COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

CONTRIBUTIONS OF URBAN AGRICULTURE TO HOUSEHOLD LIVELIHOOD AND ENVIRONMENTAL IMPROVEMENT AS WELL AS THE PREVAILING CHALLENGES: THE CASE OF BURAYU TOWN, OROMIA SPECIAL ZONE,ETHIOPIA.

BY
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NOVEMBER, 2021

ADDIS ABABA, ETHIOPIA

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THESIS SUBMITTED TO THE COLLEGE OF DEVELOPMENT STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ART IN ENVIRONMENT AND DEVELOPMENT STUDIES

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Declaration

First and foremost, I declare that this thesis is my original work and that all sources of information used in its creation have been properly acknowledged. This thesis was submitted to Addis Ababa University in partial fulfillment of the requirements for the Master of Arts degree, and it has been deposited in the University Library to be made available to borrowers under the library's rules and regulations. I declare that I have not submitted this thesis to any other institution to receive an academic degree, diploma, or certificate in any other country. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis, and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every serious effort has been made to avoid any plagiarism in the preparation of this thesis.

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This thesis has been submitted with my approval as a University advisor.

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As Thesis advisor, we hereby certify that I have read and evaluated the thesis prepared by **Ashenafi Guta Tola** under my guidance, which is titled **"Contributions of Urban Agriculture to Household Livelihood and Environmental Improvement as well as the prevailing challenges: The Case of Burayu town, Oromia Special Zone, Ethiopia".** I recommend that the thesis be submitted as it fulfills the requirements for the degree of Master of Art in Environment and Developmental Studies.

Professor Degefa Tolossa _____ _____

Advisor Signature Date

As members of the Examining Board of this Master of Art thesis open defense, we certify that we have read and evaluated the thesis prepared by Ashenafi Guta Tola under my guidance, which is titled **"**Contribution of Urban Agriculture to Household Livelihood and Environmental Improvement: as well as prevailing challenges: the Case of Burayu town, Oromia Special Zone, Ethiopia". We recommended that it is acceptable as a thesis required for the Degree of Master of Art in Environment and Developmental Studies.

Signed by the examining committee

_____ _____ _____

Internal examiner Signature Date

_____ _____ _____

External examiner Signature Date

Final approval and acceptance of this thesis are contingent upon the candidate's submission of the final copy of the thesis, incorporating all the comments made by the Examining Board, to the Council of Graduate Studies (CGS) through the Center Academic Committee (CAC).

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Acronyms

AIDS	Acquired Immunodeficiency Syndrome
BTCO	Burayu Town Communication Office
CBO	Community Based Organization
CLO	Community Labor Organization
CSA	Central Statistical Agency
DA	Development Agent
FAO	Food and Agricultural Organization
FGD	Focus Group Discussion
GN	Global North
GS	Global South
GTP	Growth and Transformation Plan
HIV	Human Immunodeficiency Virus
IFPRI	International Food Policy Research Institute
KES	Kenyan Shilling
MoFED	Ministry of Finance and Economic Development
OBCA	Oromia Bureau of City Administration
SDGs	Sustainable Development Goals
SPSS	Statistical Packages for Social Sciences
UA	Urban Agriculture
UNDP	Unite Nations Development Program
UPA	Urban Per- urban Agriculture
USA	United States of America
USD	Unite States Dollar
WHO	World Health Organization

Abstract

This study aims to assess the contributions of urban agriculture to household livelihood improvement and to access the perceptions of urban farmers about the benefits of urban agriculture to environmental improvement in the Burayu town administration. The research relies on a mixed approach, making use of both quantitative and qualitative methods. Systematic random sampling method was employed to select households from local producers and practicing and benefiting from urban agriculture in the town administration of Burayu and also systematic random sampling techniques were used to select the kebeles. From 1047 target population 289 sample urban farmers were selected using systematic random sampling techniques and studied by categorizing them into three groups Gafarsa Guje, Gafarsa Nono, and Gafarsa Burau. Descriptive Statistics and the parametric estimation logistic model were carried out to analyze the data by using a statistical package for social sciences (SPSS IBM version 20). The study results indicate that livestock rearing, crop production, and mixed farming are practiced in the town. The vast majority of the respondents (70.6%), were involved in urban agriculture for both commercial and personal consumption. About 221 (76.5%) practice milk production, while 141 (48.8%) practice poultry, among the main contribution of urban agriculture, generating household income, creating job opportunities, serving as a source of food, and ensuring the town's environmental improvement by reducing environmental pollution by waste recycling, reducing urban heat by plantation. Furthermore, the findings identify the factors/challenges that impede practicing urban agriculture, such as a lack of farmland, lack of credit services, poor market access, and availability of storage areas. Finally, the researcher suggests that government/town administration needs to encourage, strengthen, and support those activities by addressing the right policy and giving recognition to the role of urban agriculture in improving wellbeing in particular and its contribution to the country's GDPs in general.

Keywords: urban, agriculture, livelihood, farm, income

Chapter One - Introduction

1.1 Background of the Study

In recent years, urban agriculture has been a common counter-movement to reduce the environmental impacts of traditional agriculture, increase food security and strengthen social stability in urban areas (Gardiner *et al.*, 2014). Urban agriculture is commonly defined as a horticultural industry, animal husbandry and agricultural practices carried out in and around urban centers on small land plots (Enete *et al.*, 2008; Vagneron, 2007).

As Mekuria and Messay (2018) explain, urban agriculture can be found within or on the outskirts of a city. They also confirmed that it comprises a range of production systems, ranging from household subsistence production and processing to completely commercialized agriculture.

Urban agriculture can take place within towns or in peri-urban areas. Activities can take place on the farm or outside the home, private land, and public land; it is typically characterized by consumer or market proximity, high land competitiveness, limited capacity, and the use of strong urban organic waste and wastewater (Mekuria & Messay, 2018).

In other situations, urban agriculture can be the only source of household income and can play an important role in poverty alleviation (Graefe *et al.*, 2008; van Averbeke, 2007). For households that do not sell products, urban agriculture frees up money for other uses (van Averbeke, 2007; Enete & Achike, 2008; Nugent, 2002; Vagneron, 2007). This could extend the household budget to allow other valuable items to be purchased (van Averbeke, 2007; Nugent, 2002) or increase economic freedom for women with male-controlled household budgets (van Averbeke, 2007). Employment development is also highly variable by urban agriculture. Half of the urban farmers hire workers in some regions (Graefe *et al.*, 2008). In others, urban farmers are too poor or the job market too fragmented to provide more than uncommon or seasonal opportunities for employment (Nugent, 2002).

Due to this, in a globalized and urbanized world, the food supply chain spans long distances. The production site is decoupled from the place where products are sold, resulting in long distances of travel and a related environmental impact (Grewal *et al.,* 2011). Moreover, an increasing global population indicates a growing food demand, which puts more pressure on urban food, which places more pressure on urban food security (Sanyé Mengual, 2015).

A large number of literature (Messay *et al.*, 2017; Messay, 2010; Switch, 2007; Thomas, 2013; UNESCAP, 2012) indicate that the dedication of UA to food security and healthy eating for the urban poor is crucial as more people live in cities today than ever before. By shortening the distribution time and reducing transport costs, the metropolitan population has been able to buy perishable fruits and vegetables that supply essential micronutrients (Eric, 2012). Recent empirical data suggests that "the urban population has used different means as a coping mechanism due to high inflation, unemployment, and food insecurity". Urban agriculture has become one of the means to cope with the enormous increase in prices, lower wages, and food insecurity experienced in the country (Alem & Kohlin, 2013).

Some authors, however, disagree with the contribution of urban agriculture to improving urban livelihoods and demonstrate that activities are detrimental to public health and inadequate for the implementation of urban development policies. By comparison, some claim that urban agriculture will contribute to the well-being of people if properly designed and incorporated into urban design (Deelstra & Girardet, 1999). It can be used as an approach (Mpofu, 2013; Thomas P.Z, & van Veenhuizen, 2006) to counter rising urban unemployment, poverty, hunger, and other socio-economic benefits for urban poor people in general and vulnerable groups in particular.

As a result, addressing the problem of urban poverty in Ethiopia has become an important part of the country's development policy. The implementation of urban agriculture is one of those tools that many developing countries can use to tackle urban poverty. Like other Ethiopian towns, Burayu town is one of the fastest urbanizing towns in Ethiopia. This could be attributed to several factors, including food insecurity, rising urban unemployment, and environmental and other socio-economic factors. This is because, as the town is near the capital of Addis Ababa, migrants from the rural Ethiopia region can settle in the town. This can lead to inflation, food

insecurity, and environmental and ecological disruption, but many urban agricultural practices promote the livelihood of town dwellers while also creating a resilient environment. However, various researchers in the region have not examined the true impact of urban agriculture on the lives of urban poor people.

1.2 Statement of the problem

Urban agriculture can be a feasible activity and a source of income for several urban poor, but its contribution has been overestimated to enrich food sources from rural to urban areas (Maxwell, 1999; Mougeut, 2000). Planners tend to believe that growing urban food is a disorderly business and have little knowledge of the need for individuals to cultivate food in cities, (Deelstra & Girardet, 1999) write. With dynamic current livelihoods, the urban climate is increasingly complicated and varied. Without a better understanding of how urban inhabitants structure their livelihoods and how they confront vulnerability and risk to safeguard their household food security, there will be little progress in improving their situations (Hervey, 2002).

Hervey's (2002) study shows that the problem of food insecurity is a serious concern with an increasingly rising population in the cities which causes inflation and unemployment. According to Alem and Kohlin (2014), urban agriculture is coping mechanisms, including reducing consumption, working longer hours, engaging in less motivation and high energy-consuming occupations, as well as raising commercial crops and holding livestock within their vacant space. Alem and Söderbom (2012) have also done a detailed study of the effects of food price inflation on household welfare. As reported by (Ministry of Finance and Economic Development [MoFED], 2006), urban poverty is currently becoming a growing concern, especially in large towns in Ethiopia. Therefore, to boost the income and food security of households, cities will need to accept agricultural production in their respective urban areas or urban borders.

According to Mkwambisi *et al*. (2011), urban agriculture has a beneficial impact on reducing hunger, enhancing household food security, increasing income, and supplying very rich household micronutrients. According to Lee (1997) and Egziabher (1994), the livelihoods of the many urban populations of Ethiopia (e.g. Addis Ababa) are highly committed to urban agriculture, which accounts for over thirty percent of the entire urban population, but "urban

policymakers do not show the contribution of urban agriculture to improving livelihoods and do not promote due consideration."

Burayu town had a population of 4,138 in 1984, 10,027 in 1994, 63,873 in 2007, and 100,200 in 2010, according to a census survey (2007) (Estimated). Burayu's town government estimated that the town's population grew to over 150,000 people in 2014, indicating that the town is fast expanding. This, the town's rapid population increase, has influenced the town's population by producing insecurity or inflation, inhabitants' fundamental requirements, and a scarcity of fresh food and other agricultural commodities.

Urban agriculture is the key mechanism for dealing with food insecurity, inflation, and other difficulties, according to the above-mentioned literature from various cities. As a result, Burayu town is one of Ethiopia's fastest urbanizing towns, with a plethora of urban agriculture practices to support the town's urban people's livelihoods.

However, in the community, the true impact of urban agriculture on the lives of the poor is not being assessed. As a result, the purpose of this study was to determine whether the practice makes a significant contribution to improving livelihoods for the town's poor residents, identify potential UA activities in the town, and assess people's perceptions about the benefits of UA to environmental improvement. In conjunction with this, it would also be required to identify major problems, what factors contribute to its success or failure, and what has to be done to encourage and combat its challenges.

1.3 Objectives of the Study

1.3.1 General Objectives of the Study

The general objective of the study is to assess the contributions of urban agriculture to household livelihood, and urban farmers' perceptions about the benefits of urban agriculture to environmental improvement with a focus on people living in the Burayu town Administration.

1.3.2 Specific Objectives

The following are the specific objectives of the study:

- ❖ To find out major types of urban agricultural production systems practiced in the area.
- ❖ To assess the contribution of urban agriculture to household livelihood in the study area.
- ❖ To identify people's perceptions towards environmental benefits of urban agriculture.
- ❖ To investigate the major factors that inhibit household from producing enough food for their families.

1.4 Scope of the Study

Geographically, the study was conducted at Burayu town administration, located in the west of Addis Ababa City, about 15 km from the center of Addis Ababa (Piassa) and about 27 km east of Holeta town (Welmera District). The study focuses on farmers who practice urban agriculture, specifically on farmers who engage in crop and livestock farming. The thematic scope of the study was to assess the overall contribution of urban agriculture in terms of benefits to food access, income generation, job creation, and farmers' perception of the environmental benefits of urban agriculture and to find out about the existing urban agricultural practices which were practiced in Burayu town. In addition, issues related to urban agricultural challenges, such as shortage of land, landholding of last decade, credit service, fertility status of the land, market chain, storage area, challenges related to agricultural input and government support was investigated in the farmers' study area.

1.5 Significance of the study

The fast growth of the population of the town has affected the town's population by creating instability, or inflation in the necessities of the inhabitants, and a shortage of fresh food and other agricultural products. But urban agriculture was implemented in Burayu, to meet the need for fresh agricultural products, increase income, meet the needs of householders, and for socio-environmental benefits.

In line with the issues mentioned above, studying the contribution of urban agriculture to urban farmers' livelihoods, particularly and, therefore, to society in Burayu Town at large, should be applauded. The research will improve knowledge of the role that the world plays in urban farmers' livelihoods and can add information to the limited research done to this point on the

contribution of urban agriculture within the region. Because producing urban agricultural production is not a replacement phenomenon, no new alternatives to urban agriculture or the other way around are presented in this study; instead, the extent of urban agriculture in town administration and its influence on urban farmers' livelihoods are thoroughly examined. Different contextual factors that determine urban farming-based livelihood activities are also addressed, and the nature and size of urban agricultural income, and people's dependence on urban farming, are measured.

1.6 Organization of the thesis

The thesis is divided into five sections and given in five chapters. The first chapter of the study contains an overview of the study, a description of difficulties, and a general purpose, as well as particular research objectives and research questions, as well as the study's scope and limitations. In general, chapter one provides the reader with a summary of the study's overall character.

The second chapter is the review of the literature section, which contains theoretical and empirical evidence about urban agriculture's contribution to improving household livelihoods and environmental advantages in many countries throughout the world. The chapter also includes evidence of other countries and Ethiopia's urban agricultural practices, as well as the determinants of running urban agriculture, the potential for urban agriculture, the economic, social, and environmental benefits of urban agriculture, and the challenges linked to urban agriculture. In Chapter 3, the research techniques are discussed, which include the research design, data collection method, sample method, and data analysis method.

Chapter four presents the study's findings and discusses them in terms of the overall state and nature of urban agricultural contributions to farmers practicing urban agriculture in Burayu, with the main study result being the improvement of livelihood and the challenge of practicing urban agriculture. Chapter five presents the research's conclusion, which is based on the study's findings, as well as the chapter's recommendations, which are crucial to addressing the good outcomes generated from engaging in urban agriculture and possible solutions to identified obstacles discovered.

1.7 Limitations of the study

There are several limitations in this study that provide an opportunity for further research. First, the research was limited to three kebeles selected from the surrounding areas. As a result, the study's findings were limited to the study's boundaries. Second, as stated in Chapter 3, this study relied solely on quantitative data and a qualitative method, including closed and open-ended questionnaires. Another drawback of the study was that it mainly employed descriptive analysis and some variable by-parameter logistic model estimates to explore the contributions of urban agriculture to livelihood improvement, environmental advantages, and difficulties with large-scale implementation. As a result, future research to broaden this subject using a different style of research is possible.

Chapter Two -Literature Review

2.1. Urban Agriculture Meaning and Concept

Different researchers describe urban agriculture in different ways. Urban agriculture, according to Tinker (1994), is the process of producing food within or on the fringes of a city, which includes planting food crops, fruits, trees, herbs, bulbs, aromatic plants, and rearing livestock such as cattle, chickens, fish, bees, and pigs.

Urban agriculture, according to Madden *et al.* (1997), is the activity of cultivating crops and raising livestock within the city limits or immediate suburbs. UNDP(1996) defines urban agriculture as an "industry that produces, processes, and markets food and fuel on land and water spread in urban and peri-urban areas, primarily in response to the daily demand of customers in a city, town, or metropolis, using intensive production methods, using and recycling natural resources and urban waste, and generating a variety of crops. Urban agriculture can provide a source of fresh and healthy produce for individual households, community groups, and urban marketplaces as a result of its production role.

However, it's tough to say how much UA contributes to the world food supply. According to FAO (2007), urban agriculture provides 15-20% of the world's food, although this has since been questioned as a major exaggeration by Clinton *et al*, (2018). Indeed, according to a recent mapping evaluation, with optimal use of available space and intensive production practices, UA could theoretically provide 5% of global agricultural production of pulses, roots and tubers, and vegetables, but currently only contributes 1% of this production (Clinton *et al.,* 2018).

On the other hand, numerous cities around the world have historically reported high levels of food self-sufficiency (Thomson & Metz, 1998; Clapp, 2017), which refers to a region's ability to meet its population's food needs through domestic production. Shanghai, China, can meet 50% of its vegetable demand within city borders, according to Lang and Miao, (2013), but Dares Salaam, Tanzania, produces 90% of green vegetables and 60% of milk eaten within city bounds. Australia produces 24% of total vegetables and 99% of Asian vegetables out of the state's total production (Mok *et al.,* 2014).

Most cities, particularly in developing countries, are unable to provide enough money and jobs to support their rapidly growing populations. This is closely linked to food scarcity and malnutrition. Malnutrition affects approximately 53% of Ethiopians (Headey & Ecker, 2013). The number of people in six East and Southern African countries who get some of their food from urban gardening is expected to rise from roughly 25 million to 40 million by 2020 (Renevan, 2006).

Urban agriculture contributes significantly to food security and adequate nutrition, according to (Firehiwot and Degefa, 2015), making it one of the most important alternatives for meeting the Millennium Development Goals (MDG) 1. Food production in cities is typically a response of the urban poor to restricted purchasing power and insufficient, unpredictable, and irregular access to food.

Ethiopia's economy rose at an annual rate of 11%, with considerable advances in service, agriculture, and even industry (MoFED F. report 2010/11). With a fast-growing population, shrinking household landholdings, rising unemployment, persistent food insecurity, and environmental and social issues, the government will face significant challenges in maintaining growth and achieving its ambition (Growth and Transformation Plan [GTP]). One of the primary targets of the GTP plan to attain food security by developing a strong agricultural sector is the one, which is designed to not only feed the nation but also aid the industry's expansion.

According to Yonas Alem (2011), the Ethiopian economy's rise has resulted in huge inflation in food and non-food items, primarily in food commodities. In 2008, the government took attempts to limit the excess supply of money by decreasing food commodity levies (especially on oil) and taking measures to reduce the supply of money. It may take some time for these fiscal and monetary reforms to reduce costs and improve food security for city dwellers, particularly the poor. This had a considerably more negative impact on urban residents' welfare than it did on rural households, who are supported by a variety of safety net programs. With high unemployment, rising living costs, and an aging population, city dwellers have developed a range of coping strategies to deal with the changes. One of the coping mechanisms employed by city dwellers has been urban gardening.

Several studies have documented the contributions of urban agriculture to the socio-economic well-being of farmers, communities, and the urban ecology, including (RUFA, 2007; FAO, 2002; and UN-Habita; 2013). The outcomes of such studies, on the other hand, are still up for debate, and their applications differ by country. For example, households in one Nigerian province were able to make nearly 74% of their agricultural revenue through urban farming (Salau & Attah 2012). The majority of Ethiopia's urban residents rely on rural farmers for basic requirements like food, but the poor, elderly, and disadvantaged use urban agriculture to supplement their food supply and increase their income (Tewodros, 2007).

2.2. Empirical Evidence on Urban Agriculture

The rapid expansion of urban areas and populations is a worldwide problem. According to Prain (2006), half of the world's population already lives in cities, with an additional 1.5 billion people expected to do so by 2020. In Africa, cities are predicted to house 50% or more of the population by 2030 (Parrot, 2010). Ethiopia has a high rate of urbanization, according to the Ministry of Works and Urban Development, with an annual rate of roughly 4.3 percent (MoWUD, 2006). According to figures given by the World Bank, 19% of Ethiopia's population resides in urban areas (World Bank, 2015). As can be observed, this sum is extremely low in comparison to other countries (Mpofu, 2013). This is demonstrated by the World Bank (2015) urbanization is increasing at a rate of 4.3 percent per year, and urban poverty is becoming more prevalent as a result. For example, the number of urban poor climbed from 11% in 2000 to 14% (3.2 million) after a decade or in 2011. As a result, addressing Ethiopia's urban poverty problem has become a key component of the country's development strategy.

According to Bryceson (2005), urban agriculture arose in Africa as a response to restricted sources of urban economic sustenance (i.e., an insufficient supply of staple food to cities) and city dwellers' declining purchasing power. Currently, millions of urban residents in several African cities are being urged to restart farming to supplement their household income or because they cannot afford to meet their daily food needs (Bryceson & Potts 2005). In Africa, population participation in urban agriculture increased from 10% to 25% in the early 1980s to

70% in the 1990s, and urbanization has a considerable impact on food consumption (Bryld, 2003).

