<b>Pseudo R2 =0.387</b>	
<b>-4.419842</b>			
<b>Internal Factors</b>			
	Odds ratio	Std. Err.	P>z
<b>Sex</b>	.9564026	.3230728	0.829
<b>Age</b>	2.189358	.1259592	0.003***
<b>Marital status</b>	.3980271	.0272302	0.526
<b>education</b>	3.188417	.3318356	0.00***
<b>Experience</b>	1.964856	.4874648	0.048**
<b>External Factors</b>			
<b>Financial income from non dairy sector</b>	2.62182	.7802108	0.01**
<b>credit service</b>	6.589311	2.10501	0.048**
<b>Access to Extension service</b>	3.6874	1.814851	0.03**
<b>Access to Market</b>	2.67986	.9867878	0.78
<b>Breed choice</b>	.8054151	.452907	0.81
<b>Labour force</b>	.5206173	.3628308	0.65
<b>Feed availability</b>	7.367361	2.574583	0.00***
<b>Access to Land</b>	2.459387	.6747908	0.02***
<b>Disease</b>	15.84061	.8894174	0.039**
<b>_cons</b>	-.638033	4.196729	0.879

Source: own computation



According to Gujarati, 2004 indicated if the p-value of the group of independent variable is less than 5 percent, they would reliably predict the dependent variable, whereas if the p value is more than 5 percent, it would conclude that the groups of independent variables do not reliably predict the dependent variable. In the above table, the numbers of observations of this study were 120 urban dairy farmers. The other figure seen in the above table is p-value which is given as  $\text{prob} > 0.01$ . This value is used to describe the reliability of a group of independent variables in predicting the dependent variable.

When we see the p-value of the group of explanatory variables of this model is 0.0000 ( $\text{Prob} > \chi^2 = 0.0000$ ) which is less than 5 percent, from the model we can conclude that the explanatory variables can predict the dependent variable (small scale urban dairy farming). From the stata result independent variables sex, marital status, access to market, breed choice, labour force were found to be statistically insignificant in determining urban dairy farm.

#### **4.4.2 Discussion on the Significant Explanatory Variables**

A total of 13 explanatory variables were considered in the econometric model. Out of the 13 variables hypothesized to influence urban dairy farming 9 variables were found to be statistically significant at different significance level. Age, experience, level of education, financial income sources from non dairy sources, extension service, access to credit, land, feed availability and disease are among variables that are found to be statistically significant.

##### **Age of the respondents**

From the stata result age of the respondents found to be statistically significant at 99% confidence interval and found to have a positive correlation with small scale urban dairy farming. When the age of the respondent's increases dairy farmers more likely successful in their urban dairy farming. The odd ratio is 2.1893 and it implies other things kept constant, small scale urban dairy farmers decision to stay in the business increases by a factor of 2.1893 for one year increase of the farmers. Dairy farmers will develop an indigenous knowledge's to perform their farming in a productive ways. Since age is statistically significant at a ( $p > 0.01$ ), Based on the result the alternative hypothesis was accepted at 99% confidence interval. The finding of the study is similar with previous researchers Tewelde et al. (2015) Belay et al. (2012), Dehinet et

al. (2014), and Halak (2012) who found that older dairy farmers are highly experienced to the urban dairy farm than young dairy farmers.

### **Education level of the respondents**

From the research finding education level of the respondents was found to be statistically significant at 99% confidence interval and it has a positive correlation with small scale urban dairy farming. The odd ratio is 3.188417 and it interpreted as when urban dairy farmer's increases their education level by one class farmer's decision to stay in a business increase by a factor of 3.188417 other things remain constant. We can conclude that when the farmers level of education increases in a class dairy farmers more likely effective in their urban dairy farming. Those dairy farmers who educated will develop knowledge and skills how to perform their farming in productive and simplest way. The alternative hypothesis education level has a positive impact on urban dairy farming was accepted at 99 % confidence interval. The result is similar with the previous empirical evidences of Edwards (2008) found that level of education is the most determinant factor to the dairy farmers to improve their art of production in their business and, thus education is one factor for the urban dairy farm.

### **Experience of the respondents**

Experience of the respondents in urban dairy farm found to be statistically significant at 95% confidence level and found to have a positive correlation with small scale urban dairy farming. The Odds ratio is 1.96485 and it indicates when urban dairy farmers increase their experience in one year decision to stay in a business increase by a factor of 1.96485 other things kept constant. We can conclude that when the farmers experience in business increase by one year more likely they become effective and productive in their business. From the result we found that the alternative hypothesis was accepted at 95% confidence interval. This result is similar with the previous finding of Tewelde *et al.* (2015) and Belay *et al.* (2012) who found that dairy farmers with more working experience are effective to dairy farm.

