COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR FOOD SECURITY STUDIES

‘THE ROLE OF URBAN AGRICULTURE IN HOUSEHOLD FOOD SECURITY IN ADDIS ABABA: CASE STUDY IN LEMI-KURA SUB-CITY’

BY: ALEMSEGED HAILEMARIAM

JUNE 2024

ADDIS ABABA, UNIVERSITY

ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR FOOD SECURITY STUDIES

‘THE ROLE OF URBAN AGRICULTURE IN HOUSEHOLD FOOD SECURITY IN ADDIS ABABA: CASE STUDY IN LEMI-KURA SUB-CITY’

BY

ALEMSEGED HAILEMARIAM

THESIS SUPERVISOR

SITOTAW HAILE (PhD)

MSC THESIS SUBMITTED TO CENTER FOR FOOD SECURITY STUDIES, COLLEGE OF DEVELOPMENT STUDIES, ADDIS ABABA UNIVERSITY

JUNE 2024

ADDIS ABABA, UNIVERSITY

DECLARATION

I, **Alemseged Hailemariam Mekonnen,** declare to Addis Ababa University School of Graduate Studies that this thesis is a product of my original research work, and has not been submitted to any other university for any academic degree. Materials and information other than my own are dually acknowledged.

Name: **Alemseged Hailemariam Mekonnen**

Signature: _____

Date of Submission: _____

Supervisor Approval

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge as an advisor.

Approved by: SITOTAW HAILE (PhD) _____ _____

Thesis Advisor Signature Date

APPROVE SHEET

ADDIS ABABA UNIVERSITY

COLLEGE OF DEVELOPMENT STUDIES

CENTER FOR FOOD SECURITY STUDIES

As supervisors/co-advisers of the thesis, we certify that we have read and evaluated the thesis prepared by **Alemseged Hailemariam Mekonnen** ‘‘The Role of Urban Agriculture in Household Food Security in Addis Ababa: Case Study in Lemi-kura sub-city’’ and recommend for as fulfilling the requirement for the degree of **Master of Science Degree in Food Security and Development Studies.** The candidate has incorporated all the comments of the examiner/s during the thesis defense session.

Sitotaw Haile (PHD)

_____ _____

Name, Major Advisor Signature & Date

As members of the Examining Board of the Thesis Open Defense, we certify that we have read and evaluated the thesis prepared by **Alemseged Hailemariam Mekonnen** Entitled ‘‘The Role of Urban Agriculture in Household Food Security in Addis Ababa: Case Study in Lemi-kura sub-city’’ and recommend that it is acceptable as research for the thesis required for the degree of Master of Science Degree in Food Security and Development Studies.

_____ _____

Name, Chairman Signature & Date

_____ _____

Internal Examiner Signature & Date

_____ _____

External examiner Signature & Date

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

_____

Chairperson of the Centre or Graduate Program Coordinator

ACKNOWLEDGEMENTS

I devote all honor and gratitude to my Lord and Savior, Jesus Christ, first and foremost. Without his heavenly direction, power, and benefits, this research would never have been finished. I sincerely appreciate his unfailing love and support during this quest.

I want to thank my advisor, Dr. Sitotaw Haile for his mentorship, and encouragement throughout the research process. Without him, I would not have made it possible. He is such an incredible person with strong motivation, and dedication, and grateful for the positive attitude he has demonstrated to support me. From the bottom of my heart, I want to thank Dr. Meskerem Abi, my proposal examiner, for all her help and support during the research process. Her knowledge and insightful criticism have been very helpful in developing and improving this work. I also want to express my sincere gratitude to the committed faculty and friends who have supported me along the way and offered a stimulating learning environment. Their little and major contributions have been much valued and essential to this study's effective completion.

Finally, nobody has been more important to me during my whole life journey and in this research work than my mother, so I proudly dedicate this big achievement to Tsegabirhan G/tsadik.