Urban agriculture is one of the techniques that many industrialized countries may employ to combat urban poverty. Urban agriculture is the cultivation, processing, and distribution of both food and non-food products in urban or peri-urban areas. It focuses primarily on food production for household consumption and revenue generation (Mougeot, 2000). These two are critical in promoting the subsistence of the urban poor because a larger proportion of their income comes from these two sources.

According to the study, urban agriculture is a good source of nutritious food for the urban poor who suffer from malnutrition, and it is thus considered to address the problems of such a low urban population in areas where urban poverty is seen as suppressing urban dwellers' livelihoods. This is primarily because urban farming is a good source of nutritious food for the urban poor who suffer from malnutrition (Egbuna & Ngozie, 2008).

2.3. Potential Benefits of Urban Agriculture

According to previous studies, urban agriculture has the potential to reduce poverty and improve household food security. Urban agriculture, according to the International Food Policy Research Institute (IFPRI), is one answer to the hunger and poverty problems faced by the urban poor. It has been highlighted as a possible source of employment, income, and a way to improve the diet of low-income families who cannot afford to purchase a variety of diets (Oladele *et al.,* 2012; Warren *et al.,* 2015). In the face of rising food prices, urban agriculture is recognized to help farm families improve their level of living by providing an affordable supply of food (Badami & Ramankutty, 2015; Orsini *et al.,* 2013; UNDP, 1996; Smith, 1998; Mougeot, 2006).

Urban agriculture contributes significantly to the livelihoods of urban residents in developing countries by ensuring food security and producing cash (FAO 2007; Smit *et al.,* 1996; Axumite 1994). Urban agriculture, according to Lynch (2002), plays a big role in some Australian and Canadian cities, occupying 35 percent of the land area, employing 36 percent of the people, and supplying up to 50 percent of urban fresh veggies. In Addis Ababa, for example, urban farming

provides a major contribution to the lives of urban households when compared to other sources of income, accounting for more than 65 percent of household income (Theodros, 2007).

In addition to providing food, UA can produce jobs and be labor-intensive. Because UA is a labor-intensive business, cities with high unemployment rates may have significant job development possibilities (Sawio, 1994, & Tinker, 1994; Falvey, 1999; Haight, 1999). They also confirm that urban agriculture may build full-time jobs for household managers and their families, as well as part-time jobs for children and other household members, it decreases unemployment and increases the total amount of family income within the family and also plays a crucial role in reducing the detrimental effects of urban development on the climate and is also contributing to improving the urban environment.

2.3.1. Economic potential of urban agriculture

Urban farming can be an excellent source of income for the urban poor if it is specifically pursued as a formal sector. According to Bryld (2003), urban farming has economic value since it allows urban farmers, particularly the poor, to use their non-farm income for other reasons rather than purchasing food, wondered whether it makes a major contribution to city macro economies.

As a result, the importance of urban agriculture to the socio-economic growth of city people cannot be overstated, as it significantly improves their standard of living. According to Salau and Attah (2012), urban farming accounted for nearly 74% of the respondents' total annual income in Nasarawa State, Nigeria. This demonstrates that it was the respondents' primary source of income. The current work scenario in cities does not provide sufficient money for the poor urban population. As a result, urban agriculture should be considered an important part of the city's economic, employment, and food systems.

According to Firehiwot and Degefa (2015), urban agriculture accounts for around a third of total household income in Addis Ababa, and while it contributes significantly to improving household food security, it is insufficient to cover all of the household's needs. Non-food expenses including rent and membership payments for community-based groups like Edir and Equib,

medical bills, cosmetics, clothing, and utility payments are primarily covered by money from urban gardening (Firehiwot & Degefa, 2015). In a similar spirit, Mougeot (2006) claims that home-grown food can enhance the lives of urban poor people by allowing them to spend more of their cash income on non-food items.

2.3.2. Urban agriculture's contribution to food security

Increased demand for food has followed the acceleration of urbanization in developing countries. Ethiopia is an example of this (Dereje *et al.,* 2007). However, along with urbanization, the number of impoverished urban households has increased dramatically, as has the number of households who cannot afford to buy adequate food for their consumption (Bryceson & Potts 2005). According to a paper by Thomas (2013), given the correct support, urban farmers could supply more than 42% of Addis-Ababa vegetable demand.

According to Firehiwot and Degefa (2015), urban farmers in Addis Ababa saw urban farming as a method to increase the availability of food and money for their families. Urban agriculture has benefited them by giving self-employment, increasing income through excess production sales, and reducing food expenditures by diversifying their diet through the consumption of locally produced fresh and nutritious food. It also helped to deliver fresh veggies to the local market that were more than family usage. According to FAO (2007), urban agriculture has a key role in enhancing the community's and household's food security by providing food and nutrition, as well as rising purchasing power.

The above scholars' finding is also in line with what Messay (2010) said about urban agriculture's food security achievements in Adama, Ethiopia. In 2008/9, urban agriculture accounted for around 43% of total household food grain requirements. The farmers were able to collect 4.19 quintals of food grain per home per year or 0.75 quintals per person. In order of importance, grain purchases were found to be the second most important source of food grain (accounting for 13% of the net quantity required), followed by remittances and food aid.

2.3.3. The potential of urban agriculture for job creation

Urban agriculture provided a large source of employment for the urban poor, as well as providing crucial employment opportunities for city people, in many African cities where there is a mismatch between the growing urban population and the availability of work opportunities in the industrial or manufacturing sectors, as well as the lack of formal positions (Zezza and Tasciatti, 2010; as cited in Arku, *et al.*, 2012, p. 8).

Urban agriculture, according to Arku *et al.* (2012, p. 8) and Zezza and Tasciatti (2010), is a particularly important source of employment for people who may be unable to compete for a job in the formal sector, as well as for low-skilled and vulnerable city dwellers. It is estimated that 40% of African city dwellers are involved in some way in urban agriculture or related areas. Urban agriculture contributes to the expansion of the urban economy by giving employment to a large number of impoverished urban-producing households and generating earnings that are equivalent to or higher than the statutory minimum wage rate (Moustier & Danso, 2006).

In Ethiopia, urban agriculture is used in conjunction with other jobs to help households fulfill their food demands and cover other socioeconomic costs. According to Firehiwot and Degefa (2015), practically all respondents in the Addis Ababa Yeka sub-City performed urban agriculture in addition to their other employment. According to them, job kinds range from the formal sector, such as public service, to the informal sector, which includes minor commerce, daily labor, and the sale of local beverages. Petty commerce and daily labor were the other sources of income for the majority of respondents (43%) and (47%) respectively. These findings are in line with Folken and Mwangi (2000), who found that the majority of farming operations in urban areas were carried out on a part-time basis by persons with other jobs but the above two scholars findings is contradict the finding of Henock (2004) on the socioeconomic impact of UA in Addis Ababa. According to him, the bulk of respondents (70%) are self-employed on their farms and engaging only in urban agriculture, 1.43 percent work on other private farms, and 1.28% work in non-farm activities.

2.3.4. Environmental Benefit of Urban Agriculture

According to another advantage of urban agriculture, it improves microclimate and nutrient recovery, as well as its capacity to transform urban trash into food and jobs, resulting in a better living environment, improved public health, energy conservation, and attractive scenarios and ecosystems while preserving natural resources, land, and water (Smit & Nasr 1992).

Vegetation can assist enhance humidity, lower temperatures, absorb hazardous air particles and chemicals, function as a wind barrier, and intercept solar radiation, according to (Deelstra, 2002, Mohammed 2002). The majority of the rejected food utilized by the producer to feed dairy cattle would have gone to waste, raising the cost of disposal for the government. Many solid wastes are recycled into fresh food by UA, preventing contamination and contributing to environmental sanitation (Brock, 1999).

In Ethiopia, major cities and towns in the refit-valleys, such as Adama, Hawassa, Arbamich, and other towns in the northern part of the country, Bahirdar and Mekele, were some of the exemplary cities practicing tree planting in the city centers and urban agriculture to create green and recreational cities and towns for local and international tourists.

According to Messay (2010), the town of Adama in Ethiopia is the most commonly visited by both domestic and international tourists. Developing intensive urban arable farming in every tiny space serves the town a lot in this regard because of the attractiveness and ability of the crops/plants to adapt to the micro-climatic state of an environment. This might be accomplished not just by planting seasonal crops, but also by growing perennial trees and grasses to make the town more appealing to the eye, provide some type of material advantage to the residents, and modify the town's microclimate.

Messay also discovered that the building of Aba Gada Recreation Center in the town's center, as well as the efforts of a small number of small-scale commercial nurserypersons along main routes in Adama, are noteworthy in this regard. Encouragement to develop and maintain more of these public parks and nurseries is beneficial in terms of environmental greening, sustaining

microclimatic conditions, job creation, producing fruits, vegetables, and flowers for consumption or trade, and recycling urban garbage.

2.4. Constraints of Urban Agriculture

Despite the benefits of urban agriculture outlined above, there are certain drawbacks to be aware of. It is performed as an informal sector in many Ethiopian cities, with limited backing from regional and federal controlling bodies (Bryceson 2005, Bryld 2003). The urban farmers in various Ethiopian cities and towns faced several obstacles.

2.4.1. Space for Cultivation and Livestock keeping

Agriculture necessitates land, but the lack of land tenure rights was the first institutional issue (Thomas P. Z. Mpofu, 2013). Many urban farmers see this as a major impediment to the expansion and development of urban agriculture in Ethiopia, and particularly in Addis Ababa. The current ambiguous legal framework created a sense of uneasiness among most farmers, reducing their willingness to invest in the development of land whose ownership was in doubt. As a result of the lack of tenure security, farmers lived in continual fear of being evicted from "their" land. For example, over 51% of Makanisa Furi Saris members and 82 percent of Akakikaliti Cooperative members expressed concern about being evicted from "their" agricultural property (Thomas P. Z. Mpofu, 2013).

According to Thomas P. Z. Mpofu (2013), lack of land tenure rights was the first institutional issue. Many urban farmers see this as similarly, in Mekelle, 'owned' land is essentially land owned by the state, for which farmers get a certificate entitling them to utilize it over their lifetime, according to (Dereje *et al.*, 2007). Farmers have recently been granted property rights permits by the Tigray Regional State, but there is still no right to sell or transfer land to a third party (meaning a non-family member). As a result, the main institutional barrier facing urban farming households is a lack of official recognition. "Besides feeding the impoverished in cities, there is an urgent need for providing housing for the homeless," as Bryld (2003) put it. Even though growing food in cities necessitates land, it is unlikely to be prioritized in urban land uses because the demand for urban space for housing is significantly greater than the demand for

space for agricultural activities. "...agricultural productive lands are likely to be lost in this competition," Argenti (2000) addiction from 'their' farmland (Thomas P. Z. Mpofu, 2013).

2.4.2. Lack of market and agricultural technology

The most fundamental institutional restrictions to urban agriculture, according to (Drescher *et al.*, 1999), are a lack of access to farming land as well as farming inputs such as seeds, fertilizer, pesticides, and instruments. Urban food markets are frequently structured to import food from rural areas, and firms that produce agricultural inputs are also geared toward supporting rural agriculture. As a result, input and output market mechanisms, as well as infrastructure, frequently benefit rural agriculture (UNDP, 2010). This is because most market structures are made up of huge wholesalers who buy directly from rural areas or through intermediary wholesale markets on the outskirts of cities. Smaller urban farming households, on the other hand, do not yet fit well into these frameworks.

2.4.3. Extension Contact and institutional Service

One of the most pressing issues confronting most urban farmers was their lack of knowledge of contemporary agriculture. This was ascribed to a lack of training and/or technical support to assist them in improving their skills and expertise while also increasing their productivity.

According to Thomas P. Z. Mpofu (2013), roughly 44% of farmers in Addis Ababa did not receive any technical guidance from agricultural extension staff. The Addis-Ababa Urban Agriculture Department, for its part, stated that it lacked the necessary expertise to give continual support to urban farmers. Similarly, Salau and Attah (2012), who conducted a Socio-Economic Analysis of Urban Agriculture in Nasarawa State, Nigeria, findings, revealed that the majority of the respondents (76.67%) had no extension contact during the year, whereas 23.33% received at least one extension visit. This indicates that the state's extension service for urban farmers is inadequate. Agbamu (2006) stated that, whereas extension contact had a positive regression coefficient in the case of technology adoption, it had a negative regression coefficient in the case of soil management technique adoption. The presence of capable extension workers at the local level is widely thought to have a direct impact on the innovativeness of farmers.

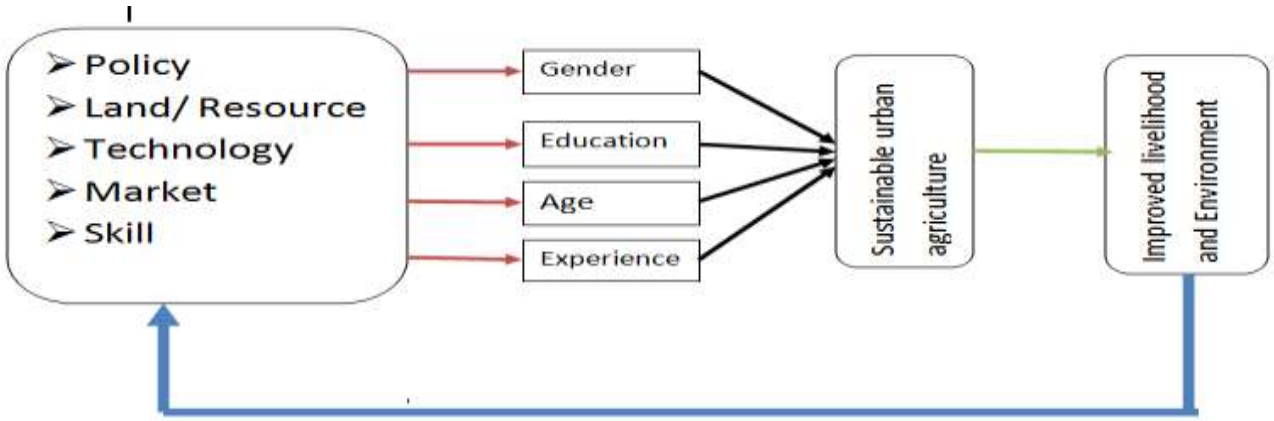
Obtaining assistance with agricultural inputs, skills training, and financing services for individual farmers is critical to increasing the productivity of urban gardening and boosting urban farmers' food security (Mougeot, 2006). According to Salau and Attah (2012), the majority of respondents (70%) had never utilized farm credit, whereas 30% had used farm credit. This means that the majority of the area's urban farmers did not use farm financing. This finding is consistent with that of Hovorka *et al.* (2009), who stated that due to their restricted land space for cultivation, urban farmers in Ghana did not have access to conventional loan schemes.

As a result, urban agriculture became a hot topic among academics. This issue also exists in Ethiopian cities and towns where livestock and crop production are practiced. Burayu town, like many other Ethiopian towns, is confronted with these issues. Raising awareness of individual urban farmers, supporting the use of new technology, and providing information on how and where to obtain public services are all key tasks and obligations of the concerned offices and officials, according to (Firehiwot & Degefa, 2015).

2.5. Conceptual Framework

In the following framework, the researcher attempted to illustrate the study's general themes. It shows the direct relationship and effect of urban agriculture on the impact indicator's stated factors, such as food availability, income generation, employment creation, and environmental advantages in reducing urban pollution and urban heat and challenge to practice UA.

Figure 2.1: Conceptual Framework of the Study



Source: Developed by researcher

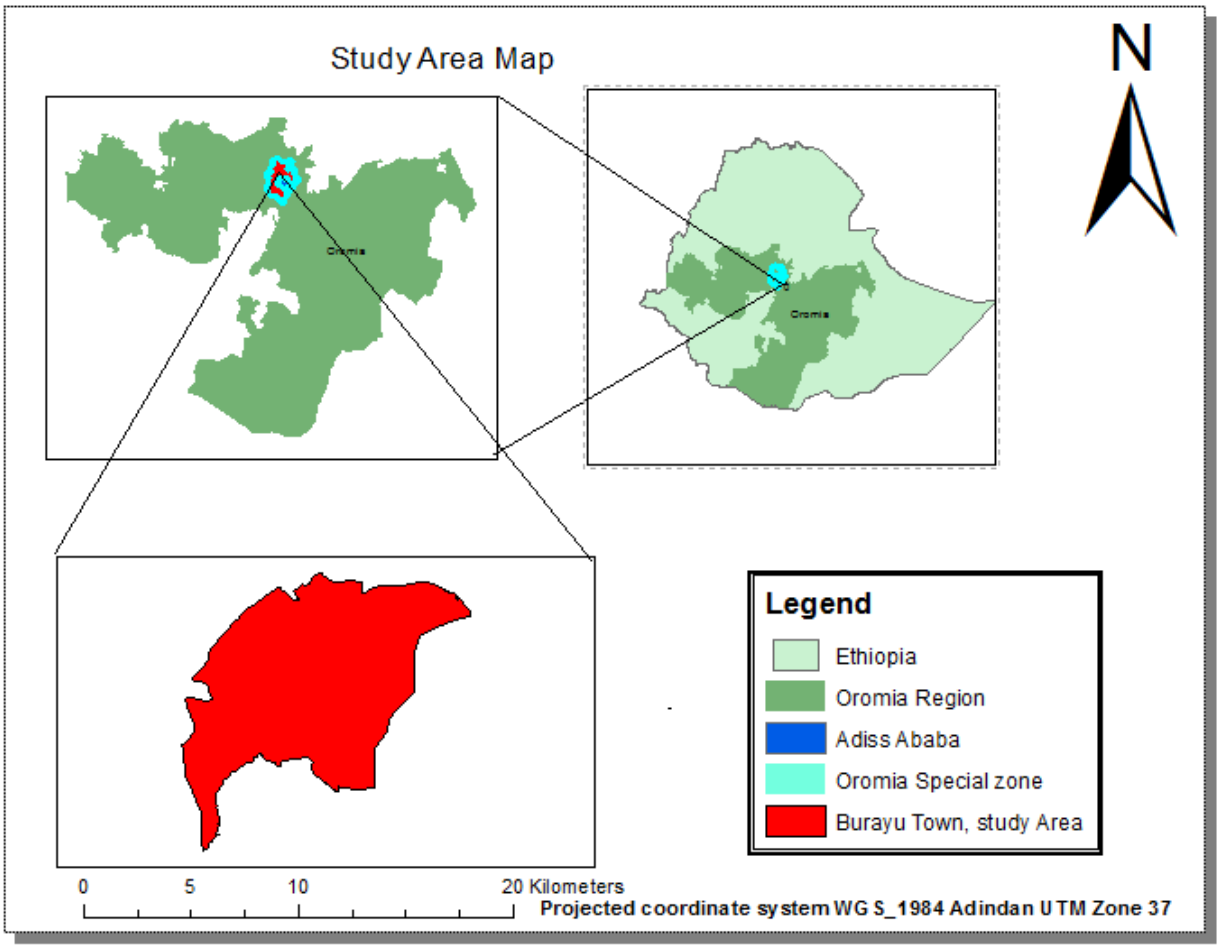
Chapter Three - Research methodology

3. Description of Study Area

3.1.1. Location

Burayu town is situated in the Oromia National Regional State, Oromia Special Zone around Finfine, 15 km away from the center of Addis Ababa (Piassa) and approximately 27 km east of the town of Holeta. Burayu town consists of six kebeles, namely Burayu kata, Lakku Katta, Gafarsa Burayu, Gafarsa Guje, Gafarsa Noonno, and Malka Gafarsa kebeles. Burayu town is located east of Kolobo town, south of Sululta town, and west of Finfinnee city. The town has an integrated development plan that was developed in 2006 (MUDC, 2011) and endured significant economic and demographic pressures as a result of the capital's recent growth and urbanization.

Figure 3.1.1 Map of study area



Source: Developed by Author from Ethiopian Regional and Wereda map 2020.

3.1.2. Rainfall and Temperature

Data on the climatic condition of Burayu town is not accessible, according to the National Regional Government of (Burayu town Administration [BTA], 2018), an attempt was made to adjust the climatic condition of Addis Ababa where the nearest metrological station is located. The town's mean annual temperature, mean annual maximum, and mean annual minimum temperatures are estimated to be approximately 14°c, 22°c and 6°c respectively, which is a warm temperate climate characteristic. The mean annual precipitation is approximately 1188 mm. From June to September, the largest concentration of rainfall (70 percent -80 percent) takes place. Low rainwater penetration, storm water incidence, flooding of low gradient areas, sheet and gully erosion are therefore common problems in the region. For the nearest meteorological station, the mean monthly relative humidity ranges from 79 percent in August to 49 percent in December. It's very cool with such moisture.

3.1.3. Population Size

Burayu town had a population of 4,138 in 1984, 10,027 in 1994, 63,873 in 2007, and 100,200 in 2010, according to the 2007 census (estimated). Burayu's town government reported that the town's population increased to over 150,000 in 2014, indicating that the town is fast expanding. This, the town's rapid population increase, has influenced the town's population by producing uncertainty or inflation, inhabitants' fundamental requirements, and a scarcity of fresh food and other agricultural commodities.

3.1.4. Socio-Economic Aspects

Burayu town, in pursuit of work and a living, followed the trade route and became a key hub for trade and small-scale industry. The town is a major distribution center for products produced locally by a variety of companies, and it is densely populated with tourists, with numerous hotels, restaurants, pubs, and cafes (Burayu Town Communication office, [BTCO], 2019).