### **Financial Income from non Dairy Sources**

The non dairy income sources of the urban dairy farmers found to be statistically significant at 95% confidence interval. From the result the Odd ratio is 2.62182 and it interpreted as When the

farmers a non dairy income sources increases by one birr urban dairy farmers decision to stay in a business increases by a factor of 2.62182 other things remains constant. The result indicated that when the urban dairy farmers got an additional non dairy income sources they can cover their cost of productions and will help the farm to stay in different challenges. From the result the alternative hypothesis was accepted at 95% confidence interval. The result the researchers found in this research is consistent with Belay et al., (2012) was found that the income which earned from non-farm sources is reported to have a significant impact on urban dairy farming.

### **Access to credit**

Access to credit service for dairy farm was found to be statistically significant at 95% confidence interval. The odd ratio is 6.589311 which implies When access to credit service increases by a unit or birr urban dairy farmers decision to stay in a business increases by a factor of 6.589311 other things remain constant. The main reason to become successful is those who got the access can obtain more capital to perform the dairy farming. From the result the researchers found the alternative hypothesis was accepted at 95% confidence interval. This finding is similar with previous empirical studies like Dehinet et al. (2014), and Tewelde et al. (2015) found that credit service is the determining factors for urban dairy farming.

### **Extension Service**

Extension service that has been provided to urban dairy farmers found to be statistically significant at 95% confidence interval. The odd ratio is 3.6874 and it implies that urban dairy farmer's decision to stay in a business increases by a factor of 3.6874 for a unit increase in access to extension service per month. The result indicated that got different extension services more likely effective and improve their ways of production. From the result the alternative hypothesis was accepted at 95% confidence interval. The finding of this research is similar with empirical studies like Getachew et al. (2012) and Tewelde et al. (2015) who have reported that extension service for the dairy farm will support and help the farmers to become productive and stay in business.

## **Feed Availability**

Feed source availability was found to be statistically significant at 99% confidence interval. The odd ratio is 7.367361 and it implies urban dairy farmer's decision to stay in a business increase by the factor of 7.367361 for unit increase in access to feed. The result indicated that has got access to adequate animal feed sources increased their daily milk production. From the result the alternative hypothesis was accepted. Finding of the research is similar with empirical studies Kamau, 2013 investigated most of the urban dairy farmers claim that the animal feed and nutritious diet for the cattle has become a determinant to run the dairy farms.

## **Land**

Access to Land for operating urban dairy farming was found to be statistically significant at 99 % confidence interval. From the result the study found when land size increased by one hectare as a result urban dairy farming more likely sustainable and stay in a business. The odd ratio is 2.459387 and it interpreted as urban dairy farmer's decision to stay in a business increases by a factor of 2.459387 for hectare increases of land holding size, *citrus paribus*. Who has got adequate land for dairy farming will have a positive impact on maximizing their products and numbers of cattle's. Due to urban expansion and urban plan farmers are forced to leave their business areas. Based on the result the researchers found the alternative hypothesis was accepted at 99% confidence interval.

## **Disease**

Disease of dairy cattle's was found to be statistically significant at 95% confidence interval. From the result the researchers found when disease infestation increases by one unit as a result urban dairy farming more likely affected negatively and production also declined. The odd ratio is 15.84061 and it implies urban dairy farming decision to stay in the business decreases by the factor of 15.84061 for unit increase in disease infestation. The result indicated that disease is a determining factor which affects dairy productions. Based on the finding of the study the alternative hypothesis was accepted. The research finding was similar with Getachew et al., 2012 examined that livestock disease is a major determinant for health and dairy farming business.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Summary

Urban farming appeared as the prior solution for the situation. Producing food in urban areas will support the rural production of food which is increasingly depleting. Rural migrants are outnumbering the urban poor. Farming in urban area can be the coping strategy for such migrants and the urban poor. Properly handled and managed urban agriculture could support the urban community beyond the consumption of producers. Irrespective of the work of different concerned bodies in the sector Ethiopia, urban dairy farming is still a traditional practice and mostly undertaken informally. Based on the problem discussed above this study was conducted to identify the major determining factors of urban dairy farming in Sebeta town.

The analysis of secondary data in chapter two clearly indicated that factors affecting small scale urban dairy farming. The aim of using primary data was to identify the most determining factors of urban dairy farming in Sebeta town, which was based on internal and external factors.