Alemseged Hailemariam

June, 2024

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

AAU	Addis Ababa University
CSA	Central Statistics Authority
FGD	Focus Group Discussion
FAO	Food and Agriculture Organization
GTP	Growth and Transformation Plan
HFIAS	Household Food Insecurity Access Scale
HHs	Households
HFCS	Household Food Consumption Score
IDRC	International Development Research Centre
IFPRI	International Food Policy Research Institute
IPO	Input-Process-Output
MDG	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
NGO	Non-Governmental Organization
ORAAMP	Organic Agriculture and Agroecology in Mountainous Areas of Peru
RUAF	Resource Centers on Urban Agriculture and Food Security
SPSS	Statistical Product and Service Solutions
SSA	Sub-Saharan Africa
UA	Urban Agriculture
UNDP	United Nations Development Programme
WFP	World Food Programme

ABSTRACT

Improving food accessibility in urban areas where household food security is reliant on household income necessitates job opportunities and a well-oiled grocery store chain. The study was conducted to examine the role of urban agriculture to the household food security of urban farmers in Lemi-kura sub-city, Addis Ababa. The study employed mixed quantitative and qualitative research methods. Additionally, given the goal of the study is to determine the link between its dependent variables, it was also said to have an explanatory design. This study design aimes to comprehensively understand the phenomenon by investigating the underlying roles, relationships, and factors contributing to its implementation of UA. Both primary and secondary data were employed in the investigation. The community-based cross-sectional study was carried out by the researcher. To make sure sample is representative of the population, a purposive sampling technique was employed to ensure that the sample wereda's are representative of the population. The data collection tools were questionnaires, interviews, observation, and FGD to obtain important data on the role of UA and HH food security. The results of the study show that 61.5% of respondents reported being food secure, whereas 10.9% reported being moderately food insecure and 27.4% reported being slightly food insecure. About 83.5% of respondents said urban agriculture helped them with marketing and met their daily food needs, while the remaining respondents said it wasn't enough to meet their daily food needs. In response, almost 75.7% of participants stated that UA assisted them in purchasing food for themselves, while 24.3% stated that it is difficult to purchase food on the market. According to 46% of respondents, urban agriculture provided them with temporary and permanent job opportunities. Furthermore, 34.7% of respondents reported their land was tiny, and 65% said their land was medium-sized and utilized for farming. The results of the ordinal logistic regression model showed that major independent variables were statistically significant. These are household food security: age, family size, formal education, household head, monthly income, marital status, educational level, primary source of income, farming experience, land access, and market access. Given the prevalence of food insecurity among households involved in urban agriculture, more specific extension assistance and intensification of various forms of urban agriculture are required. The respondent addressed the primary issue during the FGD and KII interview times, which is input supply. In particular, animal feeds and fertilizers are the primary source of the issue; as such, state institutions must support and intervene.

Keywords: Addis Ababa city, Food security, Ordinal logistic regression, urban agriculture.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Urban agriculture (UA), which is a concentrated operation combining horticulture, animal husbandry, aquaculture, and other techniques for generating fresh food or other agricultural products, refers to agricultural practices in urban areas and their surrounding regions (peri-urban) (Catherine, 2018). UA encompasses the production of agricultural products, primarily in public open spaces within cities and on their periphery, such as horticulture, floriculture, forestry, fishing, poultry, and livestock (Deelstra and Girardet, 2004, and Mougeot 2000). Over the past few decades, the population of cities worldwide has been growing. Half of the world's population lived in cities at the beginning of the 2010s (The World Bank, 2014). By 2050, this percentage is predicted to rise to 70%, mostly due to increased urbanization in developing nations, especially in sub-Saharan Africa (SSA) (FAO, 2012; Poulsen et al., 2015). 24 of the 30 fastest-growing cities in the world by the end of this decade will be in Africa, and in 18 years, the urban population of Sub-Saharan Africa is expected to expand to about 600 million, double that of 2010 (FAO, 2012).

A typical instance is the prediction made by the United Nations Department of Economic and Social Affairs that the percentage of people living in cities worldwide will increase to 60% by 2030 (UNDESA). To cover the expected expenses for household food expenditure, UA plays a significant role. UA is a common informal economic sector in many African towns (Bryceson and Potts 2005). Though it is a practical activity to replenish the food supply from rural areas to towns and is a means of income and food expenditure for many urban residents, especially the poor, its role has been underrated (Mougeut 2000). Cities around the world face a variety of unpredictable social, economic, and environmental issues, not the least of which is how to feed their growing population (UN, 2016). Ethiopia and other countries in Sub-Saharan Africa are experiencing among of the world's fastest rates of urbanization (ADB, 2014). According to the Ethiopian government, urban agriculture has the potential to significantly reduce poverty, especially in major cities like Bahirdar, Mekele, Hawassa, Jimma, and Adama (Thomas, 2013).