3.2. Research Approach

The research relied on a mixed approach, making use of both quantitative and qualitative methods. Related information from both primary and secondary sources was gathered. The main

methods for collecting primary information were questionnaires and interviews with the primary source of data. Furthermore, field observations, key informant interviews, and focus group discussions were carried out.

3.3. Sample Design

This study incorporated mixed research both quantitative and qualitative data. According to Creswell, (2013) a mixed-methods design is useful to understand a research problem and the strengths of both quantitative and qualitative research (and its data) can provide sufficient and useful results for the study's overall analysis. A qualitative approach was used to provide an in-depth understanding of the contribution of UA to livelihood, perception of farmers about environmental benefits of UA; as well as prevailing challenges of UA: the case of Burayu town. Semi-structured interviews with key informants were carried out to gather the qualitative type of data. A quantitative approach was used to understand the relationship among variables.

The key primary data sources for this study were household surveys. But determining the sample size of the research is a function of various factors, such as resources, time, study purpose, population characteristics, etc. The researcher used a scientific formula to calculate the sample size, and the estimate of variance in the key variables of interest in the analysis was a critical component of sample size formulas (Cochran, 1977). 5% margin of error is acceptable for the categorical dependent variable, and a 3% margin of error is acceptable for the continuous dependent variable (Krejcie & Morgan, 1970). To determine the total sample size, the following (Yemane, 1967) formula were be used.

$$n = \frac{N}{1 + N(e^2)} = \frac{1047}{1 + 1047(0.05)^2} = 289$$

Where n= minimum required sample size (289), N= population size (1047), and e= level of accuracy (5%).

3.4. Sampling Technique

Judgmental sampling techniques were used to generate primary data sources for this research. First, three sample Kebeles were purposefully chosen from different parts of town where the researchers suspected there were more urban farming households. Urban farmers found in three separate kebeles of Burayu town such as Gafarssa Guje, Gafarssa Nono, and Gafarssa Burayu kebele were sampled for this particular study by using systematic random sampling techniques.

3.5. Methods of Data Collection

3.5.1. Primary sources of data

Primary data was collected from three selected kebeles of Burayu town's urban farmers who practice urban agriculture and benefit from agricultural products, mainly engaged in crop and livestock farming. In addition, the key informant of primary data was the urban agricultural office of the Burayu town Government whereby urban agricultural department officials and agricultural experts were consulted and discussions were held with them.

3.5.1.1. Field Observation

Field observation assessment was examined both before and during the study period. Before data collection, few sites were visited to recognize current urban agricultural practices and the topography of the study area. People's attitudes toward the contribution of urban agriculture were gathered through observation by researchers and informal network communication with individuals.

3.5.1.2. Focus Group Discussion

A total of three Focus Group Discussions were carried out in the study area. Focus groups provide insights into how the community perceives and provide a better view of the phenomenon being studied. Although a valuable research instrument, surveys typically ask closed-ended questions that can limit the input that a respondent may obtain. Focus groups are group interviews that provide the investigator with the opportunity to collect deeper data more efficiently than individual interviews. As a result, three focus group discussions (FGDs) were

held in selected kebeles Gafarsa Guje, Gafarsa Nono, and Gafarsa Burayu to gather in-depth information on UA contributions. The participants of (FGDs) were randomly selected mix of male and female-headed urban farmers.

3.5.1.3. Key informant interview

The key informant interview is a dialogue between persons in which ideas and expertise are freely exchanged. The interview was based on the findings of a household survey that looked into the current practice of urban agriculture and how it relates to bettering livelihoods and the environment. Three small-scale urban farmers, one Development Agent (DA), and three wereda agricultural extension officers were purposefully chosen and interviewed as key informants to obtain additional information and used to triangulate the information gained by quantitative data.

3.5.2. Secondary sources of data

Secondary data was acquired from relevant governmental offices' published and unpublished reports, books, journals, articles, and previously read research papers on the contribution of urban agriculture. The town administration of Burayu, as well as agricultural office directives, strategies, manuals, and the annual report, were all scrutinized. In addition, a variety of magazines and publications were consulted in reviewing existing literature.

3.6. Method of Data Analysis

The study intends to use a survey approach to assess the contribution of urban agriculture on household livelihoods' economic and environmental improvement. Data from both primary and secondary sources were evaluated. The quantitative data were examined using descriptive statistics, which comprised percentage distribution, frequency counts, cross-tabulation, and chi-square by using Statistical Packages for Social Sciences computer software system (SPSS) version 20. Bivariate Logistic regression parameters estimate analysis of the logistic model was also used to analyze the quantitative data. The qualitative data from the study were transcribed and organized into topics and sub-themes.

When you wish to forecast the existence or absence of a characteristic or outcome based on the values of a set of predictor variables, you can use logistic regression. It's comparable to a linear regression model; however, it's better for models with dichotomous dependent variables. The

odds ratios for each of the independent variables in the model can be estimated using logistic regression coefficients. As a result, we have a binary result from urban agriculture's contribution to improved household livelihoods and the environment (yes, no). Allow the dependent variable to take the lead. X 1, X 2...X k are independent variables, while Y is dichotomous (categorical variable) with two categories. The following is how the binary logistic regression model was fitted:

$$\log\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p$$

Assumptions:

- Logistic regression implies meaningful coding of the variables: if the variables are not coded meaningfully, it is difficult to interpret the results. In binomial logistic regression, the dependent class of interest is coded as 1 while the other class is coded as 0.
- There must be a categorical dependent variable.
- The groups must be mutually exclusive and exhaustive; each instance can only belong to one of the groups, and each case must be a member of at least one of the groups.
- Logistic regression does not presume that the dependent and independent variables have a linear relationship.
- The logit form of the dependent variable should be linearly related to the logit regression equation. Because maximum likelihood coefficients are big sample estimates, larger samples are required than for linear regression. Source: (Hosmer and Lemeshow, 2000)

The Wald Statistic: The Wald statistic is a popular alternative test for determining the significance of the logistic regression coefficients of each independent variable (In a logistic regression model, this means testing the null hypothesis that a certain logit coefficient is 0). If the Wald test for a particular explanatory variable or set of explanatory variables is significant, we can deduce that the parameters associated with these variables are significantly different from zero, indicating that the variables should be included in the model.

The Hosmer and Lemeshow Test Statistic: The Hosmer and Lemeshow goodness-of-fit statistic, which assesses the connection between the actual and predicted values of the dependent variable, is the last measure of model fit. The Hosmer and Lemeshow test is a widely used test for determining a model's goodness of fit. It accepts any number of explanatory variables, which

can be continuous or categorical. In this situation, a lower difference between observed and anticipated classification indicates a higher model fit (Bewick & Jonathan, 2005).

3.7. Ethical consideration

The interests of the informants in this study, as well as those of the general public, were protected at all stages of the research process. Proper procedures are followed to collect information from any source. First, a support letter written from the Center was presented to the Burayu Town Urban Agriculture Office. Subsequently, they also informed their urban agriculture experts about the study's goal and wrote a letter of support to whoever was concerned. The researcher kept a positive attitude toward the respondents throughout the process of gathering information from various interested agencies. The respondents were asked to react to a series of questions based on the researcher's need. The respondents provided unambiguous answers to the researcher's questions, and the researcher anticipated appropriate ethical behavior from the respondents throughout the study.

Chapter 4 - Results and Discussion

4. Introduction to Result and Discussion

Results that are found to draw out more significant information on the contribution of urban agriculture are presented and discussed in this chapter. The chapter addressed five important aspects of urban agriculture, namely the demographic characteristics of the respondent, type of urban agriculture found in Burayu town, the contribution of urban agriculture to livelihood, the environmental benefits of urban agriculture, and the challenges that influence farming activities.

4.1. Result of the study

4.1.1. Demographic characteristics of respondents

The demographic data includes the respondents' age, gender, household head, marital status, educational level, family size, and social participation. The demographic characteristics of respondents were investigated using descriptive statistics, primarily frequency analysis.

Table (4.1) shows that a large number of respondents age group at age group 41 to 50 years (50.9%), followed by age groups 51 and above (32.9%), and age groups 31-40coveres (16.3%) This indicates that the majority of Burayu town's urban farmers were in the matured elder's age group.

Table 4.1; Age of the respondent

Age	Frequency	Percent
31-40	47	16.3
41-50	147	50.9
51 and above	95	32.9
Total	289	100

Source: Own survey, 2021

In Table 4.2 the household head type result illustrated that of the 289 samples interviewed, 232 (80.3%) were male-headed households and 57 (19.7%) were female-headed households. Of all interviewed female-headed 32(57%) are at the inhabitants of Gafarssa Guje kebele followed by Gafarssa Nono 16 (28.5%) and the fewer female-headed households 9(14.5%) were from

Gafarssa Burayu. This result indicates that the participation of women in fields of urban agriculture in the study area was very low.

Table: 4.2: Household head type

Type	Frequency	Percent
Male-headed	232	80.3
Female- headed	57	19.7
Total	289	100

Source: Own survey, 2012

As study result in Table 4.3 shows that, at all locations, many of the urban farmer household heads had below secondary school education. Grade (1 to 8) were 136 (47.1%), those with no formal education that means, farmers who can have the ability to read and write were 105 (36 .3%) and above grade (9-12) where account 48 (16.6 %), members of the householder who attending formal education account 184 (63.5%) and who did not go to school were 105 (36.4%) of the total sample. This indicates that the majority of those interviewed had a very low level of schooling.

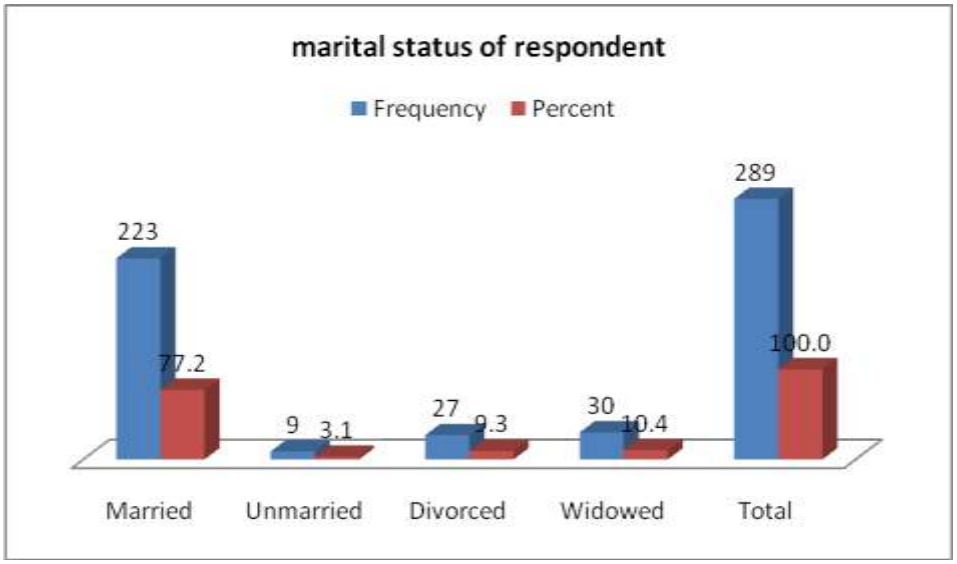
Table 4.3: Education level of respondent

Education level		Frequency	Percent
	Read and write	105	36.3
	Grade 1 to 8	136	47.1
	Grade 9 to 12	48	16.6
	Total	289	100

Source: Own survey, 2012

Figure 4.1 shows that the distribution of marital status of respondents was married for 223(77.2%), unmarried for 9(3.1%), divorced for27 (9.3%), and windowed for 30(10.4%).

Figure 4.1: Marital status of the respondents



Source: Own survey, 2021

Data in Table 4.4 reveals that members of households working in additional nonfarm activity at Gafarssa Guje kebele were120 (92%) and those who work only in urban agriculture in this kebele were 10 (8%). In Gafarsaa Nono 83(89%) work on both agriculture and non-agricultural activity and 17(11%) work only in UA. In Gafarssa Burayu 63(100%) of sampled household members are working both UA and non-UA activities. Looking at the distribution for all samples in Burayu town 269 (93%) were found to engage in UA and non-UA activity while only 20 (7%) of the total sample were depending on urban agriculture. This observation implies that urban farmers found in Burayu town were working in additional jobs to generate additional income and be able to afford their livelihood expenditures.

Table 4.4: Distribution of respondents engage in non-farm activities by kebele

Working on non-farm		Kebele							
		Gafarssa Guje		Gafarsaa Nono		Gafarssa Burayu		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Number of respondent working in non-UA activity	Yes	120	92	83	89	63	100	269	93
	No	10	8	10	11	0	0	20	7
Total		130	100	93	100	63	100	289	100

Source: Own survey, 2021

The result of the study in Table 4.5 shows that the distribution of family size at the household level was as follows: 3 for 29 households (10%), 4 for 39 households (13.5%), 5 for 77 households (26.6%), 6 for 86 households (29.8%), 7 for 40 households (13.8%), and 8 for18 households (6.2%). The result was illustrated that majority of households in Burayu had a large family size, with an average of 4.5 people, and half of the members are dependents in terms of age. The researcher also discovered that large families participate in urban agriculture to meet their family's food demands and produce additional money based on this research.

Table 4.5: Family size of the respondent

Family size		Frequency	Percent
	3	29	10
	4	39	13.5
	5	77	26.6
	6	86	29.8
	7	40	13.8
	8	18	6.2
	Total	289	100

Source: Own survey, 2021

Table 4.6 presents the experience of the respondent as to how long they engaged in urban agriculture. The study finding showed that 161(55.7%) of the respondent have been practicing urban agriculture for about 6-10 years, 69 (23.9%) of the respondent have been engaged in for 11-15 years, and 59 (20.4%) of the respondent were practicing urban agricultural activity for more than 16 years. The finding indicates that the majority of the respondents had extensive experience in urban farming and were likely to have learned the necessary skills for successful operations. The researcher can therefore deduce that urban agriculture was not a new phenomenon in Burayu town.

Table 4.6: How long the respondent was practicing urban agriculture

Years		Frequency	Percent
	6-10 years	161	55.7
	11-15 years	69	23.9
	16 years and above	59	20.4
	Total	289	100.0

Source: Own survey, 2021

Descriptive analyses of the social participation of the respondent indicated that the respondent's participation in community affairs, traditions, and values. According to the result Table, 4.7A showed that 172 (59.5%) of the respondent were participated in community labor organizations, whereas, 117 (40.5%) of the respondent were not be participating. As the result of the finding showed that, from the total participants of LBO, 87 (30.1%) of respondents were participate in Debo/Jigii, 43 (14.9%) of the respondent were participate in Wanfala and 42 (14.5%) of the respondent were participate on Humna. The majority of the respondents were members of Debo/Jigii, a community labor group, according to the findings of the study. This sort of community labor organization can be found throughout Ethiopia, and it is one of the most essential social assets for people to help each other during large-scale labor activities such as home construction, crop harvesting, and other large-scale labor tasks.

Table 4.7A: Descriptive analysis of respondent social participation on labor based organization (LBO)

Participation on (LBO)		Frequency	Percent
Do you participate in various community labor organizations?	Yes	172	59.5
	No	117	40.5
	Total	289	100
In which labor based organization do you take part (LBO)?	Debo/Jigii	87	30.1
	Wanfala	43	14.9
	Humna	42	14.5
	Total	172	59.5
	System	117	40.5

Source: Own survey, 2021

The descriptive analysis of Table 4.7B shows about is the participation of respondents in Community Based Organization (CBO). Those are local institutions like, (Mahiber, Iqubi, Edir, and Hirpha), and they are local-based social institutions used to support each other during sad and happy. This institution had had its own rule and regulation. As findings showed that, 43 (14.9%) of the respondent were the member of Mahiber, 59 (20.4%) of the respondent were members of Equbi, 159 (55%) of the respondent were the member of Idir, and 28 (9.7%) of the respondent were the member of Hirpha. This indicates that the majority of the respondent 55% were the members of Idir, which is a large community-based organization found in every corner

of Ethiopia, and this local institution is known for supporting individuals and groups of the member during the sad and gladness.

The other finding in this section was identifying respondents who got relief support from those community-based organizations. As the study result of Table 4.2.7, B showed that 173 (59.9%) of the respondent were ever received relief supports. The results indicate that the majority of respondents had participated in a social group in the study location. Social assets were a vital organization/institution of people's contracts that enabled them to survive, assist one another, and share their knowledge and experience.

Table 4.7B: Social participation of the respondents on community-based organization

Participation on (CBO)		Frequency	Percent
In which community-based organization (CBO) do you participate?	Mahber	43	14.9
	Equbi	59	20.4
	Idir	159	55.0
	Hirpha	28	9.7
	Total	289	100.0
You have ever received relief support	Yes	173	59.9
	No	116	40.1
	Total	289	100.0

Source: Own survey, 2021

In general, the findings of the household characteristics of the respondent Variation in age, household head, marital status, educational level, family size, farm experience, and social participation show that farmers come from different social backgrounds. Women also participate in farming as household heads, and, in addition, most urban farmers supplement their income by engaging in non-urban agricultural activities.

4.2. Types of Urban Agricultural Found in Burayu Town

Urban farmers in Burayu town engaged in a variety of agricultural activities to increase their income feed their families and sell agricultural products for a profit and to earn money in various ways. During the survey, information on the sorts of farming operations practiced in the town was gathered from sample respondents, a key informant in the town, and onsite field observation.

4.2.1. Livestock farming practice

In developing nations like Ethiopia, livestock production is an integral part of agriculture. Milk and milk products, meat, eggs, food, and numerous cultural applications are all supported by such farming activities in both urban and rural sections of the country. Livestock farming is crucial because it provides the potential for agricultural diversification and intensification, as well as considerable livelihood benefits (Bossio, 2009). Livestock farming is an important aspect of the farming system and serves an important economic and social role in the country as a whole, as well as in Burayu town specifically. The field observation also revealed that several forms of animal rearing practices, such as cattle (cows, calves) and poultry, are practiced in the area. Such farming practices are primarily classified into dairy farming and poultry keeping.

Dairy farming

As the study, result shown in Table 4.8 revealed that among survey sample 221(76.5%) of the respondents keep milk cows, and the majority of urban livestock producers in Burayu town keep milk cattle (cows) and sell milk to the locals, and practically all cattle owners keep their cows and calves at their homesteads. When the researcher look at the study result at kebele levels inhabitants in Gafarssa Guje from 90 respondents (69.2%) were engaging in dairy farming, in Gafarssa Nono 80 respondents (86.1%) were engaging on a dairy farm, and in Gafarssa Burayu 51respondent (77.3%) were engaging on dairy farming activity. Hence households practicing dairy farming Gafarssa Nono kebele are greater than those in the other two kebeles. This is since Gafarssa Nono kebele was discovered to be a per-urban area and is located far from the core of Burayu town, and the farmers in Gafarssa Nono relatively possessed ample farmland and community grazing grounds.

Figure 4.2: Some Practices of Dairy farm at the study area

Source: Photo taken by the researcher, June 202

Poultry farming

Table 4.8 result shows that in Burayu town, 141 (48.8%) of respondents practiced chicken farming for personal consumption and commercial purposes. The distribution by kebele reveals that 51.5% of respondents in Gafarssa Guje, 31.2% respondents in Gafarssa Nono, and 68.2% in Gafarssa Burayu were keeping poultry. In general in urban centers, maintaining chickens for meat and eggs is difficult, but in Burayu town, keeping fowl for eggs is a rewarding habit.

Table: 4.8: Distribution of Livestock rearing activity, and cross-tabulation by kebele

Livestock rearing activity			kebele						Total	
			Gafarssa Guje		Gaffarssa Nono		Gafarssa Burayu			
			frequency	Percent	frequency	Percent	frequency	Percent	frequency	Percent
Do you have Dairy for milk	Cows for milk	yes	90	69.2	80	86.1	51	77.3	221	76.5
		No	40	30.8	13	13.9	15	18.7	68	23.5
	total		130	100	93	100	66	100	289	100
Do you have Poultry for egg	chicken for egg	yes	67	51.5	29	31.2	45	68.2	141	48.8
		No	63	48.5	64	68.8	21	31.8	148	51.2
	total		130	100	93	100	66	100	289	100

Source: Own survey, 2021

According to the respondent, most Burayu town farmers raise sheep and goats for home consumption and oxen for farming purposes rather than for the market. According to field observations in Burayu town, some potential farmers can have more than 5-10 milk cows and get 20-25 liters of milk per day from a single cow.

Figure 4.3: Some practices of Poultry keeping activity

Source: Source: Photo taken by the researcher, June 2021

4.2.2. Plant Production

In the town of Burayu, as well as in the surrounding area, a diverse range of crops are grown. Crop farming is another popular sort of farming practice in the area. This type of farming activity is done to feed the farmer's family as well as for market purposes. The most popular crop farming practices, according to key informants and survey respondents, were from cereal crops (barely), root and tuber crops (potatoes, carrots), and vegetable crops (cabbage, tomatoes). According to field observations during a survey, farmers in the area practice crop farming in the back of their backyards, along the riverbank, and in the town's hinterland.