In order to identify the determining factors that affect small scale urban dairy farming the study employed both descriptive statistics and binary logistic regression model. Some variables (demographic characteristics of the respondents and challenges of urban dairy farming) were analyzed by using descriptive statistics and 13 explanatory variables used to identify the cause and effect relationship with dependent variables were discussed by using econometrics' model. Out of 13 explanatory variables which affect urban dairy farming 9 variables were found to be statistically significant at different levels of interval. To mention some variables like age, education level, experience, access to credit, extension service, financial income from non dairy sources, feed availability land and disease were found to be statistically significant.

## **5.2 Conclusion**

In order to solve the problems of small scale urban dairy farming that force them to leave the business there is a need to know a determining that affect urban dairy farming in different ways. In effect, the likelihood that a given hypothesized variables threaten small scale urban dairy farming was analyzed. In order to test the hypothesis, binary logistic regression was specified and applied with small scale urban dairy farming as a function of series of characteristics. In this case the dependent variable is the function of internal factors (sex, age, marital status, education level, experience) and external factors (access to credit, extension service, financial income from non dairy sources, access to market, feed availability, land and disease).

From the finding of the study the researchers conclude that in order to meet the demand for milk the following challenges like expanding their dairy farm and credit availability and accessibility is hindering them too much because the land management policy and the credit access is extremely complicated and the sector has not been given proper opportunity to be expanded immensely.

### 5.3 Recommendations

There is no comprehensive study that has been conducted in Sebeta town on determinant factors of small scale urban dairy farming. The main objective of this paper is, therefore, to identify whether or not the decision variables have relationships and significant impact on urban dairy farming. The study highlights the problems such as urban expansion, market price problems. Lack of capital, water shortage and high price of exotic breeds. The following recommendations are forwarded in order to address the inhibiting factors thereby to make the urban dairy farming effective.

- Veterinary service centers are not solving the need of small scale urban dairy farms in the study area due to in adequate numbers of professionals and the work load they are accommodating. Therefore, new veterinary service centers must be established to proportionate the demand and supply and reduce the workload of the professionalsthereby increase their professional efficiency.
- The city municipality of the study area needs to develop a multilateral urban planning Strategy which is equitable to all the sectors contributing for the livelihood of the society and appraises their activities thereby alleviates institutional limitations.
- Dairy farmers should apply the money from finance institutions only for expansion and development of their urban dairy farm business.
- Oromia credit and saving association and other institution should work with micro and small scale development office and city municipality in providing financial supports to the needy peoples.
- Agricultural Input dissemination system should be changed to increase the input availability and accessibility especially in feed and fodder supply.
- The regional government needs to promote the establishments of milk processing factors to create a sustainable market chain to their products.

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## Appendix 1

### multicollinearity test result

	Co linearity Statistics	
	Tolerance	VIF
<b>(Constant)</b>	33.058	
<b>Sex</b>	.744	1.345
<b>Age</b>	.785	1.275
<b>marital</b>	.661	1.514
<b>education</b>	.566	1.767
<b>Nonfarm income</b>	.484	2.066
<b>Experience</b>	.830	1.205
<b>Access to credit</b>	.905	1.105
<b>Extension service</b>	.771	1.298
<b>Market</b>	.942	1.062
<b>breed choice</b>	.806	1.240
<b>Labor</b>	.781	1.280
<b>Access to Land</b>	.854	1.171
<b>Disease</b>	.876	1.142

Source: own computation



**PART 2: External factors that determine urban dairy farming**

**Direction:** Please encircle the alternative that is most applicable to you in respect of each of the following items.

1. What is your current status on dairy farming?  
[] Am still on dairy farming                      [] I have stopped
2. Do you involve in different non-farm/off-farm activities to support your household income?  
A. Yes                      B. No
3. If your answer for question #2 is “yes”, what is the type of activity that you involves?  
A. Own trading      B. Employing on Government/ private organization  
C. Other \_\_\_\_\_
4. Have you ever used credit service in relation to your dairy farming activity?  
A. Yes                      B. No
5. If your answer for question number 4 is „YES“ where did you get the access to credit?  
\_\_\_\_\_
6. Do you have access to extension services?      A. Yes                      B. No
7. If your answer is “yes” what kinds of extension service are getting from concerned bodies?  
A. Training and capacity building                      B. Veterinary service  
C. Artificial insemination                      D. \_\_\_\_\_
8. Do you have sustainable market for your products?  
A. Yes                      B. No
9. If your answer is “Yes” how is the price of milk in the market?  
A. Encouraging                      B. Can cover the cost of production  
C. Discouraging                      D. \_\_\_\_\_
10. What types of dairy cattle breed are you use for your business?  
A. Local breed                      B. pure exotic breed  
C. cross breed
11. Do you think that choice of breed will have an impact on dairy farm?  
A. Yes                      B. No
12. If you say Yes for the above question how choice of breed affect dairy farm?  
\_\_\_\_\_