Despite the 2008 global food price explosion, many low-income urban dwellers in Africa have been dealing with the issue of urban food insecurity for many years, particularly since the 1980s structural adjustment era (Maxwell 1995). Food is not lacking; rather, low-income urban customers cannot afford it. This is the harsh but uncomplicated reality that underlies a large portion of the agriculture that is practiced in and around African cities. Urban decision-makers have in the past come to recognize what urban households have known and done for generations: urban agriculture is a livelihood strategy (Gordon & Diana 2010).

Numerous African governments continue to prioritize rural agriculture, disregarding and undervaluing it in urban settings. But at the moment, a lot of governments are setting up organizations to oversee UA (Mougeot, 2000; Alemayehu et al., 2017). Government planning and policy interventions to support urban food production and exchange while also recognizing UA's embeddedness within urban food systems are needed to fully realize the potential benefits of UA on food security (White and Hamm, 2017). Urban low-income communities face immense challenges in accessing nutritious food. One of Africa's biggest cities and Ethiopia's capital, Addis Ababa, shares this struggle. A fifth of its five million residents live in poverty and now face high inflation and cost of living rates that make access to healthy food a daily challenge (Nega, 2023). Fortunately, urban agriculture can help. Farm Africa's urban agriculture pilot project in Addis Ababa has shown how cultivating food in a city can be a powerful and practical solution to poverty and hunger, while also creating the potential to enhance local ecosystems and green spaces (Nega, 2023).

To solve the above problems, growing vegetables in cities has grown in popularity as a means of promoting agricultural sustainability in urban environments (Walters et al., 2018). Urban agriculture not only increases resource efficiency in cities but also contributes to increased food security in communities. To maximize the community income, some initiatives have play a significant role. For instance by Implementing Yelemat Tirufat successfully may require knowledge of the "Green Legacy" and the "Wheat Production Movement," among other things, regarding partnership creation, resource mobilization, and program coordination. Notable projects like the "Green Legacy" and the "Wheat Production Movement" have an impact on how well urban agricultural efforts like Yelemat Tirufat are implemented. In Ethiopia, the "Green Legacy" is a massive reforestation initiative with billions of tree seedlings to be planted, while

the "Wheat Production Movement" is an initiative spearheaded by the government to boost domestic wheat production and lessen Ethiopia's dependency on imports. These programs are usually carried out at the national and regional levels, with local communities, NGOs, and the government sharing coordinating and execution duties (Ayenew, H. Y, 2021).

The "Green Legacy" project is one of the biggest reforestation initiatives in the world, with an ambitious goal of planting over 20 billion tree seedlings throughout Ethiopia. Although the effort primarily targets peri-urban and rural areas, urban agriculture can also benefit from enhanced environmental conditions and a greater tree cover. The viability and sustainability of urban agricultural techniques can be indirectly supported by the "Green Legacy" by improving ecosystem services such as soil health, water control, and climate resilience (Ayenew, H. Y, 2021).

Additionally, the two major agricultural ventures' successes will motivate top leadership to work harder and produce even greater outcomes. Yelemat Tirufat is hence off to a strong start following these two projects. Nonetheless, Yelemat Tirufat's professionalism demands a grassroots level of dedication and capability that matches its own. To do this, it is necessary to arrange for awareness-raising events and technical and leadership training sessions for individuals directly involved in implementation. Furthermore, implementing livestock-centered treatments under Yelemat Tirufat calls for delicacy appropriate to their particular characteristics (Dessie, et al., 2023).

To lower food insecurity and the incidence of poverty, cities may need to take into account agricultural production in urban areas or on the outskirts of metropolitan areas (Tewodros, 2007). A range of qualitative and empirical findings indicate that UA has been demonstrated to improve malnutrition, raise household food security, increase income, and supply a plethora of micronutrients for consumption by households (Mkwambisi et al., 2011). However, policymakers, city management, governmental agencies, non-governmental organizations, and other groups are among the governmental stakeholders that pay insufficient attention to urban agriculture (Firew, 2021).

Additionally, research shows that urban agriculture can increase food security for households by 30–50% (Orsini et al., 2013; Gallaher et al., 2013). According to a study conducted in Nairobi, Kenya, urban farming households experienced 40% greater levels of food security than non-

farming households (Gallaher et al., 2013). It has been demonstrated that urban households can greatly improve their year-round food supply and access by engaging in self-production of staple foods, vegetables, and livestock through urban agriculture. These quantitative results offer compelling evidence for the advantages of encouraging and funding urban farming programs by demonstrating the significant positive effects that urban agriculture may have on lowering malnutrition and improving household food security in urban environments.