According to survey result Table 4.9; among survey sample 232 (80.3%) of urban farmers engaging in crop production. Cultivating a variety of vegetables is found to be the most common practice in all of the kebele as compared to other kinds of crops. Carrot, different types of cabbages, tomato, potato, and beetroot are the most commonly cultivated, where over 171(59.1%) of respondents were cultivating vegetation crop, 164 (56.7%) of respondents were cultivating root and tuber crop and 140 (48.4%) of respondent were cultivating cereal crop. Root and tuber crops are most commonly produced at Gafarssa Guje kebele by 87 (93.5%) of 93 respondents were engaging in root and tuber crop cultivation. As researcher field observation and key informant interview information potato is a commonly cultivated crop at Gafarssa Guje. Most potato cultivars produce potato mainly for only commercial purposes and some of them were produced for home consumption. (See Table 4.10 for the potential of kebeles).

According to field observation, key informant interviews, and information gained from group discussion, fruit tree planting is a less common activity. No, any fruit tree was found in the study kebele, but the same practice of planting tree-like eucalyptus are found, and it is also common to plant tree seedlings like eucalyptus and others around homestead area as leaving fence and there is also the practice of planting a tree on the land with poor fertility, stony land and inside gorge land and along the river, mostly on the land highly vulnerable to erosion. Those who plant trees were found to supply to the market, tree seedlings, and tree itself for building materials depending on the types of trees As informed from an individual interview and FGD.

Table 4.9: Type of plant production activity, descriptive analysis cross-tabulation by kebele

Crop production activity			kebele						Total	
			Gafarssa Guje		Gaffarssa Nono		Gafarssa Burayu			
			Frequency	Percent	frequency	Percent	frequency	Percent	Frequency	Percent
on which types of crop production activity you engaging it	Vegetable crop	yes	60	46.1	75	80.6	36	54.5	171	59.1
		No	70	53.9	18	19.4	30	45.5	118	40.9
	total		130	100	93	100	66	100	289	100
	Root and tuber crop	yes	50	38.4	87	93.5	27	40.9	164	56.7
		No	80	61.6	6	6.5	39	559.1	125	43.3
	total		130	100	93	100	66	100	289	100
	Cereal crop	yes	70	53.9	43	46.2	27	40.9	140	48.4
		No	60	46.1	50	53.8	39	59.1	149	51.6
	total		130	100	93	100	66	100	289	100

Source: Own survey, 2021

Table 4.10 results indicate that the specific type of livestock and crop production found in each selected kebele. As the findings show, from the total respondent of 130 at Gafarssa Guje 98 (75.4%), 70 (53.8%), and 70 (53.8%) of respondents were keeping cows for milk, chicken for egg, and chicken for meat respectively. At Gafarssa Nono from the total respondent 93, 88 (94.65%), 29 (31.1%), and 29 (31.1%) of respondents were also keeping cows for milk, chicken for egg and chicken for meat respectively and, Likewise, at Gafarssa Burayu 36 (54.5%), 45(68.2%) and 45(68.2%) of respondent were keeping cows for milk, chicken for egg and chicken for meat respectively. This shows that the numbers of farmers that can engage in milk production at Gafarssa Nono were larger than the other kebeles, while households engaged in poultry keeping activity at Gafarssa Burayu were higher than in other kebeles.

The findings of Table 4.10 show that cereal crop production is most common in Gafarssa Nono. From the cereal crop barely were commonly cultivated. As the findings show, at Gafarsa Guje 76 (58.9%), at Gafarsa Nono 89 (95.5%), and at Gafarsa Burayu 19 (28.8%) of the respondent were cultivated barely. As the result showed Table 4.10 other types of cereal crop, maize and teff are less commonly found in Burayu town.

Table 4.10: Specific type of livestock and crop production practice found in each kebele

Agricultural activity			Kebele						Total respondent	Percent
			Gafarssa Guje		Gafarssa Nono		Gafarssa Burayu			
			frequency	percent	frequency	percent	frequency	percent		
Livestock	Dairy	Cow for milk	98	75.4	88	94.6	36	54.5	222	76.8
	Poultry	Chicken for egg	70	53.8	29	31.1	45	68.2	144	49.8
		Chicken for meat	70	53.8	29	31.1	45	68.2	144	49.8
Crop production	Cereal crop	Barley	76	58.5	89	95.6	19	28.8	184	63.6
		teff	10	7.7	23	24.7	9	13.6	42	14.5
		maize	82	63	78	83.8	45	68.2	205	70.9
	Root and tuber crop	Beetroot	93	71.5	0	0	18	27.3	111	38.4
		Potato	50	38.4	77	82.7	0	0	127	43.9
		Carrot	0	0	19	20.4	9	13.6	28	9.7
	vegetable crop,	Cabbage	40	30.7	87	93.5	18	27.2	145	50.2
		Tomato	20	15.3	9	9.6	18	27.2	47	16.3
Total number respondent(the respondent give multiple response for each practice)			130		93		66		192	

Source: Own survey, 2021

The finding Table 4.10 showed that at Gafarssa Guje beetroot 93 (71.5%), potato 50 (38.4%) and carrot (0%) of the respondent were cultivated, at Gafarssa Nono beetroot are not cultivated by the respondent, potato 77 (82.7%), carrot 19(20.4%) of the respondent were practicing and at Gafarssa Burayu beetroot 18(27.3%), potato we're not be cultivated by respondent and carrot 9(13.6%) were cultivated. According to survey result Table 4.3.3, from the vegetable crop, cabbage at GafarssaGuje 40 (30.7%), at Gafarssa Nono 87 (93.5%) and at Gafarssa Burayu 18 (27.2) were produced, but tomatoes were less commonly cultivated at all study kebele.

Figure 4.4: Some practice of crop production at the study area

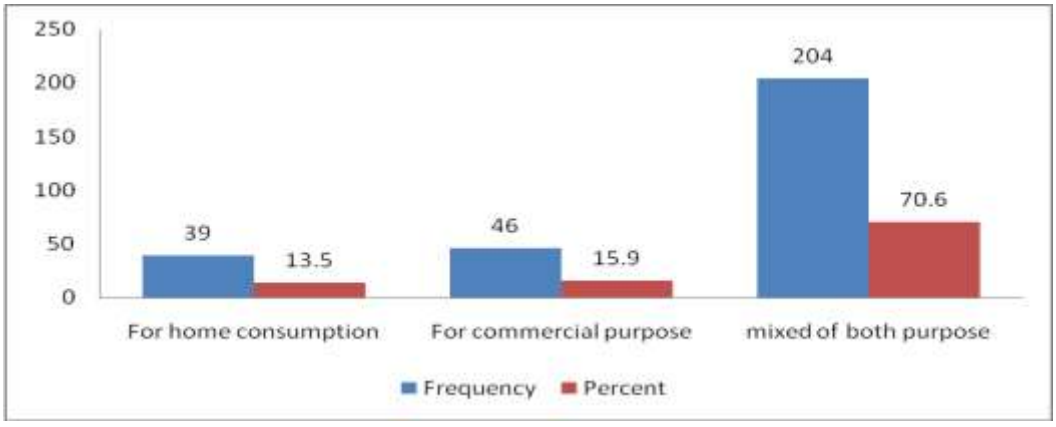
Source: Photo taken by the researcher, July 2021

4.3. Contribution of Urban Agriculture to Livelihood Improvement

The survey results showed that urban farming has a variety of contributions in the research area. It plays a critical role in generating household income, creating job opportunities, serving as a source of food, generating money, and ensuring the town's environmental improvement, as well as solid waste recycling.

To assess the contribution of urban agriculture first, identifying the respondents whether they practice urban agriculture for home consumption or market or both for home consumption and to commercial purpose are the beginning step of this section.

Figure 4.5: Reason of the respondent engaging urban agriculture



Source: Own survey, 2021

Figure 4.5 shows that a large number of respondents 204 (70.6%) were practicing urban agriculture for both home consumption and commercial purpose, about 46 (15.9%) of respondents were practicing urban agriculture for only commercial and the least number of the respondent is about 39 (13.5%) were engaging in urban agriculture for only home consumption. Field data indicate that the reason for engaging in urban agriculture is necessary, to avoid food shortage and meet nutritional food needs of the household and in line with food availability and access, they engage UA to generate more income to improve household well-being.

Table 4.11: Type of benefits derived from urban agriculture by respondent.

Benefits Derived by Practitioners		***respondent***	***Percent***
According to your self-assessment, your UA serves as a food source and your household food security?	Yes	204	70.6
	No	85	29.4
	Total	289	100
Does your urban agriculture meet a variety of food needs for daily consumption? (vitamin, protein and carbohydrate)	Yes	208	72
	No	81	28
	Total	289	100
Do you meet all year-round food requirements of your household members from your production?	Yes	212	73.4
	No	77	26.6
	Total	289	100
According to your perception urban agriculture can have environmental benefits?	Yes	225	78
	No	64	22
	Total	289	100
Does your urban agriculture Create job opportunity	Yes	162	56.1
	No	127	43.9
	Total	289	100
Does your income increase by the urban agriculture you engaged in?	Yes	251	86.9
	No	38	13.1
	Total	289	100

Source: Own survey, 2021

To examine the contribution that households derive from the practice of urban agriculture, an attempt was made to look at three characteristics of households. The first is regarding urban agricultural activity to increase income to the household, the second was regarding source and availability of food to household and the third is to identify whether the activity has served as creating job opportunity to any unemployed as job creating means.

4.3.1. Increasing income to the household

According to the finding of this study Table 4.11, among the total respondent (86.9%) have confirmed that their annual income increased as the contribution of urban agriculture. Only 13.1% of respondents reported no change in the level of income. To analyze by how much that the households have experienced an increase in income, they were asked to range both their previous monthly income (income before the time the household used to undertake urban agriculture) and their current monthly income. The income level of most of the households shows increment. As such, 23.5% of the respondents used to obtain an amount less than ETB 1000 before their engagement in the activity. But, this amount has significantly improved later. And now, it is only 6.9% who have said to obtain less than ETB 1000. The percentage of respondents obtaining between 1001- 2000 before involving in urban agriculture was 37.4%, which decreased to 17%, this indicates that the number of households with less amount of income was shifted to the middle range of income. Similarly, the amount between ETB 2001-3000 that referred previously to 16.6% were at it is, and the number of the respondents ranges 3001-4000 12.5% before UA involvement were rose to 13.8%. In another income range of respondents ETB 4001-5000 shows an incredible change from 6.6% before to 29.1% after engaging in urban agriculture. Similarly, the categories of income above ETB 5001, 3.5% before were also rose to 16.6% as clearly seen in Table 4.12A. This incensement in monthly income per urban agriculture to post-urban agriculture showed that UA has the potential contribution to generating additional income to households and allowing them to afford their annual basic needs.

Table 4.12A: Comparison of income of households in pre and post-urban agriculture practices.

Monthly Income Range in Birr	Percentage of Households falling in a given income range			
	Income of householder before practicing UA		Income of householder after practicing UA	
	Frequency	percent	frequency	Percent
Less than 1000	68	23.5	20	6.9
1001-2000	108	37.4	49	17.0
2001-3000	48	16.6	48	16.6
3001-4000	36	12.5	40	13.8
4001-5000	19	6.6	84	29.1
above 5001	10	3.5	48	16.6
Total	289	100.0	289	100.0

Source: Own survey, 2021.

As shown in Chi-square Table 4.12B, there is an association between the income of household pre and post-urban agricultural engagement since the significance value is less than 0.05. So we have enough evidence to say that there is a relationship between the incomer of household pre and post-urban agriculture engagement. This indicates that the income level of urban farmers is dependent on their engagement in urban agriculture activity.

Table 4.4.2B: Chi-square test of household income pre and post UA engagement.

Test	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	273.389[a]	25	.000
Likelihood Ratio	279.416	25	.000

Source: Own Survey, 2021

4.3.2. Serving as a source of food to the household

The advantage that is strongly come to next of increasing income of the household is using urban agricultural outputs as a source of food in terms of food availability, variety of food needs, and meeting the annual food requirement of the household. Accordingly, 70.6% of the respondents used urban agriculture as the source of food, 72% of the respondent also meet a variety of food needs (vitamin, protein, and carbohydrate), and also about 73.4% of respondents were able to meet all year round food requirement of household from own production (See Table 4.11). As an interview with one informant shows, "Before engaging in urban agriculture, they were unable to consume egg, milk, meat, and various types of vegetables easily, but now they can consume their variety of foodstuff from our product easily".

4.3.3. Creating job opportunities for others

The creation of jobs for others is the third parameter used in this study to assess the urban agriculture impact. According to the study result (Table 4.11) shows that some 56.1% of respondents generated permanent and temporary work for people other than their immediate family. The data for this study were collected for 1-8 people per family, temporary and permanent job opportunities were generated. Employment for a previously unemployed household member is followed by increased household income, which, as previously said, is the key to improved living conditions.

4.3.4. Total annual income from livestock and crop product

Descriptive analysis of livestock and crop product annual income describes that, the minimum and maximum annual income gain from the sales of the urban agricultural products. According to survey result Table 4.13, the minimum annual income gain from milk sales is ETB 83,000, the maximum annual income was ETB 720,000.00 and the average mean income is ETB 292,651.14, the minimum annual income gain egg sales are ETB 9,000, the maximum annual income was ETB 2,160,000 and the average mean income is ETB 544,306.14, The total annual income of livestock and crop product indicated that there is a high difference between the minimum cost and the maximum cost.

The standard deviation of household income from milk and egg is 200,935.071, 771,610.8556 respectively, which indicates that there is a high variation in income from household to household. This deference is the reason why, there is a difference in livestock assets and scale of crop production, some urban farmers had more than seven and above milk cows, and also some of the urban farmers had more than 800 chickens. On the other side, the standard deviation of household income from Maize, Cabbage, and Potatoes is 2811.11965, 11177.10633, and 12170.54491 respectively which indicate that there is a low-income variation with mean value and compatible income level of product sale from household to household (as seen on table 4.13).

Table 4.13: Descriptive analysis of total annual income from livestock and crop product

Income at household level	N	Minimum	Maximum	Mean	Std. Deviation
Income from milk sale	221	83000.00	720000.00	292651.1403	216288.87755
Income from egg sale	114	9000	2160000	544306.1404	771610.8556
Income from maize sale	184	2000	10000	5753.2609	2811.11965
Income from barley sale	205	500	12500	5564.6341	4040.23702
Income from beet root	111	2000	20000	9001.8018	6623.82726
Income from potatoes sale	127	2000	40000	10378.7402	12170.54491
Income from carrot sale	28	3000	15000	8535.7143	4331.04335
Income from cabbage	145	2000	40000	11772.4138	11177.10633
Income from tomato	47	10000	60000	30848.9362	18757.81428

Source: Own survey, 2021

4.3.5. Different sources of income and sectoral contribution to household

Urban farmers in Burayu make their livelihood strategies from the different farm and non-farm-based activities. As it is shown in Table 4.14, 95 % of sectoral income is derived from crop and livestock farming activity. Crop farming contributes to 10.5 % of the total sectoral income and livestock (milk and egg production) accounts for 84.5 %. Most of the livestock income was generated from poultry keeping for egg and dairy cattle for milk production. The income share of non-farm-based activities was found to be very low, which is 5 % out of the total income. This finding indicates that "most urban farmers found in Burayu town that their livelihood strategies were strongly dependent on agricultural activity, with poultry keeping for egg production and milk cows being the main income generation sources of the farmers," as an interview with one of an informant in the study region. Because Burayu town is a densely populated and rapidly growing town close to the capital city (Addis Ababa), there is a high demand for agricultural products, particularly fresh cow milk and eggs, one of the reasons why farmers in Burayu town specialized in livestock rearing, milk production, and poultry keeping.

According to the study's findings (Table 4.14), the sectoral contribution of household income from crop production is 10.5%, which is very low in comparison to livestock rearing, which is 84.5%. This is due to "the expansion of urbanization to urban areas, farmland and open space," as an interview with farmers and FGD. Non-farming activity, on the other hand, contributes very little, if at all, compared to livestock, which contributes 5%.

Table 4.14: Different sources of income and their sectoral contribution

Source of income		mean annual income in ETB*	Sectoral income share (%)	Standard deviation	Min.	Max.
	Crop	105,733.74	10.5	138,727.71	0	725,000
Agriculture	**Livestock**	847,276.19	84.5	492,253.4	0	1,900,800
	Subtotal	953,009.93	95		0	2,625,800
Non-farm income		50,611.42	5	17,852.8	0	84,000
Total income		1,003,621.35	100		0	2709800

Source, Own survey, 2021

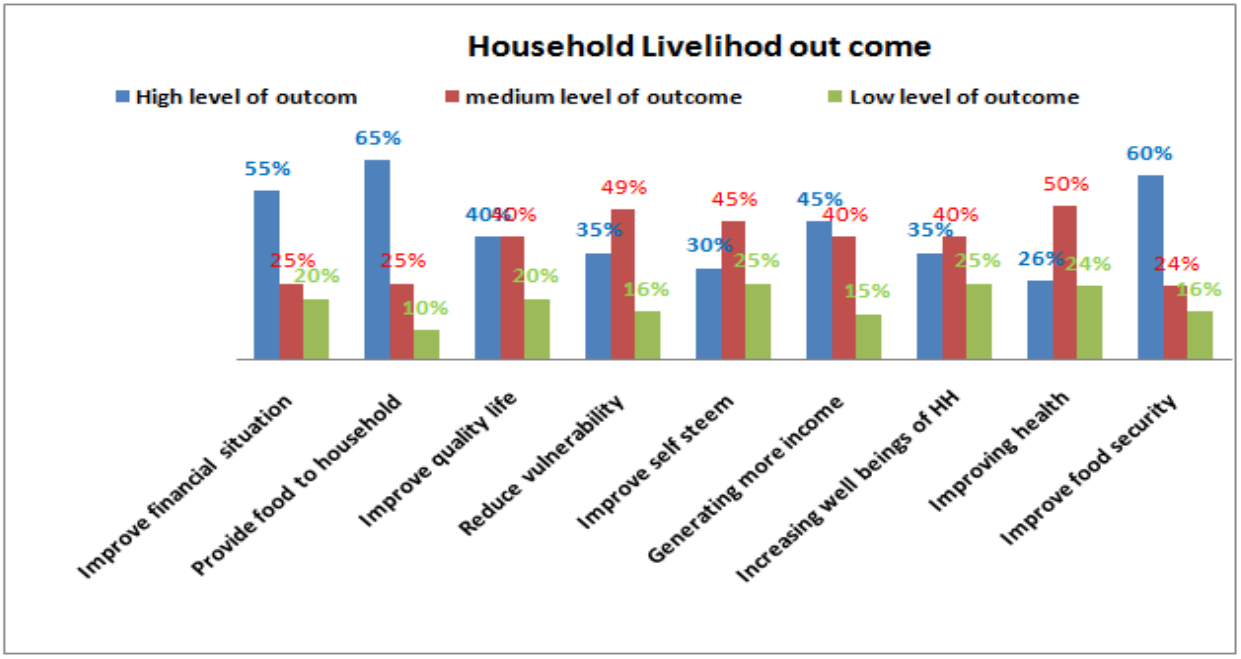
4.3.6. Household livelihood Outcomes from urban agriculture

The goals and accomplishments of people's livelihood plans are referred to as livelihood outcomes (Kappel & Pedersen, 2010). A livelihood is sustainable if it can reduce vulnerability to external shocks and trends, maintain or enhance income, well-being, food security, and empowerment, and reduce vulnerability to external shocks and trends.

As long as the main purpose of urban agriculture is to contribute to food security, scholarly writings emphasize other benefits of urban agriculture. In this study, the respondents were asked about the reasons why they participated in urban agricultural activities. Again, the respondents had to indicate their level of benefit from the high, medium, and low contribution of urban agriculture to household livelihood outcomes. Surprisingly, respondents in this study identified three levels of urban agriculture outcomes for household livelihood (See Figure 4.6).

Study result Figure 4.6 showed that one of the outcomes or benefits gained from participation in urban agriculture is the provision of food to households. Some 188 (65%) provide food from urban agriculture at a high level, 73 (25%) provide food moderately, and 28 (10%) provide food at a low level. The second outcome of practicing UA is that it improves the financial situation of households. In this study, 159 (55%) of the respondents greatly improved their financial situation, 72 (25%) moderately improved, and 58 (20%) significantly improved their financial situation by practicing urban agriculture. This finding suggests that, in addition to serving as a food source and generating income, urban agriculture plays an important role in improving household well-being, reducing vulnerability, increasing health, and increasing self-esteem, which is the most important outcome of urban agriculture for households' livelihood improvement.

Figure 4.6: Household livelihood outcome improvement by practicing urban agriculture



Source, Own survey, 2021

4.3.7. Parameters estimates analysis of the logistic model for contribution of UA to livelihood outcome

The goals and accomplishments of people's livelihood plans are referred to as livelihood outcomes (Kappel & Pedersen, 2010). A livelihood is sustainable if it can reduce vulnerability to external shocks and trends to maintain or enhance income, well-being, food security, and empowerment.

To analysis the dependent variable livelihood improvement by parameters estimation logistic model the respondents were asked whether their livelihood improved or not (Yes and No). And also the level of household livelihood outcome was measured by independent variable urban agriculture contribution in improving; financial situation, providing a source of food, improving quality of life, reducing vulnerability, improved self-esteem, generating more income, improving health, improving well-beings and improving food security of household were used as indicators and again, the respondents had indicated three levels of outcome(high, medium and low) level of household livelihood outcome by engaging on urban agriculture on each indicator.

As a result, a logistic parametric statistic isn't as straightforward as that of a regression coefficient. While B is convenient for testing the usefulness of predictors, Exp(B) is less complicated to interpret. Exp (B) represents the ratio-change within the odds of the event of interest for a one-unit change within the predictor. In general, if the importance level of the Wald statistic (which tests the effect of individual predictors while controlling other predictors.) is little (less than 0.05) then the parameter is helpful to the model.

Table 4.15: provides estimated coefficients for the factor change in the odds of being in the zero counts group (those who agreed that UA has no contribution to livelihood improvement) compared to the non-zero count's group (those who agreed that UA has a contribution to livelihood improvement). AU serves as a food source and household food secure, food requirement of household members from own production, income increased by UA, UA generating more income, UA activity increasing well beings of the household had significant impacts on the probability of being in the livelihood improvement since their p-value less than 0.05 level of significance.

The odds of being in the livelihood improvement decreased by about 47% for those who reported that UA serves as a food source and household security as compared to that for those who haven’t agreed that UA serves as a food source and household security. Concerning food requirement of household members from own production, the odds of being in the livelihood improvement decreased by about 98.3% for those not agreed that food requirement their household members from own production as compared to those who agreed that food requirement their household members from own production. The findings show that the odds of being in the livelihood improvement decreased by about 98.4% for those who haven’t responded that their income increased by UA as compared to those who agreed that their income increased by UA. The result shows that the odds of being in the livelihood improvement decreased by about 63% for those who responded that their UA generating low income as compared to those who revealed that their UA generating high income. Lastly, the odds of being in the livelihood improvement decreased by about 96.2% for those who have not revealed that UA activity increasing well beings of the household as compared to those indicated that UA activity increasing well beings of the household.

Table 4.15 Parametric estimation logistic model livelihood improvement

Variable name	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
UA serves us food source & food means of food security						
No	0.5342	1035.839	3.10	0.002	0.33972	0.94000
meet verity of food need						
No	.3052446	.4939818	-0.73	0.463	.0127978	7.280475
UA meet food need all year round						
No	.027218	.0465685	-2.11	0.035	.0009517	.7784195
Your UA create job						
No	.3364379	.1871979	-1.96	0.050	.1130542	1.001205
your income increased by UA						
No	.0268883	.0251108	-3.87	0.000	.0043115	.1676854
UA improve your financial situation						
Medium	1.328647	1.378993	0.27	0.784	.1737615	10.15934
Low	.3469943	1.086781	-0.34	0.735	.0007488	160.795
UA Provide food to household						
Medium	.7607617	2.63065	-0.08	0.937	.0008667	667.7787
Low	.027931	.0764778	-1.31	0.191	.0001304	5.980826
UA practice improve quality life						
Medium	.286022	.5690795	-0.63	0.529	.0057919	14.12473
Low	2.066231	7.759147	0.19	0.847	.0013144	3248.074
Does your UA reduce venerability						
Medium	2.815925	9.277182	0.31	0.753	.0044188	1794.485
Low	1.877621	6.956767	0.17	0.865	.0013177	2675.422
your UA practice improve self-steam						
Medium	.7499372	.8269504	-0.26	0.794	.0863796	6.510865
Low	.037604	.0826593	-1.49	0.136	.000506	2.794496
your UA generating more income						
Medium	1.729924	1.835234	0.52	0.605	.2162758	13.83713
Low	0.37003	126.9501	2.00	0.045	0.087809	3.070012
UA Increasing well beings of HH						
Medium	.157036	.1513895	-1.92	0.055	.0237358	1.038949
Low	.0488348	.0693691	-2.13	0.034	.0030173	.7904001
Does UA activity Improve health						
Medium	1.277338	3.038189	0.10	0.918	.0120697	135.181
Low	13.8405	74.54871	0.49	0.626	.00036	532052.1
Improve food availability, accessibility and food security						
Medium	1.247394	1.076054	0.26	0.798	.2299966	6.76528
Low	.3983633	.6059343	-0.61	0.545	.0202093	7.852495
_cons	31.15334	28.79421	3.72	0.000	5.090512	190.6548

Source: Own survey, 2021

4.4. Role of urban agriculture in improving the environment

According to Smit and Nasr (1992) "urban agriculture is the potential to produce environmental benefits". They also reported that "UA increases microclimate and nutrient recovery, as well as its potential to transform urban garbage into food and employment, providing a better living environment and increasing public health, saving electricity, and generating beautiful scenarios and ecosystems preserving natural resources, land, and water, and lowering the cost of waste management in cities". One of these specific study objectives is to determine the environmental impact of urban agriculture. According to the finding of this study Table 4.11 225 (78%) of respondents believe that urban agriculture is good for the environment, but 64 (22%) have no idea how important urban agriculture is to the environment. Urban agricultural benefits to solid waste management and practice and perception of the respondents were discussed in the following section.

4.4.1. Contribution of urban agriculture to solid waste management

Decomposed municipal garbage is not a problem because it can be used as organic fertilizer in agriculture. During data collection, the researcher observed municipal waste and waste generated by individual homes being dumped and thrown into the street in an unmanageable way because of these they pollute the area. Some questions were included in the survey questionnaire to assess respondents' practice and perception about solid waste management and how it benefits UA and the environment. According to the study findings Table 4.16, 160 (55.4%) of respondents required compost for their UA practice, although only 44 (15.2%) of respondents made compost from their domestic waste and use compost for their farms. However, the majority of respondents, 245 (84.8%), have little knowledge of how to make compost or recycle waste for use as organic fertilizer. Urban dwellers have some negative attitudes towards waste because they see it as "waste" and do not see it being reused or recycled.

Table 4.16: Perception and practices of urban farmers towards the advantage of UA to the environment (Multiple responses are possible).

Respondent Perception and practice		Respondent	Percent
Waste recycling and using it for UA is a possible solution to environmental improvement?	Strongly agree	130	45
	Agree	116	40.1
	Disagree	28	9.7
	Strongly disagree	15	5.2
	Total	289	100
Do you need to use waste as natural fertilizer for your agricultural practice?	Yes	160	55.4
	No	129	44.6
	Total	289	100
Do you have any Experience in making compost from the waste and use for your UA?	Yes	44	15.2
	No	245	84.8
	Total	289	100

Source: Own survey, 2021

The use of decomposed municipal wastes for urban agriculture is an immense and highly important aspect of urban agriculture for two reasons. That is, pollution is being removed from the environment, and attractive surroundings are being created, all while farmlands are being improved with organic fertilizer to increase productivity. As a result, the researcher determines if respondents believe trash recycling and reuse for urban agriculture is a viable approach for environmental improvement. According to the survey results (Table 4.16), 130 (45%) of respondents highly agreed, 116 (40.1%) agreed, 28 (9.7%) disagreed, and 15 (5.2%) severely disagreed. This result suggests that a substantial percentage of respondents (86.1%) recognize the need for trash recycling and reuse in urban agriculture to enhance the environment, and they also believe that waste reuse and recycling is a viable option for avoiding pollution.

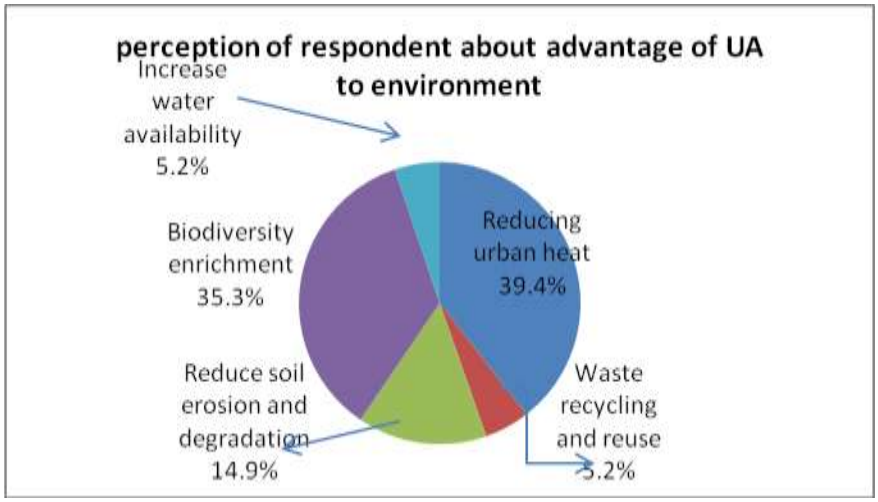
4.4.2. Perception of the respondent about the importance of UA to environment improvement

According to the findings of the study, urban farmers agreed on the importance of UA that could be delivered to them (see Figure 4.7), 39.4% of the respondents agree that practicing urban agriculture reduces urban heat, 5.2% agree with the importance of waste recycling or reuse to environmental resilience, 14.9% agree with the role of UA in reducing soil erosion/degradation,

and 35.3% agree with the role of UA in enhancing green biodiversity and also 5.2% agree with the importance of urban agriculture to increase water availability.

Almost all of the survey respondents stated that there are other types of benefits gained from UA by growing trees on their home campus, such as environmental aesthetics, shading, windbreak, and tree planting for financial reasons. According to observation data, the majority of respondents plant trees in their compound. As a result, planting trees reduces heat, improves groundwater availability, reduces soil erosion, creates clean surroundings, provides habitat for birds and microorganisms beneath the trees, and increases biodiversity enrichment opportunities.

Figure 4.7: Perception of the respondents about the advantage of UA to the environment



Source: Own survey, 2021

4.4.3. Parameters estimates analysis of the logistic model for contribution of UA to environment improvement

To analysis, the dependent variable environmental improvement by parameters estimation logistic model the perception of respondents was asked whether UA can have environmental benefits or not (Yes, No). And also the environmental improvement was measured by independent variable urban agriculture contribution in reducing soil erosion, waste recycle, reduce urban heat as an indicator of respondent perception and also the respondent asks level of agreement (Strongly Agree, Agree, disagree and strongly disagree) on the benefit of UA to environmental improvement and they indicate their level of agreement. And also the practice of respondents on waste management was asked whether they used waste as fertilize for UA and the respondent indicated whether they practice or not (Yes, No).

Table 4.17: provides estimated coefficients for the factor change in the odds of being in the zero counts group (those who agreed that UA has no environmental benefit) compared to the non-zero count's group (those who agreed that UA has environmental benefit). Waste recycling and reuse, reducing soil erosion and degradation, using waste as a natural fertilizer for agriculture, making compost from the waste, and use as UA had significant impacts on the probability of being in the environmental benefit since their p-value less than 0.05 level of significance.

The results show that the odds of being in the environmental benefit increased by a factor of 1.74, 1.29 for those who waste recycling and reuse, reduce soil erosion and degradation respectively as compared to those who reduce urban heat. That means the expected environmental benefit with those who practice waste recycling and reuse, reduce soil erosion and degradation was increased about 74%, 29% respectively higher than the expected environmental benefit with those who assuming urban agriculture reduce urban heat.

Also, the finding shows that the odds of being in the environmental benefit decreased by a factor of 0.89 for those who have not used waste as a natural fertilizer for their agriculture as compared to those who used waste as a natural fertilizer for their agriculture. Lastly, the finding indicated that the odds of being in the environmental benefit decreased by about 88% for those who have no experience of making compost from the waste and use for their UA as compared to those who have experience of making compost from the waste and use for their UA.

Table 4.17: Parameters estimates of logistic model analysis benefit of UA to environmental

Variables name	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
The major advantage of UA to the environment						
Waste recycling and reuse	1.7435739	.5650012	-2.39	0.002	.1677037	3.2969
Reduce soil erosion and degradation	1.293054	.9527029	5.35	0.027	.3051151	5.479858
Biodiversity enrichment	1.208205	.5219323	0.44	0.662	.5181197	2.817417
Increase water availability	2.490319	2.044173	1.11	0.266	.4983653	12.44406
Waste recycling and using it for UA is possible solution to a resilient environment						
Agree	.6304287	.2679132	-1.09	0.278	.274095	1.45001
Disagree	.5140001	.340641	-1.00	0.315	.140233	1.88398
Strongly disagree	.7064868	.4439566	-0.55	0.580	.206162	2.421026
Do you need to use waste as a natural fertilizer for your agricultural practice?						
No	.8930074	.3031967	3.33	0.039	.459042	1.737231
Experience in making compost from the waste and use for your UA?						
No	0.127863	.625371	4.22	0.028	.0304407	3.343688
_cons	2.258978	1.49216	1.23	0.217	.618948	8.244608

Source: own survey, 2021

4.5. Challenges of urban agriculture

Some of the visible challenges faced by urban farmers, such as land shortages, landholding over the last ten years, fertility status, credit challenges, government support, and challenges related to agricultural input and market chain are asked to them to examine the major challenges that practitioners face while engaged in their respective urban agricultural activities. Additionally, the researcher attempted to interview two male-headed and one female-headed urban farmer from

three different kebeles to make a case study on the challenges of urban agriculture. Informant selection was based on their level of involvement in urban agriculture and assumed they were model farmers. An in-depth interview was done for the case study. The in-depth interviews were conducted in Gafarssa Guje coded (KI1), Gafarssa Nono coded (KI2), and Gafarssa Burayu coded (KI3).

4.5.1. Shortage of land to practice urban agriculture

The urban poor frequently lives in cramped and congested quarters. Almost all of the respondents had had land resources to practice urban agriculture, but the methods of land acquisition were in different forms. As study result shows in Table 4.6.1A 230 (79.6%) respondent land inherited from their parents, 30 (10.4%) respondents were sharing with relatives, 19 (6.6%) respondents got to land by purchase, and 10 (3.5%) respondents got access to land through land distribution. This finding indicates that the most common method of land acquisition was an inheritance from parents. As a result, the majority or a considerable number of respondents were found to be people who had been in the research area for a long time. However, because the town's original residents do not have adequate farmland to do urban agriculture, over 93.5 percent of respondents said they experience challenges in producing additional crops for their source of food and generating extra revenue. Only 6.5 percent of respondents said they had enough land, in fact, priority was given to urbanization rather than agriculture in town.

Table 4.18A: Ways of land acquisition

Ways of land acquisition	Frequency	Percent
through land distribution	10	3.5
shared with relative	30	10.4
inherited from parents	230	79.6
purchased	19	6.6
Total	289	100.0

Source: Own survey, 2021

Descriptive analyses of the landholding of respondents depict the farmland size of the respondent. Table 4.18B indicates that 74 (25.6%) of the respondent had had 0.02ha, 44 (15.2%) of the respondent had had 0.025ha, 29 (10%) of the respondent had had 0.05ha of land, and 14 (4.8%) of the respondent had had above l hectare farmland as clearly (seen on Table 4.18B).

Table 4.18B Description of landholding in hectare

Size land in hectare	Frequency	Percent
0.02	74	25.6
0.025	44	15.2
0.05	29	10
0.075	15	5.2
0.1	43	14.9
0.2	14	4.8
0.25	28	9.7
0.5	28	9.7
1	14	4.8
Total	289	100

Source: Own survey, 2021

As findings Table, 4.6.1B indicates that the minimum individual farm landholding size was 0.02ha, the maximum individual farmland size was 1ha and the mean 0.163ha, and the majority of the urban farming household had less than 0.2 hectares of farmland. This might be connected with the difficulty of getting land for farming purposes in town. As result, most urban farmers, particularly chicken keepers and dairy producers, perform urban agriculture in homestead areas on extremely small plots of land, according to researcher field observations. To summarize, land scarcity is a severe challenge that farmers confront as a result of urbanization, making it difficult for them to produce on a large scale.

Box 4.5.1: Detail key informant interview on shortage of land to practice urban agriculture

KI1, at Gafarssa Guje

The first informant was a 46-year-old male-headed urban farmer from Gafarssa Guje kebele (KI1). He was the father of six children, two daughters, and two sons. His two daughters were in grades ten and seven, while one of his sons was in fifth grade. The other is a preschooler. In Gafarssa Guje kebele, he was a model farmer who engaged in large-scale poultry farming as well as vegetable growing at his home. He had about 850 hens for egg production. In an in-depth conversation with him, he told to the researcher that there was a severe scarcity of land for him and other urban farmers in his kebele to practice urban agriculture. No one is concerned enough to provide a solution to their problem. For a short-term solution he desires needs to contract land to conduct large-scale crop production of potatoes and onions, but there is no land available for contract and sharecropping. His family gave him the land on which he raises chickens as a gift. It covers roughly 0.5 hectares, but the government refuses to provide him an investment license for large-scale chicken farming. The reason for this is that the

government discovered the lands for other purposes. He is now afraid of how he will survive and has decided to relocate the farm.

KI2, Gafarssa Nono informants

The second informants at Gafarsaa Nono (KI2) were 48-year-old females headed by urban farmers. She had five children; two of them were in grades 11 and 8 at the time. Her other two daughters and one son were helping their mother with different duties around the house. She was mostly a cattle farmer with seven milk cows. KI2 told to the researcher in an in-depth interview that there is a severe shortage of land on which to practice UA. She had 0.5 hectares of land to work with. Homestead land accounted for about 0.05 hectares, whereas undulating topography and less fertile land accounted for about 0.1 hectares. The rest of the land was utilized for grazing and part was used for crop cultivation. According to the source, she needs to engage in large-scale urban agriculture, particularly vegetable crop and root and tuber crop production, namely potatoes and various types of cabbage, but she does not due to land constraints.

KI3 Informant of Gafarssa Burayu youth enterprise

At Gafarssa Burayu (KI3), the third informant was a 33-year-old member of a youth cooperative for poultry-keeping. When the cooperative organization started in 2009 E.C., there were ten members, but now there are just eight. KI3 also told to the researcher there was a severe lack of land, according to an interviewer. They have about 1200 hens for egg production and two halls, each measuring about 60 care meters. As he explained to the researcher, there was a land issue in accommodating the over 1200 hens in these overcrowded halls and treating the hens professionally. Even during the outbreak of hen sickness, there was no way to distinguish between the sick and the healthy. To fix the problem, they asked the relevant bureau of employment creation and enterprise development to deliver additional hall, and they also need to raise poultry on a large farm-scale and develop their output to meet the high needs of town people, but the problem remains unsolved.

When the researchers conclude the above case study findings of KI1, KI2, and KI3, the difficulty of land scarcity is a key issue that has an impact on the amount of output and income of the household. This means that if they have a large farm, they may produce more and earn more money, so supplementing their family's income and livelihood needs.

4.5.2. Landholding over last decades

According to observations made on the ground during data collection and interviews with key informants, Burayu town was one of the most rapidly developing towns in the Oromia Special Zone, and the government took land from farmers for industry, transforming the town into an industrial town, with Gafarssa Guje and Gafarssa Nono Kebele serving as the town's industrial zone. In contrast, as my information gathered from a key informant, "landowner farmers sell their holdings for people to migrate to town for settlement or home building". According to the findings of this study, 89.6% of respondents' landholdings have shrunk in recent decades, while just 10.4% of respondents' land holdings have remained the same (see Table 4.19). The interview with informants shows that the reason for landholding remained the same as before due to a lack of infrastructure, transportation, and water access, as well as the fact that it is located far away from the town's center. It will also diminish soon. Finally, land scarcity for crop production, milk cows, sheep and goats, poultry, and other UA practices are serious challenges that farmers face today and will continue to face future generations if not addressed.

Box 4.6.2: Landholding over last decades

KI1, Gufarssa Guje

According to KI1, farmlands have declined dramatically in recent decades. His father, according to the informant, possessed over four hectares of farmland two decades ago. In recent decades, these farmlands have been reduced to two hectares, and they have also been fragmented by urbanization and turned to settlement. His father died, and the government took away some of their lands, while others were shared with concerned relatives and family members. The land they have passed is now history. His farmland was also reduced from 0.05 hectares to 0.25 hectares. The same can be said for the rest of the kebele's families. Despite the government's emphasis on investment, he claims that lands are being used for the planting industries rather than urban agriculture. To build dwellings, urban farmers must sell their agricultural areas to migrants from the city. Urban farmers are also afraid of using their agricultural land for UA since the government will take it over for industry if it is vast and open. That is why farmland is sold to migrant workers in the town.

KI2, Gufarssa Nono

KI2 also told the researcher land had deceased, according to the facts obtained from the KI2 in-depth interview for the case study. She and her family's farmland in Burayu town were quickly transformed into a community and industrial zone. This is because farmers were selling their farmland to migrants in town, and the government was also distributing suitable farmland for home construction for government employees and other town residents. According to KI2, community grazing land existed 10 years ago. This site has now been turned into an industrial zone and a residential area. This causes a livestock feeding dilemma and reduces the town's cattle output capacity. This issue has enraged her, and the amount of money she earns from milk and milk products has declined.

KI3, Gafarssa Burayu

KI3 claims that farmland has been greatly reduced, converted to settlement zones, and urbanized. Even now, the town's property is gradually being transformed into an urban area, while the government remains silent.

As a conclusion of the case study found, the landholding capacity of urban farmers in Burayu town has been shrinking year after year. While urbanization was given priority in towns, urban agriculture was one means of stabilizing the urban market, regulating food price inflation, regulating environmental conditions, and creating a lovely recreational environment. As a result, for the town to reap these and other benefits, the government must pay attention and change policies to preserve urban agricultural land.

4.5.3. Fertility status of farmland

According to the researcher's observations on the ground, the topography of Burayu town is mostly flat, with some rolling terrain. The majority of agricultural producers utilized chemical fertilizers, particularly for cereal crops, barley, and some root and tuber crops, while vegetable growers used organic fertilizers such as compost and animal manure. According to the findings of this study Table 4.19 perception of the respondent, 37.4 percent of respondents own poor fertile farmland, 56.1 percent own moderately fertile farmland, and just 6.5 percent own good fertile farmland.