Although there are growing benefits associated with UA, the majority of its products are just utilized for subsistence (Bryld 2003; Deelstra and Girardet 1999). In addition, Tewodros (2007) notes that the expenses of inputs (land, water, labor, machinery, chemicals, seeds, electricity, etc.) for urban agricultural farming systems and the waste products they produce could outweigh the benefits.

The Lemi-kura sub-city of Addis Ababa is the focus of this study. Because the sub-city has an appropriate agroecology for both horticultural crop production and husbandry, it is by far the ideal location for the implementation of UA. However, there are obstacles facing Lemi-kura's UA that are not related to the system itself. Crop, Vegetables, and Livestock are the main ones by Lemi-kura's urban farmers for their use and financial gain (Yared et al., 2019).

1.2 Statement of the Problem

One popular activity with lots of potential is UA. While Mohamed (2002) researched "urban agriculture initiatives in Addis Ababa on selected vegetable producing cooperatives," Tewdros (2007) looked at "livelihood dependence on urban agriculture in Addis Ababa." Accordingly, the lack of extension agriculture personnel in the field, the restricted amount of land, and the less implementation of UA were the gaps that they were brought up with. Their findings indicate that the primary focus areas for UA expansion are enhancing food and nutritional security at the family and community levels and making efficient use of the limited space through horizontal and vertical farming. Food security is positively impacted by urban agriculture because it provides for the dietary needs of urban residents with limited resources, raises the income of households producing, processing, and marketing products related to urban agriculture, and increases the availability of fresh and perishable foods like vegetables and milk (Thomas, 2013). The problem of providing the urban poor with a sufficient quantity of food that is nutritionally

acceptable is one of the anticipated obstacles to urbanization in emerging nations, particularly Ethiopia (Mesay, 2018). In a similar vein, the majority of cities in emerging nations like Ethiopia are rapidly urbanizing, which could present significant issues in the form of unemployment, inadequate sanitation, and population congestion (Thomas, 2013). Accordingly, for the rapidly expanding urban poor, UA may be one of the most practical sources of employment, income, and fresh food (Mesay, 2018).

The paper points out that some previous research has emphasized the benefits of urban agriculture, such as fewer food miles through the optimization of nutrient-dense foods for better nutrition and the optimization of social capital. Studies like Mulugeta's (2018), however, point out that difficulties like low levels of community involvement, restrictions from the government and regulations, and restricted access to resources are also highlighted by many urban development studies conducted in developing nations. These studies focus on housing, urban services, and non-agricultural informal activities. These results highlight the need for evidence-based approaches that address the more important social and economic components necessary for long-term food security, in addition to assisting in the creation and sustainability of urban agricultural enterprises.

Ultimately, the goal of this research is to positively impact the development of inclusive, sustainable urban environments that support urban agriculture and ensure food security for all. The study's intentional title, "The Role of Urban Agriculture in household food security" was selected with consideration for the aforementioned criteria. Planners and legislators will benefit from the results of these studies when they draft suitable legislation that will support UA and strengthen the elements that support family food security.

1.3 Research Question

The research addresses the following questions.

1. What is the current food security status of households engaged in UA in the study area?
2. What are the challenges and contributions of UA that are affecting household food security in the study area?
3. What are the key determinants that influence household food security concerning UA production?

1.4 Objectives of the Study

1.4.1 General Objective

The General Objective of the research is to investigate the role of urban agriculture in household food security of urban farmers in Addis Ababa, taking Lemi-kura Sub-city as a case study.

1.4.2 Specific Objective

1. To measure the food security status of urban agricultural producers.
2. To identify the key determinants of household food security in the context of UA production.
3. To assess the challenges and opportunities of urban agriculture in Lemi-kura sub-city of Addis Ababa.