According to a key informant from the Burayu Bureau of Agricultural Office, "the fertility status of farmland has declined year after year; most activities require fertilizer, and no product is expected without fertilizer". As observed at the field, most of the farmland is near to asphalt and the soil on the plot is mixed with some building material; fragmented stone, some are also the nature of compaction, some plot is also disturbed soil with sub-soil plowing by a bulldozer for road and house construction and plot along the river bank have been contaminated by chemicals released from the industry. As a result, the fertility status of farmland is one of the quantifiable challenges faced by urban farmers.

Box 4.5.3: Fertility status of farmland

KI1, Gafarssa Guje

According to an in-depth interview with KI1, his farm land's fertility is deteriorating year after year. Without fertilizer, even certain crops would be useless. According to him, the farmers in Gafarssa Guje kebele utilized chemical fertilizer to grow their crops. In interviews, he claims that the main problem on his farmland and other farmlands in Kebele is the pollution of agricultural land caused by urban garbage generated by individual dwellings, rather than nutrient depletion. As a result of the no-waste damping site in Kebele, individuals handle waste in plastic bags and just throw it on the farm when they go from home to work in the morning. This trash consists of decomposed and un-decomposed waste, primarily plastic and water bottles, which is not suitable for farming land and results in pollution rather than the loss of critical nutrients. One of his brothers' farms, he claims, is close to the main asphalt road. Anyone who can drive down the asphalt road can dump rubbish on farmland. He always collects and cleans his agricultural area at the beginning of each farming season, yet his land is still polluted by plastic and undesired things.

KI2, Gafarssa Nono

KI2 farmland had a low fertility rate, according to KI2. Her property is undulating, making it susceptible to erosion and nutrient loss. Her farm wouldn't have produced anything if it didn't have fertilizer. To obtain decent results, she regularly used fertilizer. She told the researcher during the in-depth interview that she has used animal manure before. Because she has milk cows, she collects more animal feces every day. This daily gathered manure was used to grow potatoes and barely farm, but her farmland was still in bad condition.

KI3, Gafarssa Burayu

The KI3 do not have their farmland on which to grow crops and monitor fertility. They have a hall for hen production delivered from the government because they are a cooperative firm. However, he provides the researcher with general information and observations about the town's overall fertility condition. He backs up the information Gafarssa Guje and Gafarssa Nono presented. According to him, the bulk of agriculture is under-fertilized and needs fertilizer to develop. He saw that the majority of urban farmers employed fertilizer in their farm operations.

Table.4.19: Challenge of urban agriculture faced by urban farmers in the study area

Challenges related to urban agriculture		respondent	Percent
Do you have enough land access for your urban agriculture	Yes	19	6.5
	No	270	93.5
	total	289	100
What happened to the size of landholding over the last decades	Decrease	251	89.6
	No change	38	10.4
	Total	289	100
What is fertility status of your farmland	Poor	108	37.4
	Moderate	162	56.1
	Good	19	6.5
	Total	289	100
Do you have access to credit service from micro-institutions to supplement your urban agriculture?	Yes	113	39.1
	No	176	60.9
	Total	289	100
Do you have a good market and technology assessment to promote your agricultural product?	Yes	113	39.1
	No	176	60.9
	Total	289	100
Do you have enough storage area for your product?	Yes	57	19.7
	No	232	80.3
	Total	100	100
Does government supports your agricultural activities related to urban agricultural policy and in delivering agricultural input?	Yes	133	46
	No	156	54
	Total	289	100
Do you have shortage of feeds for livestock rearing and agricultural input to crop product?	High	212	73.4
	moderate	77	26.6
	Total	289	100

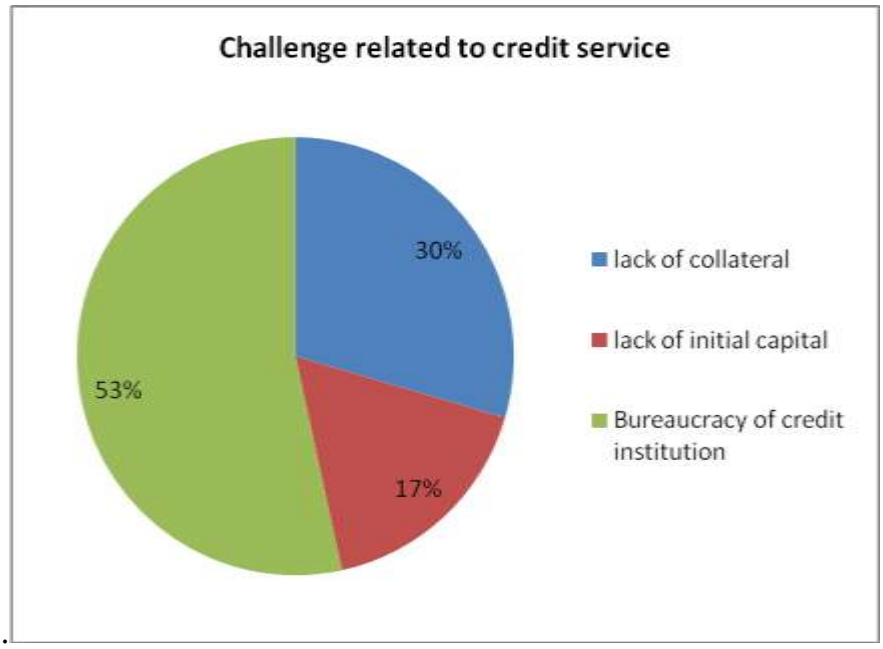
Source: Own survey, 2021

4.5.4. Credit service to supplement urban agriculture

One of the most important development tools is credit. Credit services are essential for farmers and some entrepreneurs to put their ideas into action. However, more than half of the respondents in the study location said they had a difficult time getting credit. Study result Table 4.19 showed that 176 (60.9%) of respondents have encountered this problem, with 39.1 percent receiving proper credit service. When it comes to credit service issues, we have identified three categories of constraints. The first was a problem with credit institution bureaucracy; of the 176 respondents who had a credit problem, 53 percent of them said they did not have assessed credit service for their agricultural activities because of the bureaucracy. FGD and interviews with

informants confirm that expertise in bureaucratic conduct is one of the primary challenges faced by farmers in the study area.

Figure 4.8: Challenge related to credit service



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Source: Own survey, 2021

Another obstacle, second to credit institution bureaucracy, was a lack of collateral. According to the finding result (Figure 4.8) of the 176 respondents, nearly 30% had a collateral problem. The third issue with credit services is the lack of initial deposit money, which is a problem that 17 percent of respondents face problems with. As an interview with one informant showed, "there are practices of depositing money before processing credit. It typically takes two to three months. At this stage, the credit benefits must be deposited at least 15-20% of his/her credit proposal amount". This is especially difficult for farmers and new businesses. Therefore, lack of access to credit is a serious challenge that is faced by poor urban agriculture practitioners.

Box 4.5.4: Challenges to the credit service

KI1, Gafarssa Guje

He doesn't ask for a credit to supplement his farm right now, according to an in-depth interview with KI1, because he has enough funds to manage his poultry project. He claims that he will need credit services in the future, but he is afraid of credit institution bureaucracy. He mentioned our prime minister Abiy Ahmed's speech of parliament, Farmers with farmland and livestock owners, according to the prime minister, can use their property as collateral to access loan services. However, this speech was left at the hall of parliament and was not translated into action. His wife needed to use a credit service and construct a business plan for a small shop, as he revealed during the in-depth interview, but the credit service failed due to a 20% initial deposit and collateral issues.

KI2, Gafarssa Nono

The KI2 also confirms the above problem. Even though she produced a business strategy to employ credit services to conduct high-volume milk production, she requested 400,000 ETB in her business plan, but due to collateral issues and an initial deposit of 80,000 ETB, she was unable to access the loan. Why do I need credit if I have 80,000 ETB? Why don't I manage my company on my birr? While she is emotional during the in-depth interview. This shows that the lending institution's bureaucratic nature and credit criteria are inconvenient for urban farmers.

KI3, Gafarssa Burayu

According to the KI3, they have not encountered any difficulties in obtaining credit for their project. As he stated, the government encourages them to use credit services. The institution covered the initial deposit of 20% birr, and they were repaid once they lasted and used the credit facility. This is one-time support because they are small and microenterprise, and they only need it when they first start working. They treat the second round of credit service according to the credit institution's guidelines.

In conclusion of the above case study finding, due to credit and collateral issues, two of the informants had credit service challenges. This case study's findings matched those of the survey. As a result, credit institution bureaucracy, initial deposit money, and collateral issues were widespread.

4.5.5. Market chain for agricultural product

According to the finding in Table 4.19, more than half (60.9%) of the respondents mentioned that they have faced market linkage. Most urban farmers sell their urban agricultural products at a lower price in the local market, in homestead areas, and on-farm plots, on street. About (39.1%) total respondents were said to have experience of using technology to promote products and search for a market. Farmers who raise poultry and milk cows, in particular, were delivering egg and milk products to supermarkets and shops located throughout the town and capital city of Addis Ababa. This is a well-liked practice from which others can learn. As a result, market chain and technology use are also major issues for urban farmers, particularly vegetable producers who handle perishable agricultural products.

Box 4.5.5: Challenges to the market chain

KI1, Gafarssa Guje

According to KI1, one of the most difficult things he was currently dealing with was the market chain. His market troubles stemmed from a lack of market access, but the real issue was the product's pricing. As he noted in the in-depth interview, the price of an egg was 5 ETB when he first started keeping chickens, but it has now been hiked to 7.50 ETB. He is dissatisfied with this pricing and has not benefited from chicken egg production. He is concerned about the farm's long-term viability if the inflation of feed price continues at this rate.

KI2, Gafarssa Nono

The KI2 also reflects the difficulties she encounters in the supply chain. She told to the researcher in an in-depth interview that she doesn't get the exact market chain from the government. She sells the milk products at the local market and the farm at a low price. Other urban agriculture products suffered from the same issues. In comparison to the minimarket and supper market, the majority of the vegetable crops grown at this kebele were sold on the street and the farm at low prices.

KI3, Gafarssa Burayu

According to the KI3, they haven't had any market chain issues like the previous informants. He told to the researcher throughout the in-depth interview that they have experience searching the market on their own. Supermarkets, shops, hotels, and industry all received the egg product. The issue is the cost of eggs. As the cost of feed increased, so increased the cost of eggs. The relationship between clients becomes affected when market price inflation occurs daily. He emphasized that the government must address feed access to control egg costs; else, the problem will persist.

According to the case study finding revealed, all of the informants were experiencing market issues, with inflation of feed and treatment prices being one of the reasons disclosed in the case study findings. This has an impact on the pricing of the goods and creates a harsh link with the client.

4.5.6. Storage area and accessing market on time

According to the study's findings Table 4.19, about 80.3 percent of respondents faced a shortage of storage space for post-production handling, and, as noted above, market and technical problems are also a concern for urban farmers. Only 57 (19.7%) of responses were unaffected by the challenge. Agricultural products are being lost due to a lack of storage space. According to the researcher's understanding of the study region, the problem is primarily related to perishable products such as vegetables, root and tuber crops, eggs, and milk.

Box 4.6.6: Storage area and accessing to market on time

KI1, Gafarssa Guje

According to the KI1, his agricultural activity was also hampered by a lack of storage space. He engages in chicken keeping activity and harvests more than 650 egg products every day, as specified inbox one of the case studies. This egg product was not sold in a single day. He places the product uncontrollably and unwisely on the cemented ground. He has no separate storage stock and sells the egg product in 4 to 6 days. He sells and stores his goods in a little room in front of his farmstead on the side of the road. Do the researchers inquire as to why the egg product is not stored on a vertical leveled shelf on sheets of paper, cartons, or boxes? He responds that storing egg on a shelf by paper stuck or carton box incurs additional costs, but he fails to recognize that storing egg on shelf and carton box reduces the risk of egg product while also providing the benefit of leveling and storing product vertically for more manageable and efficient land or space use. In this case, the researcher needs to speak and share something about storage and the need of leveling the product vertically and storing the egg product in carton boxes, as well as the dangers of storing eggs on the ground; eventually, he understands and agrees to do so.

KI2, Gafarssa Nono

KI2, like KI1, has difficulty with storage. She had about seven milk cows and about 140 liters of milk produced every day. However, she did not employ a regulated and adequate storage system; instead, she used a hard plastic container that could hold 25 liters of milk. According to the informants, to reduce the risk of milk, she sells the product at a cheap cost at a local market in the homestead area, which is significantly lower than the price of milk in a supermarket or other shop.

KI3, Gafarssa Burayu

They were also irritated by the lack of storage space, as informed by informants one and two. They haven't separated storage, according to KI3. They harvest the egg and store it in a tiny room where they sell it. But one thing the researcher noticed there was that this youth-led group was receiving various forms of government-sponsored training on how to manage egg products. They also put the lesson into practice by putting egg goods in carton-made boxes to reduce the risk of egg contamination and make the product easier to handle.

4.5.7. Government support in input and policy

According to the study results Table 4.19, in terms of agricultural input delivery, such as feed for livestock, improved seeds for crop production, and other crop and animal treatment, 133 (46%) of respondents were not facing government challenges, but more than half of the respondent, 156 (54%) were facing these challenges. However, when it came to policy, all of the respondents were unsure about urban agricultural policy, also, as an interview with one of informant agricultural office expertise of the town says that, "no written policy that guides expertise and urban farmers to support their agricultural activities, whereas there is a guideline and manuals to run agricultural activities in urban areas". As a result, government support and policy guidelines are the main challenges for urban farmers.

Box 4.5.7: Government support in input and policy

KI1, Gafarssa Guje

According to the KI1, government assistance is insufficient. Even if the extension work was carried out by two development agents (DA) for all of Burayu's six kebele. The development agent is unable to reach all of the farmers. As he explained to the researcher, items such as poultry feed and treatment are not provided by the government, so he must get them from individuals at a high cost. According to the informant, he had a situation last year when the feed he had in storage ran out for three consecutive days, and his client, who was scientifically preparing feed for hens, had to suspend preparing feeds due to political instability. His hens have been without feed for three days, at a time when their lives were in danger, but he fixes the situation on his own, producing local feed from corn and barley. He also supplemented the vitamin feed items with grass and cabbage to get through the critical three days. He claims to not know urban agricultural policy.

KI2, Gafarssa Nono

According to KI2, government backing was little to non-existent. As she indicated during the in-depth interview, she has to establish a market chain for her milk product with hotels, schools, and other milk product demanders, as well as consult the development agent (DA) to facilitate and write support to hotels and other demanders. The DA, on the other hand, kept silent. When she spoke more broadly, she stated that the government's support was insufficient, and that no inputs such as feed and improved seed were provided by the government, and that, while there may be an urban agricultural policy on paper, "she doesn't see it."

KI3, GafarssaBurayu

According to the KI3, there is some government support, but he believes it is insufficient. As a result of his reaction, he believes that the delivered production site was a result of government assistance. He also believes that the establishment of this production location and credit service was a result of urban agricultural policy.

When the researcher generalized the case study on government assistance in delivering inputs and policy support for urban agriculture, KI1 and KI2 criticized government support for urban agriculture, particularly for feed, treatment, and extension services. On the other side, KI3 was taking advantage of government assistance. As a consequence of the case study findings, it was discovered that Burayu town had insufficient government assistance and extension service for urban agriculture. As a result, the government must amend the way it manages urban agriculture.

4.5.8. Inputs, feeds and treatment to crop and animals

According to the study results in Table 4.19, 73.4% of respondents faced this challenge. This issue is particularly acute in the case of milk cows and poultry feeding. This is a relatively minor issue in crop production. According to the FGD discussion at Gafarssa Guje and Gafarssa Nono kebele, "the main reason for this is that agricultural inputs can easily be found at local stores for a reasonable price". However, only 26.6% of respondents faced the challenges in a moderate manner, which does not mean that they are free of the problem, but that they can access their input and feeding needs moderately while still facing the challenges. As the interview with some informants showed that, "the urban farmers who were engaged in poultry and dairy, treatment and feeding are the primary challenges of the study area's agricultural activity".

4.6. Discussion of the findings

In this section, the data is summed together to present the findings discussions of the study along with previous findings of literature and theoretical arguments. The study mainly focused on household characteristics, type of urban agriculture, the contribution of urban agriculture, people's perception towards benefits of UA as well as prevailing challenges data was defined using tables, graphs, and pictures.

Demographic information of the respondents (Table 4.1) shows that the majority of Burayu town's urban farmers are in their mature elderly age group. This finding is consistent with the findings of Mohammed's (2002) and ENDA-Ethiopia's (2002) studies, which found that UA is the most common occupation among women, the elderly, and low-income urban people.

With regards to the household head type (Table 4.2), the result illustrated that of the 289 samples interviewed, 232 (80.3%) were male-headed households and 57 (19.7%) were female-headed households. These results indicate that the participation of women in the fields of urban agriculture in the study area was very low. This finding contradicts what is stated in FAO (2012), which claims that women are more involved in urban agriculture than males, which is supported by the similar report of Onyango (2010), who reported that the percentage of women participating in urban agriculture was significantly higher than men. Women are still found to be

more active in the field, but the disparity between the sexes is very large as the head of the house in this study.

Concerning the education status of respondents (Table 4.3) showed that, at all locations, many of the urban farmer household heads had below secondary school education and those with no formal education. That means farmers who can have the ability to read and write. This indicates that the majority of those interviewed had a very low level of schooling. This finding is consistent with Salau and Attah's findings (2012). They discovered that 33.33 percent of respondents had completed primary school, 22.22 percent had completed secondary school, and 17.78 percent had completed higher education; in total, 73.33 percent of respondents had completed secondary school. According to Agbamu (2006), formal education has long been acknowledged to have a good impact on farmers' adoption of new technologies

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With regards to members of households working in additional nonfarm activity (Table 4.4) reveals that large numbers of respondents were found to engage in UA and non-UA activity. This result implies that urban farmers found in Burayu town were working in additional jobs to generate additional income and be able to afford their livelihood expenditures. This finding is in line with that of Foeken and Mwangi (2000), who discovered that most urban farming operations were carried out part-time by people who had other employment. Their involvement in urban agriculture was meant to supplement their household's food and income.

In terms of family size at the household level (Table 4.5), the majority of Burayu homes have a large family size, with an average of 4.5 individuals and more than half of the members being dependents in terms of age. Based on this research, the researcher discovered that large families participate in urban agriculture to meet their family's food needs while also earning extra money. These findings are in line with those of Onyango (2010). She suggested that a household with a large number of members would require more food, putting pressure on the household to find alternate food sources, such as urban gardening.

Table 4.6 shows the respondents' experience in terms of how long they have been involved in urban agriculture. According to the findings of the survey, the respondents had been practicing

urban agriculture for more than 6 years, and some had been doing so for up to 15 years. This shows that the majority of the respondent had a lot of experience with urban farming and were likely to have picked up the necessary skills for a successful business. As a result, the researcher can conclude that urban agriculture is not a new phenomenon in Burayu. However, it may not be able to generalize that experienced farmers are effective without adequate farm extension support services and technology transfer for appropriate agricultural approaches.

Descriptive analyses of the respondent's social participation reveal that the respondent is involved in community affairs, customs, and values. According to the results (Table 4.7A), the bulk of the respondents were members of Debo/Jigii, a community labor group. This type of community work organization can be found all over Ethiopia, and it's one of the most important social assets for people to assist one another during large-scale labor. In terms of respondents' involvement in community-based organizations (Table 4.7B), it reveals that they are involved in local institutions such as Mahiber, Iqubi, Edir, and Hirpha, which are community-based social institutions that help each other in both joyful and sad times. The study result indicates that the majority of the respondents were members of Idir, which is a large community-based organization found in every corner of Ethiopia, and this local institution is known for supporting individuals and groups of members during sad and glad times. This institution had its own rules and regulations. Social assets were a necessary organization/institution of people's contracts that enabled them to survive, assist one another, and share their knowledge and experience. This finding is in line with Agbamu (2006) the researcher believes that the higher a farmer's participation in social organization, the more interaction he has with other farmers, and thus the faster he absorbs innovations and shares his experience with other farmers.

With regards to livestock farming practice (Table 4.8), it revealed that the majority of urban livestock producers in Burayu town keep milk cattle (cows) and sell milk to the locals, and practically all cattle owners keep their cows and calves at their homesteads. While poultry-keeping practice (Table 4.8) shows that 48.8% of respondents practiced chicken farming for personal consumption and commercial purposes. The distribution by kebele reveals that 68.2% of respondents in Gafarssa Burayu were keeping poultry. In general, in urban centers,

maintaining chickens for meat and eggs is difficult, but in Burayu town, keeping fowl for eggs is a rewarding habit.

Concerning plant production (Table 4.9), the result shows that 80.3% of urban farmers are engaged in crop production. Cultivating a variety of vegetables is found to be the most common practice in all of the kebele as compared to other kinds of crops. Carrot, different types of cabbages, tomato, potato, and beetroot are the most commonly cultivated. As researcher field observation and key informant interview information potato is a commonly cultivated crop at Gafarssa Guje. Most potato cultivars produce potato mainly for only commercial purposes and some of them were produced for home consumption. (See Table 4.10 for the potential of kebeles).

With regards to the general practice of urban agriculture found in Burayu, there was a practice of mixed farm activity in town and provided a variety of farm products to producers and consumers. In terms of crop production, vegetables, root and tuber crops, and cereal crops barely overcome the higher share of other crops in agricultural output, and poultry and milk cows are more visible in livestock rearing operations. When crop production and livestock rearing activities are compared, farm operations such as milk production and poultry keeping have surpassed animal rearing activities. This is because they only require a small area of land relative to crop production. As a result, Burayu town's urban farmers were able to obtain fresh vegetables, eggs, and milk products for their families and they supply to the market. This is in line with Van Veenhuizen and Danso's observations (2007). They claim that profitable, in-demand commodities including green leafy vegetables, eggs, milk, mushrooms, medicinal herbs, flowers, and ornamental plants are produced by urban farmers. As a result, farmers and producers in cities have a competitive advantage over those in rural areas.

Concerning the reasons why urban farmers engage in urban agriculture (Figure 4.5), it shows that the large numbers of respondents (70.6%) were practicing urban agriculture for both home consumption and commercial purposes. This indicates that the reason for engaging in urban agriculture is to avoid food shortages and meet the nutritional food needs of households. In line with food availability and access, they engage UA to generate more income to improve household well-being. This finding is much different from Kutiwa *et al.* (2010), who found a

significant number of respondents (66.1 percent) farmed purposely for home consumption, while (33.9 percent) farmed for both sale and consumption. The same study revealed that a substantial number (50 percent) of the farming households used farm income to purchase food; 30 percent attested to using the money to supplement household income; 10 percent for school fees; and another 10 percent for procuring medicine. The most frequently mentioned primary motivator for urban agriculture was the need to avoid hunger for urban farmers and their families by growing staple foods. Other experts, on the other hand, see the failure of families' monthly per capita incomes to keep up with growing food prices as the key motivator for people to engage in urban agriculture (Flynn, 2001). It is vital to emphasize, however, that these two features are closely linked. People who grow their food, for example, can spend less money on food, and money earned from the sale of urban agricultural goods is typically used for other household food needs (Mougeot, 2005).

For income (Table 4.11) shows that among the total respondents (86.9%) have confirmed that their annual income increased as a result of urban agriculture. This finding is in line with that of Salau & Attah (2012), who said that 75.56% of their respondents' annual income increased by engaging in urban agriculture. Income is one of the most basic livelihood assets that have a direct impact on household advancement. Better disposable income equals more food security, more saving, and more investment opportunities (investments in the health, education, and employment conditions of household members). As a result, this directly implies that the households' vulnerability context has been reduced and that their well-being has improved.

Regarding UA as a source of food According to Table (4.11), a large number of respondents use urban agricultural outputs as a source of food in terms of food availability, variety of food needs, and meeting their households' annual food requirements. The study found that this type of benefit supports households in two ways. First, it cuts household food expenses immediately, contributing to an increase in the household's disposable income. Second, it delivers nutritious meals to homes at a very low cost.

In terms of UA contributions to job creation (Table 4.11), 56.1% of respondents created permanent and temporary jobs for people other than their immediate family. This

proportion/figure is significantly higher than the one reported by Salau and Attah in their Nigerian investigation. In their study, Salau and Attah (2012) found that "28.89 percent of respondents created jobs." To sum up, urban agriculture serves as a source of food, creates job opportunities for the unemployed, and improves the well-being of the poor households under study by creating more cash, contributing to the household's food needs, and establishing new markets.

Regarding sectoral contribution (Table 4.14) shows that crop production contributes 10.5%, which is very low in comparison to livestock rearing, which is 84.5%. Non-farming activity, on the other hand, contributes very little, if at all, compared to livestock, which contributes 5%. In a similar study report, Mougeot (2000) discovered that livestock sector contribution is greater than 20%. He reported that in Cairo and Dare Salaam, urban livestock producers earn more than 65% of their income from small livestock rearing, and urban agriculture was discovered to be the second-largest employment sector in Dare Selam.

With regards to UA outcome (Figure 4.6), it shows that almost all of the outcome indicators respondents' household livelihoods were significantly improved by practicing urban agriculture. This finding suggests that, in addition to serving as a food source and generating income, urban agriculture plays an important role in improving household well-being by reducing vulnerability, increasing health, and increasing self-esteem, which is the most important outcome of urban agriculture for households' livelihood improvement. Similarly, Reuther and Dewar (2005) discovered that urban agriculture had both positive and negative effects. Economic gains have accrued to several societal benefits in addition to food security. Participants in socialization develop contacts and networks that help to improve communities, families, and individuals.

Concerning the role of UA in improving the environment (Table 4.11), the majority of respondents believe that urban agriculture is good for the environment, and a very small number of respondents have no idea how important urban agriculture is to the environment. Regarding the waste management and reuse practices of respondents (Table 4.16) indicates that (55.4%) of respondents required compost for their UA practice, although only 44 (15.2%) of respondents made compost from their domestic waste and used compost on their farms. This finding is consistent with the findings of Losada *et al*. (2009), who discovered that local food production in

Mexico City converts waste into resources. Compostable organic wastes, which can be used as an organic fertilizer, make up approximately 25 to 40% of municipal waste streams, and landfills frequently release methane.

With regards to respondent perception towards environmental benefits of UA (Figure 4.7), it indicates that a large number of respondents believe that UA is important in reducing urban heat and a considerable number of respondents also believe that UA is important in enhancing green biodiversity. This study also reveals the other benefits of urban agriculture by growing trees on their home campus. According to observation data, the majority of respondents plant trees in their compound. As a result, planting trees reduces heat, improves groundwater availability, reduces soil erosion, creates clean surroundings, provides habitat for birds and microorganisms beneath the trees, and increases biodiversity enrichment opportunities. This observational result agrees with Dubbeling *et al.* (2010). They believe that UA and forestry can help to green the city, improve the urban microclimate, preserve biodiversity, and reduce the city's impact on the environment.

Concerning ways of landholding (Table 4.18A), it indicates that the most common method of land acquisition was an inheritance from parents. As a result, the majority or a considerable number of respondents were found to be people who had been in the research area for a long time. While challenges of shortages of land (Table 4:19) indicate that a large number of respondents said they experience challenges in producing additional crops for their source of food and to generate extra revenue. Regarding the landholdings of the respondents (Table 4.18B), it indicates that the majority of the respondents have small farmland. This finding is consistent with Redwood (2009), whose study reported that the most significant barriers to widespread adoption of urban agriculture are limited access to land for those who want to grow food, as well as a lack of secure tenure on that land, especially where production functions compete with other uses (such as commercial development) that provide a higher profit to the landowner. To summarize, land scarcity is a severe challenge that farmers face as a result of urbanization, making it difficult for them to produce on a large scale.

Regarding the challenges of the fertility status of urban agricultural land (Table 4.19), they indicate that the fertility status of farmland is one of the quantifiable challenges faced by urban farmers, and the majority of respondents have poor fertile land. Field observation and key informant interview reports indicate that most of the farmland fertility status problems in the study area are related to the pollution of farmland by unwanted waste released from individual homes and chemicals released from the industry. This observational finding goes in line with Cruel (1985). He states that urban soils differ from their natural counterparts in several ways. Great vertical and geographical variability; modified soil structure leading to compaction; the existence of a water-repellent surface crust on bare soil; modified soil reactivity, usually raised; restricted aeration and water drainage; nitrogen cycling disruption and altered soil organism activity; the presence of anthropic materials and other pollutants; and altered soil temperature regimes are among these characteristics. The interplay of these traits causes issues for those involved in the management of the urban environment.

Concerning the credit service challenge (Table 4.19) indicates that 60.9% of the respondents didn't access credit services due to three constraints of credit service institutions, such as collateral issue, initial deposit, and bureaucracy of credit institutions. Salau and Attah (2012) found the same thing. They found that the majority of respondents (70.00%) had never utilized farm credit, whereas 30% had used farm credit in the past. As a result, the majority of urban farmers in the area do not use agricultural finance. This is also supported by Hovorka *et al.* (2009), who reported that urban farmers in Ghana did not have access to formal credit schemes due to their limited land space for cultivation and proper credit accessibility.

Regarding market chain challenges (Table 4.19), it indicates that more than half of the respondents mentioned that they have faced market linkage. Most urban farmers sell their urban agricultural products at a lower price in the local market, in homestead areas, on-farm plots, and on the street. According to Awasthi (2013), this issue is widespread around the world. According to him, self-consumption accounts for a large portion of urban agriculture production in emerging countries, with surpluses being sold. Market-oriented urban agriculture's importance, both in terms of volume and economic value, should not be underestimated. Products are sold at the farm gate, in local shops, in local (farmers') markets, or to middlemen and supermarkets via cart in the same or adjacent neighborhoods. Although the majority of the products are fresh,

some are processed for personal consumption, cooked and sold on the streets, or processed and packaged for sale at one of the above establishments.

In terms of storage concerns (Table 4.19), the majority of respondents reported a lack of storage space for post-production handling, and, as previously mentioned, market and technical issues are also concerns for urban farmers. This discovery is in line with Harris et al (2001). According to them, the primary post-production challenges in urban agriculture are insufficient processing, storage, packing, distribution, and marketing facilities. As a result, the problem was more serious than other issues that farmers in the research region had to deal with.

With regards to inputs for urban agriculture and government support (Table 4.19) shows that the majority of respondents faced this problem, especially significant when it comes to milk cows and poultry feeding. This finding is consistent with Cohen and Reynolds, who found that "the principal problems of the study area's agricultural activities are the urban farmers who were engaged in poultry and dairy treatment and feeding" (2014). They report that New York farmers and gardeners face basic challenges such as a lack of financial and material resources such as seeds, feed, treatment, and other government policy support, but study participants also expressed a desire for more opportunities to network with other practitioners and participate more fully in policy development, as well as policies that address race and class disparities in the urban agriculture system.

Chapter 5: conclusions and recommendation

5. Summary, conclusion and recommendation

5.1. Summary and conclusion

This study aims to assess the contribution of urban agriculture to household livelihood improvement and assess the perceptions of urban farmers' about the benefits of urban agriculture to environmental improvement: as well as prevailing challenges in the Burayu town Administration.

Urban farmers in Burayu town engage in a variety of agricultural activities to increase their income, feed their families, sell agricultural products for a profit, and earn money in various ways. The study result indicates that livestock rearing, crop production, and both mixed farming practice was observed. The majority of the respondent was engaging urban agriculture for both commercial and home consumption purposes. And also more than half of respondent households keep milk cows and engage in poultry.

Crop production is another popular sort of farming practice in the study area and as well as in the surrounding areas. A diverse range of crops is grown. This type of farming activity is done to feed the farmer's family as well as for market purposes. The most popular crop farming practices involve cereal crops (barely), root and tuber crops (potatoes, carrots), and vegetable crops (cabbage, tomatoes). Farmers in the area practice crop farming in their backyards, along the riverbank, and the town's hinterland.

The results of the survey show that urban farming has a variety of contributions in the research area. Among them, it plays a critical role in generating household income, creating job opportunities, serving as a source of food, generating money, and ensuring the town's environmental improvement, as well as solid waste recycling. Among the reasons for engaging in urban agriculture are necessary to avoid food shortage and meet the nutritional food needs of the household and in line with food availability, they engage UA to generate more income to improve household well-being.

Households have experienced an increase in income, they were asked to range both their previous monthly income (income before the time the household used to undertake urban

agriculture) and their current monthly income. The majority of respondents respond that their income is increased after they engaged in urban agriculture. The creation of jobs is the third parameter used in this study to assess the urban agriculture impact. It is found that more than half of the respondents generated permanent and temporary work for people other than their immediate family. Another finding of this study is to describe the contribution of the urban agriculture sector.

As the finding of the study indicate that, a very great income is derived from crop and livestock farming activity. Livestock incomes were generated from poultry keeping for egg and dairy cattle for milk production. The income share of non-farm-based activities was found to be very low. Furthermore, the finding indicated the factors/challenges of urban agriculture that inhibit practicing urban agriculture. Land shortages landholding over the last ten years, fertility status, credit challenges, market access, storage area, and challenges related to government support, in input delivering and policy support, and challenge related to feeding and treatment for livestock and crop production was the major barrier to practice urban agriculture at the study area.

The Parameters estimates analysis logistic model indicate that contribution of urban agriculture to the householder as a food source, food security, generating more income, increasing well beings of the household had significant impacts on the probability of being in the livelihood improvement. And waste recycling and reuse, reducing soil erosion and degradation, and using waste as a natural fertilizer for agriculture had significant impacts on the probability of being in the environmental improvement.

5.2. Recommendations

The current state of urban development/urbanization and market inflation are the factors that push urban dwellers to practice urban agriculture in their homestead areas to meet their food needs, generate income, and, in general, improve their livelihood. However, other factors affect urban agricultural practice in urban areas. Based on the study results, the research recommends the following points.

According to the findings, there are good practices of urban agriculture, the majority of the community is well aware of urban agriculture contribution, many types of agricultural practice

also employed, like; livestock rearing mainly (poultry and dairy cows), crop production (barely, potatoes, maize, cabbage, carrot, beetroot, and tomato). Those practices bring a substantial contribution to livelihood improvements for urban farmers (food access, food security, income generation, and job creation). And also, the communities are well awarded for the contribution of UA to environmental improvement (in solid waste recycling, urban heat reducing, and biodiversity enrichment). However; the real influence of urban agriculture on the lives of the urban poor is not being evaluated in the study area and is not supported by urban planners and policymakers. Therefore,

- ❖ The government/town administration and other concerned bodies need to encourage, strengthen, support the activity and give recognition to the impact and role of urban agriculture on household wellbeing in urban planning and development.

The findings also dig out the problem/challenges to practice UA at a large scale and inhabit to produce enough food for the household. As a result, the sector faces challenges related to: Lack/shortage of land to practice at large scale, the shrinkage of urban farmland over the last decade due to urbanization, access to market chain, access of credit service, loss of fertility status, lack of storage area, lack of government support and access of agricultural input like animal (feed and treatment), crop seed and treatment was the major problem need to be considered. **Therefore; the researcher recommends that:-**.

- ✓ To address urban farmers' credit services challenge, the researchers recommend that an agricultural credit/on-farm credit service should be available and supported by policy.
- ✓ It would also be preferable if city planners will include urban farmers, experts of the urban agricultural sector, and stakeholders in the development of town plans, and give proper consideration to the urban agriculture sector in their urban development plans.
- ✓ It would be preferable if the government established a link between urban farmers and the business sector, non-governmental organizations, and national and international markets.
- ✓ The sector will also perform better if it is supported by technology, extension work, and, the sector needs to adopt new urban agricultural technology, like vertical farming.

5.3. References

Agbamu, J. U. (2006). *Essentials of agricultural communication in Nigeria*. Malthouse Press.

Alem, Y. (2011). *Essays on Shocks, Welfare, and Poverty Dynamics: Micro econometric Evidence from Ethiopia*. Department of Economics.

Alem, Y., & Köhlin, G. (2013). The impact of food price inflation on subjective well-being: Evidence from urban Ethiopia. *Social indicators research, 116*(3), 853-868.

Alem, Y., & Köhlin, G. (2014). The impact of food price inflation on subjective well-being: Evidence from urban Ethiopia. *Social indicators research, 116*(3), 853-868.

Alem, Y., & Söderbom, M. (2012). Household-level consumption in urban Ethiopia: the effects of a large food price shock. *World Development, 40*(1), 146-162.

Arku, G., Mkandawire, P., Aguda, N., & Kuuire, V. (2012). Africa's quest for food security: what is the role of urban agriculture?

Awashi, P. (2013). Multi spectroscopic Methods Reveal Different Modes of Interaction of Anti Cancer Drug Mitoxantrone with Poly (dG-dC) and Poly (dA-dT). J. Photochem. Photobiol. B: Biology, 127, 78-87.

Axumite, G. 1994. Urban Farming: Cooperatives, and the Urban Poor in Addis Ababa. Ottawa: IRDC.

Axumite, G., Egziabher, D. B., Daniel, G. M., &Mougeot, L. J. (1994).An example of urban agriculture in East Africa. *International Development Research center, Ottawa Canada*.

Ayenew, M. (2003).Urban Poverty and Urban Governance Institutions in Ethiopia: Three Selected Papers, 47(53.4), p.16.

Badami, M. G., & Ramankutty, N. (2015). Urban agriculture and food security: A critique based on an assessment of urban land constraints. *Global Food Security, 4*, 8-15.

Bewick, V., Cheek, L., & Ball, J. (2005). Statistics review 14: Logistic regression. Critical c Van

Bossio, D. (2009). Livestock and water: understanding the context based on the 'Comprehensive Assessment of Water Management in Agriculture'. *The Rangeland Journal, 31*(2), 179-186.

Brock, B. (1999). Actual and potential contribution of urban agriculture to environmental sanitation: a case study in Cotonou. *Urban agriculture in West Africa: Contributing to food security and urban sanitation*, 126-137.

Bryceson, D., & Potts, D. (Eds.). (2005). *African Urban Economies: viability, vitality or vitiation?* Springer.

Bryld, E. (2003). Potentials, problems, and policy implications for urban agriculture in developing countries. *Agriculture and human values*, *20*(1), 79-86.

Clapp, J. (2017). Food self-sufficiency: Making sense of it, and when it makes sense. *Food policy*, *66*, 88-96.

Clinton, N., Stuhlmacher, M., Miles, A., Uludere Aragon, N., Wagner, M., Georgescu, M., ...& Gong, P. (2018). A global geospatial ecosystem services estimate of urban agriculture. *Earth's Future*, *6*(1), 40-60.

Cochran, W.G. (1977). The estimation of sample size. Sampling techniques, 3, pp.72-90.

Cohen, N., & Reynolds, K. (2014).Urban agriculture policy making in New York's "New Political Spaces" strategizing for a participatory and representative system. Journal of Planning Education and Research, 34(2), 221-234.

Craul, P. J. (1985). A description of urban soils and their desired characteristics. Journal of arboriculture, 11(11), 330-339.

David W..Hosmer, Lemeshow, S., & Rodney X..Sturdivant (2000). *Applied logistic regression*. New York: Wiley.

Deelstra, T., & Girardet, H. (1999). Urban agriculture and sustainable cities, thematic paper 2. *Growing Cities Growing Food: Urban Agriculture on the Policy Agenda: A Reader on Urban Agriculture. Resource Centre on Urban Agriculture and Forestry*.

Drescher, A. W., Koc, M., MacRae, R., Mougeot, L., & Welsh, J. (1999). Urban agriculture in the seasonal tropics: The case of Lusaka, Zambia. *For hunger-proof cities: Sustainable urban food systems*, *67*, 76.

Dubbeling, M., Zeeuw, H. D., & Veenhuizen, R. V. (2010). *Cities, poverty and food: multi-stakeholder policy and planning in urban agriculture*. Practical Action Publishing.

Egbuna, N.E. (2008). Urban Agriculture: A strategy for poverty reduction in Nigeria. CBN Abuja, Nigeria.

Egziabher, A. G. (1994). Urban farming, cooperatives, and the urban poor in Addis Ababa. *Cities feeding people: an examination of urban agriculture in East Africa [Egziabher, AG; Lee-Smith, D.; Maxwell, DG; Memon, PA; Mougeot, LJA; Sawio, CJ]*., 85-104.

ENDA-Ethiopia 2002.Experience of Urban Agriculture in Addis-Ababa, Ethiopia.

Enete, A. A., &Achike, A. I. (2008). Urban agriculture and urban food insecurity/poverty in Nigeria: The case of Ohafia, South-East Nigeria. *Outlook on agriculture*, *37*(2), 131-134.

Eric, R. (2012). UA: Improving Food Security and Environmental Health of Cities. United Nations Asian and Pacific Centre for Agricultural Engineering and Machinery, Policy brief.

Falvey, L. (1999). The future for smallholder dairying. *Smallholder dairying in the tropics. ILRI (International Livestock Research Institute), Nairobi, Kenya*, 417-432

FAO (2007) Profitability and sustainability of urban and peri-urban agriculture. Agricultural Management, Marketing and Finance Occasional Paper 19. FAO, Rome

FAO. (2012). Growing greener cities in Africa. Rome: Food and Agriculture Organization of the United Nations

Flynn, J. L., & Chan, J. (2001).Immunology of tuberculosis. Annual review of immunology, 19(1), 93-129.

Foeken, D., &Mwangi, A. M. (2000).Increasing food security through urban farming in Nairobi.

Graefe, S., Schlecht, E., &Buerkert, A. (2008).Opportunities and challenges of urban and peri-urban agriculture in Niamey, Niger. *Outlook on agriculture*, *37*(1), 47-56.

Grewal, S. S., &Grewal, P. S. (2012). Can cities become self-reliant on food?. *Cities*, *29*(1), 1-11.

Harris, P. J. C., Allison, M., Smith, G., Kindness, H. M., & Kelley, J. (2001).The potential use of waste-stream products for soil amelioration in peri-urban interface agricultural production systems. *Waste Composting for Urban and Peri-urban Agriculture: Closing*

the Rural-Urban Nutrient Cycle in Sub-Saharan Africa. CAB International, Wallingford, UK, 1-28.

Harvey N. (2002). Not just where we live; but how we live: Addressing urban food and nutrition security. International Food Policy Research Institute. http://www.livelihoods.norg/post/IUDD4-postit.html (referenced at July 5, 2006). Havana, Cuba. Ian Randle Publ., Kingston, Jamaica.

Headey, D., &Ecker, O. (2013). Rethinking the measurement of food security: from first principles to best practice. *Food security*, *5*(3), 327-343.

Headey, D., &Ecker, O. (2013). Rethinking the measurement of food security: from first principles to best practice. *Food security*, *5*(3), 327-343.

Hovorka, A., Zeeuw, H. D., &Njenga, M. (2009).*Women feeding cities: Mainstreaming gender in urban agriculture and food security*. CTA/Practical Action.

Kappel, E., Michelle, P., & Pedersen, L. (2010). The Sustainable Livelihoods Approach: From a Psychological Perspective: Approaches to Development. Institute of Biology, University of Aarhus.

Korth, M., Stewart, R., Langer, L., Madinga, N., Da Silva, N. R., Zaranyika, H., ... & de Wet, T. (2014). What are the impacts of urban agriculture programs on food security in low and middle-income countries? A systematic review. *Environmental Evidence*, *3*(1), 1-10.

Kothari, C. R. (2004). Sample size determination. Research Methodology *New Age International Publications*, *1*, 74-1.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, *30*(3), 607-610.

Kutiwa, S., Boon, E., & Devuyst, D. (2010). Urban agriculture in low-income households of Harare: an adaptive response to economic crisis. Journal of Human Ecology, 32(2), 85-96.

Lang, G., & Miao, B. (2013).Food security for China's cities. *International Planning Studies*, *18*(1), 5-20.

Lee, M. (1997).Recognizing Ethiopia’s urban farmers. IDRCreport.Vol. 21.No. 3. *International Development Research Centre, Ottawa, Canada*.

Losada, H., Rivera, J., Vieyra, J., & Cortés, J. (2009).The role of urban agriculture in waste management in Mexico City. Urban Agriculture Magazine, (23), 40-41.

Lynch, K. 2002. A Theory of Good City Form. Cambridge, Massachusetts: MIT Press. Powell, J. M., Pearson, R. A., & Hiernaux, P. H. (2004). Crop–livestock interactions in the West African drylands. *Agronomy Journal*, *96*(2), 469-483.

Madden, J. P., West Hollywood, C. A., Chaplowe, S. G., & World Sustainable Agriculture Association. (1997): For all generations: Making world agriculture more sustainable.

Maxwell, D. (1999). The political economy of urban food security in Sub-Saharan Africa. *World Development*, *27*(11), 1939-1953.

McClintock, N. (2010). Why farm the city? Theorizing urban agriculture through a lens of metabolic rift. *Cambridge Journal of Regions, Economy and Society*, *3*(2), 191-207.

Mekuria, D., & Messay, M. (2018).The status of urban agriculture in and around Addis Ababa, Ethiopia. *Journal of Sustainable Development in Africa*, *20*(2), 128-147.

Mezgabu, F., & Tolossa, D. (2015).The Contribution of Urban Agriculture to Food Security of Individual Urban Farmers in Yeka Sub City, Addis Ababa. *Ethiopian Journal of Development Research*, *37*(1), 177-207.

Mkwambisi, D. D., Fraser, E. D., &Dougill, A. J. (2011). Urban agriculture and poverty reduction: Evaluating how food production in cities contributes to food security, employment and income in Malawi. *Journal of International Development*, *23*(2), 181-203.

Modirwa, S., & Oladele, O. I. (2012).Food security among male and female-headed households in Eden District Municipality of the Western Cape, South Africa *Journal of Human Ecology*, *37*(1), 29-35.

MoFED (Ethiopia) Fiscal year Report 2010/11.

Mohammed, J. (2002). Urban Agriculture Initiatives in Addis-Ababa. *Unpublished Master's Thesis, Addis-Ababa University*.

Mok, H. F., Williamson, V. G., Grove, J. R., Burry, K., Barker, S. F., & Hamilton, A. J. (2014). Strawberry fields forever? Urban agriculture in developed countries: a review. Agron Sustain Dev 34 (1): 21–43.

Mougeot, L. J. (2000). Urban agriculture: definition, presence, potentials and risks. *Growing cities, growing food: urban agriculture on the policy agenda*, *1*, 42.

Mougeot, L. J. (Ed.). (2005). *Agropolis: The social, political, and environmental dimensions of urban agriculture*. IDRC.

Moustier, P., &Danso, G. (2006). Local economic development and marketing of urban-produced food. Cities farming for the future: Urban agriculture for green and productive cities, 174-195.

MoWUD (2006). Ethiopia: Annual rate of Urbanization report, unpublished.

Mpofu, T. P. (2013). An evaluation of the performance of urban agriculture in Addis-Ababa City, Ethiopia. Research Journal of Agricultural and Environmental Management, Vol. 2(No. 2), 51-57.

Mulugeta, M. (2010). Food security attainment role of urban agriculture: a case study from Adama City. *Ethiopian Journal of Business and Economics (The)*, *1*(1).

Mulugeta, M., Tolossa, D., &Abebe, G. (2017).Description of long-term climate data in Eastern and Southeastern Ethiopia. *Data in brief*, *12*, 26-36.

Nsangu, C. A., & Redwood, M. (2009). Urban agriculture and physical planning: A case study of Zaria, Nigeria. *Agriculture in urban planning: Generating livelihoods and food security*, 217-234.

Nugent, R. A. (2000). Economic impact of urban and peri-urban agriculture.Annotated bibliography on urban agriculture, 1–5.

Onyango, C. L. (2010). *Urban and peri-urban agriculture as a poverty alleviation strategy among lo- income households: The case of Orange Farm, South Johannesburg* (Doctoral dissertation, University of South Africa).

Orsini, F., Kahane, R., Nono-Womdim, R., &Gianquinto, G. (2013). Urban agriculture in the developing world: a review. *Agronomy for sustainable development*, *33*(4), 695-720.

Parrot, L. (2010) Urban and peri-urban horticulture and the capability approach, the case of Cameroon.

Pieri, Christian, Julian Dumanski, Ann Hamblin, Anthony Young, and UNEP UNDP."Land quality indicators." (1996).

Prain, G. (2006). Urban Harvest: A CGIAR Global Program on Urban and Peri-urban Agriculture Extension Bulletin 575. *Food and Fertilizer Technology Centre, Taiwan*.

Renevan, V. (2006).Cities Farming for the Future. *Urban Agriculture for Green and Productive Cities, RUAF Foundation*.

Reuther, S., & Dewar, N. (2006). Competition for the use of public open space in low-income urban areas: the economic potential of urban gardening in Khayelitsha, Cape Town. *Development Southern Africa*, *23*(01), 97-122.

Rogerson, C. M. (2010).Resetting the policy agenda for urban agriculture in South Africa. Journal of Public Administration, 45(2), 373-383.

RUAF (2007). What is urban agriculture? http://www.ruaf.org/node/512.

Salau, E. S., &Attah, A. J. (2012).A socio-economic analysis of urban agriculture in Nasarawa State, Nigeria. Production Agriculture and Technology, Nassarawa State University, Keffi Journal, 8(1), 17-29.

SanyéMengual, E., & Oliver i Solà, J. (2015). *Sustainability assessment of urban rooftop farming using an interdisciplinary approach*.UniversitatAutònoma de Barcelona,.

Smit, J., & Nasr, J. (1992). Urban agriculture for sustainable cities: using wastes and idle land and water bodies as resources. *Environment and urbanization*, *4*(2), 141-152.

Smit, M., Brown, K., Bellows, A 1996. Health Benefits of Urban Agriculture. Community Food Security Coalition's North American Initiative on Urban Agriculture New York and New Jersey.

Smith, M. L. (1998). Publishing qualitative research. American educational research journal, 24(2), 173-183.

Tewodros F. (2007).Livelihood Dependence on Urban Agriculture in Addis Ababa, Ethiopia. Unpublished MSc thesis, Norwegian University of Life Sciences, Ås, Norway

Thomas, P. Z. (2013). An Evaluation of the Performance of UA in Addis Ababa City, Ethiopia. Res J Agric Environ Manage, 2(2), 051-057.

Thomas, P. Z. M. (2013). An evaluation of the performance of urban agriculture in Addis Ababa City, Ethiopia. *Research Journal of Agricultural and Environmental Management*, *2*(2), 051-057.

Thomson, A. M., & Metz, M. (1998). *Implications of economic policy for food security: A training manual*. Food & Agriculture Org.

Tinker, I. (1994). Women and community forestry in Nepal: Expectations and realities. *Society & natural resources*, *7*(4), 367-381.

Tinker, I. (1994).Urban Agriculture is Already Feeding Cities: In Cities Feeding People. IDRC: Ottawa...

UNDP (2010). The input and output market systems and infrastructure in developing countries

Undp, A. (2012). *Africa Human Development Report 2012 Towards a Food Secure Future* (No. 267636). United Nations Development Programme (UNDP).

Vagneron, I. (2007). Economic appraisal of profitability and sustainability of peri-urban agriculture in Bangkok. *Ecological Economics*, *61*(2-3), 516-529.

Van Averbeke, W. (2007).Urban farming in the informal settlements of Atteridgeville, Pretoria, South Africa. *Water Sa*, *33*(3).

Van Veenhuizen, R., &Danso, G. (2007). *Profitability and sustainability of urban and periurban agriculture* (Vol. 19). Food & Agriculture Org.

Veenhuizen, R. (2006). Cities farming for the future. *Cities farming for future, Urban Agriculture for green and productive cities,(p 2-17). RUAF Foundation, IDRC and IIRP, ETC-Urban agriculture, Leusden, The Netherlands*.Are, 9(1), 1-7.

World Bank, (2015). Ethiopia Poverty Assessment: Addis Abeba: World Bank group.

World Health Organization. (2003). *Diet, nutrition, and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation* (Vol. 916). World Health Organization.

World Health Organization.(2006). *WHO guidelines for the safe use of waste water excreta and grey water* (Vol. 1).World Health Organization.

5.4. Annex

Questionnaires to be completed by randomly selected urban farmers of Burayu city administration.

Date of Interview: _____Time of interview: Starting time_____, finishing time: ____

Cod of the Respondent_____

Demographic question

I. Household information

1. Address of Household: Region _____city _____ sub-/city _____kebele_____
2. Age of respondent____ 1) 20-30 2) 31-40 3) 41-50 4) 51 and above
3. Sex of respondent 1) male 2) female
4. Family size female _____ male _____ total_____
5. Family size in age category:1) Less than 18 yrs2) 19 – 35yrs3) 36- 51yrs 4) Above 51
6. Number of Household members attending formal education: 1) Male ___ 2) ___ 3) Total___
7. Household type 1) Male headed 2) Female-headed
8. Marital status of household 1) Married 2) Unmarried 3) Divorced 4) Widowed 5) Other
9. Education level of the household? 1) Read and write 2) Grade 1 to 8 3) Grade 9 to 12 4) Same TVT and college graduate 6) University degree and above
10. Religious;1) Muslim 2) Orthodox 3) Protestant 4) Waqefata5) Catholic
11. Main householder income source? 1) From agricultural activity 2) Non-agricultural activity 3) casual labor work 4) Government employer
12. Household monthly income range: 1) less than 1,000 birr 2) 2,000 – 4,000 birr 3) 4,000 – 6,000 4) 6,000 – 10,000 birr 5) above 10,000 birr
13. How long have you been in farm experience? 1) Less than 5 2) 6 to 10 years 3) 11 – 20 years 4) Over 20 years

Major types of urban agricultural Practicing in the study area

1. Do you engage in urban agriculture? 1) Yes 2) No

2. Do you have natural capital or land resource for urban agriculture? 1) Yes 2) No

3. If "yes" for question 15, how do you get natural capital or land resource for urban agriculture? 1) Through land distribution 2) Shared with relatives3) Inherited from parents 4) Purchased 5) Sharecropping

4. Where do you carry out urban agriculture? 1) Along riverside 2) home garden area 3) In backyards/In open space 4) In urban fringe areas 5) Roadsides

5. What are the major types of urban agriculture practicing in your farmland by you and your household members? 1) livestock production, 2) crop production, 3) poultry production, 4) bee-keeping, and 5) mixed of all.
6. If you are rear livestock, would you tell us the specific types? 1) Cows for milk production 2) Oxen for fatting 3) Sheep and goats 3) Mixed of all
7. If you are engaging in crop production, would you tell us a specific type? 1) vegetation 2) Root and tuber crop 3) Cereal crop 4) Fruit tree
8. If you are producing **cereal crops**, which crop you are engaging and more benefiting you? Specify it. 1). wheat, 2). barley, 3). millet, 4). teff 5). mixed of all
9. If you are producing **Root and tuber crops**, on which crop you are engaging and more benefiting? Specify it. 1). the beetroot, 2). potato, 3). carrot
10. If you are producing **vegetation crops**, on which crop you are engaging and more benefiting? Specify it. 1). Cabbages, 2). tomato
11. If you are producing **Fruit trees**, on which crop you are engaging and more benefiting? Specify it. 1) . mango, 2). avocado, 3). Orange, 4) papaya, 5). banana

III. Contribution of urban agriculture to household livelihood

1. Why you are engaging in urban agriculture? 1) For home consumption 2) For marketing purpose or sale 3) Mixed of both
2. If you engaging urban agriculture for home consumption; according to your self-assessment, is your household food secure? 1) Yes 2) No
3. If your answer is “Yes” for question 26, does your urban agriculture meet a variety of food needs for daily consumption; vitamin, protein and carbohydrates? 1) Yes 2) No
4. If your response is "Yes” for Question 27, do you meet all year-round food requirements of your household members from your production? 1) Yes 2) No
5. If your response is "No" for Question 28, why? 1) No place to produce more food 2) no supports from the government 3) low access to inputs
6. Do you afford to buy foodstuffs from market to meet food requirements for your household consumption? 1) Yes 2) No
7. Does any of your household members work in non-crop production and livestock herding activities? 1) Yes 2) No
8. If your response is "Yes" for question 32, on average how much do they earn monthly? 1) Less than 2000 2) 2001-4000 3) 4001-6000 4) 6001-8000 5) above 8000 birr.
9. According to your perception urban agriculture can have environmental benefits?

1) Yes 2) No

10. If your answer is “Yes” for question 35, how does it contribute to the environment? 1) by recycling wastes 2) by making green environment 3) by regulating environmental temperature
11. Does your urban agriculture create a permanent and temporary job for other rather than household members? 1) Yes 2) No
12. If your response is “Yes’’ for question 37, do you specific in numbers? 1) 2 2) 3-5 3) 6-8 4) more than 8 people
13. Does your income increased by the urban agriculture you engaged in? 1) Yes 2) No
14. If your response is “Yes” for question 39, what is your annual income from both crop production and livestock rearing?

	List of crop and livestock	**Product amount**	**Price in birr**	**Total Annual income**
	List of crop	***In kg***	***Single price***	***Total price***
1	**From Cereal crop production**			
	Barley			
	Wheat			
	Teff			
	Millet			
2	**From root and tuber crop production**			
	Beetroot			
	Potato			
	Carrot			
3	**From vegetation crop production**			
	Potato			

	Tomato			
	Cabbage			
4	**From fruit tree production**			
	Mango			
	Avocado			
	Orange			
	Papaya			
	Banana			
	Sub-total of crop income			
	List of livestock production	***In no_ and Liter***		***In birr***
5	From cow milk production			
6	From Oxen fatting			
7	From sheep and goat			
8	From chicken for egg and meat			
9	From beekeeping (Honey in Kg)			
	Sub-total of livestock production			
	Total annual income			

Household livelihood outcome from practicing urban agriculture

No_	Household livelihood outcome from UA	Level of outcome		
		Highly	medium	Low
1	Does your UA improve your financial situation			
2	Does your UA Provide food to household			
3	Do you believe your UA practice improve quality of life			
4	Does your UA Reduce venerability			
5	Do you believe that your UA practice improve self esteem			
6	Does your UA generate more income			
7	Does your UA activity increase well beings of household			
8	Does UA activity improve health			
9	Improve food security			

- **Environmental contribution of UA**

1. What is the major advantage of urban agriculture to the environment according to your perception 1) reduce urban heat 2) waste recycling and reuse 3) reduce soil erosion and degradation 4) Biodiversity enrichment 5) increase water availability
2. Waste recycling and using it for UA is a possible solution to resilient environment 1) strongly agree 2) Agree 3) Disagree 4) Strongly Disagree
3. Do you need to use waste as a natural fertilizer for your agricultural practice? 1) Yes 2) No
4. Do you have any experience of making compost from the waste and using it for your UA? 1) Yes 2) No

- **Social Organizations, Networks and Support related issues**

1. . In which of the following community-based (CBO) do you participate? 1) Mahber 2) Equbi 3) Idir 4) Hirpha
2. Do you participate in various community labor organizations? a) Yes b) No
3. If your response is 'yes' to question no 2, in which of the following organizations do you take part? 1) D*ebo/jigii 2) Wanfala 3) Humna 4)* Others
4. Have you ever received relief support? 1) Yes 2) No

IV. Challenges of urban agriculture

1. Do you have enough land access for your urban agriculture? 1) Yes 2) No
2. What happened to the size of landholding over the last decades?

1) Increased 2) Decreased 3) No change

3. If your response is 'decreasing', to question no. 50, what were the reasons?1) Large household size 2) Decline in quality of land3) Redistribution of land 4) Expansion of urbanization 5) others
4. How do you rate the sufficiency of your landholding for farming?
   1) Scarce 2) Sufficient 3) Others
5. What is the fertility status of your farmland? 1) Poor 2) Moderate 3) Good
6. How far is your farmland from your home in minute? 1) less than 10 minute 2) 10 to 20 minute 3) more than 30 minute
7. Do you have access to credit services from micro-institutions to supplement your urban agriculture? 1) Yes 2) No
8. If your response is "No" for question 55, what is the main problem? 1) lack of collateral 2) lack of initial deposited 3) bureaucracy of credit institution
9. Do you have good market accesses for your agricultural product? 1) Yes 2) No
10. Do you have enough storage area for your products? 1) Yes 2) No
11. Does government supports your agricultural activities 1) Yes 2) No
12. Do you have a shortage of land for livestock rising? Indicate their level of importance?
    1). High 2) Moderate 3) Low
13. Does you have a lack of additional fodder and water for livestock rising? Indicate their level of importance? 1). High 2). Moderate 3). Low
14. How does disease prevalence and veterinary service to livestock rising? Indicate their level of importance? 1). High 2). Moderate 3). Low
15. How does government and policy support your urban agriculture? Indicate their level of importance? 1). High 2). Moderate 3). Low

Data collector	Supervisor
Name _____	Name_____
Date_____	Date _____
Signature _____	Signature_____

V. CHECKLIST FOR KEY INFORMANT

1. How is the extent of urban farming in Burayu?
2. In which kebele urban farming is most common?
3. What proportions of the people in Burayu are engaged in urban farming?
4. Which crops and livestock are commonly produced in Burayu? Start with the most important.
5. What are the main uses of the crops and livestock? Start with the most important.\

6. According to your self-assessment, is an urban farmer in Burayu food secured?
7. What problems do urban farmers face in crop and livestock production?
8. How do you evaluate the contribution of urban agriculture to household livelihood in Burayu? In terms of food access and income generation
9. Did UA contribute to job creation in Burya? 1) Yes 2) No
10. According to your self-assessment, UA can contribute to the environment in Burayu? How?
    1) By waste recycling 2) by making green environment 3) by conserving nature 4) balancing environmental temperature 5) if more explain it

VI. CHECKLIST FOR FOCUS GROUP DISCUSSION

1. What is the main agricultural practice in Burayu? from crop and livestock
2. How did you evaluate the contribution of urban agriculture in Burayu? Related to household livelihood asset/sustainable livelihood asset?
3. What are the main challenges of urban agriculture in Burayu? Related to accessing, the market, government supports and other....
4. What is the possible solution to solve problem related to urban agriculture in Burayu?
5. According to your perception, what is the contribution of urban agriculture to the environment?
6. Do urban agriculture support job creation and other social interactions in Burayu?

VII. CHECKLIST FOR FIELD OBSERVATION

1. Environment

1. Total area of Burayu town in square kilometer or hectare_____
2. Land-use and land coverGrass land_____%, forest land_____% agricultural land_____%, urban building area_____%, settlement area_____% water body_____% and other_____%
3. Relief (plain, plateau, mountain, steep slopes, rolling)

2. Population

1. Total population of Burayu town male_____ female_____ total_____
2. Settlement patterns 1)scattered settled 2) densely settled
3. Ethnicity 1) Oromo_____% 2) Amhara_____% Other _____%
4. Religion 1) Orthodox_____% 2) Muslim_____% protestant_____% other _____%
5. Culture, value, traditions

3. Economy/Sources of livelihood

1. Main source of livelihood: 1) farming _____%2) non-farm activities_____%

2. Crop types: dominant crop
    1. _____Size of farm_____
    2. _____Size of farm_____
    3. _____Size of farm_____
    4. _____Size of farm_____
    5. _____Size of farm_____
    6. _____Size of farm_____
3. Livestock: type, size, raising practices
    1. Type_____ raising practices_____
    2. Type_____ raising practices_____
    3. Type_____ raising practices_____
    4. Type_____ raising practices_____
    5. Type_____ raising practices_____
    6. Type_____ raising practices_____
4. Situations of social and economic infrastructure:

    Transport, Source of water supply, Health posts, Market assess, Schools, Bank access

    _____

    _____