1.5. Significance of the Study

The purpose of this study is to identify the role of UA, to assess their income status between urban agriculture theory and practice by providing practical guidance and recommendations for household food security in Lemi-kura sub-city. By examining successful case studies and identifying barriers and enablers of urban agriculture, this research aims to give stakeholders the knowledge and tools necessary to implement and sustain initiatives (Yelemat Tirufat, School feeding programs) that improve food security and the primary role of UA for each study area household and community well-being. By enabling the integration of urban agriculture frameworks for urban planning, food security initiatives, and community development plans, this research has the potential to bring about major advancements. Even though urban agriculture plays a significant role in preserving urban life, politicians and researchers have paid little attention to it in Ethiopia during the previous few decades. However, the UA has undergone noticeable changes in the last several years. While some studies have been done on the topic of urban agriculture, there hasn't been a systematic approach to gathering and analyzing data, especially from Addis Ababa's urban agriculture practitioners, about their food security and means of subsistence. By addressing the three research questions, this study will be extremely important for academics and politicians involved in urban development to take into account urban agriculture for inclusive and holistic urban planning. Additionally, the study will be used

as a tool by international development agencies to better understand the lives of those involved in urban agriculture as a means of securing food security and generating income, as well as to support their perspectives and improve their quality of life. Lastly, the study intends to add to the dearth of knowledge regarding the function and significance of UA in the mentioned sub-city.

1.6 Scope of the Study

Thematically, the study focuses is on agricultural practices that are carried out at the urban level, particularly mixed farming, and the production of Livestock, and vegetables, all of which are in great demand and have an advantage over farming in rural areas. Geographically, using Lemi-kura as a case study, the study concentrated on comprehending the role and primary drivers of UA on household food security. Furthermore, household food insecurity access scale(HFIAS) scores at the household level are used to quantify food security.

1.7 Limitations of the Study

The primary limitations of this study include the availability and quality of secondary data, the limited budget and time frame for the research, potential biases in the information provided by respondents, and methodological constraints. Firstly, the absence of comprehensive secondary data on urban agriculture practices, policies, and outcomes in the study area posed a challenge, as the research had to rely more heavily on primary data collection. The quality and completeness of available secondary sources were also variable, which may have introduced gaps or inaccuracies in the background information. Additionally, the constrained budget and timeframe for the study limited the scope of primary data collection, geographic coverage, and the ability to validate findings through extended fieldwork or follow-up interviews. There is also the possibility that some respondents may have been hesitant to provide full or candid information due to concerns over confidentiality or other factors, which could have introduced response bias into the data. Finally, the chosen research methods, such as surveys and semi-structured interviews, while appropriate for the research questions, inherently have limitations in terms of sampling, generalizability, and the depth of insights that can be obtained. These methodological limitations should be considered when interpreting the findings and drawing conclusions from this study on the study title.

1.8 Organization of the Study

There are five chapters in this thesis. The introduction, problem statement, aims, research question, importance, study scope, and limits are all covered in Chapter One, and the literature review is covered in Chapter Two. The third chapter covered sampling methodologies, sample size determination, data processing methods, and data collection strategies. The study's results and a discussion are presented in Chapter 4, and a conclusion and recommendations are suggested in Chapter 5.

CHAPTER TWO: LITERATURE REVIEW

2.1 Conceptual and Theoretical Literature Review

Urban Agriculture: Concepts, Definitions, and Roles

UA is a difficult concept to define because there are many different types of urban agricultural systems around the world, each with unique features based on regional socioeconomic, geographic, and political factors (Dereje, 2021). UA, according to Deelstra and Girardet (2004), is any agricultural activity that takes place primarily in public open spaces inside or outside of cities, including horticulture, forestry, fisheries, poultry, and livestock. Renevan (2006) concludes that "*urban agriculture is an industry located within or on the fringe of a town, which grows or raises, processes and distributes a diversity of food and non-food products, using largely human and material resources, products and services found in and around that urban area*".

Most cities, particularly those in developing nations, struggle to provide enough employment and income to support their rapidly growing populations. This equates to starvation and inadequate food intake. Undernourishment affects over 53% of Ethiopians (Headey D. and Ecker, 2013). By 2020, it is anticipated that 40 million people—up from 25 million in six East and Southern African countries—will get a portion of their food from urban gardening (Renevan, 2006). According to the MoFED F. report 2010/11, Ethiopia has had significant advances in several sectors, including agriculture, industry, and products and services, with an annual growth rate of 11%. With a rapidly expanding population, fewer households owning land, rising unemployment, ongoing food insecurity, and environmental and social issues, the government will face significant challenges in maintaining growth and implementing its ambitious Growth and Transformation Plan (GTP). By 2025, Ethiopia is expected to reach a middle-income level under this GTP plan. One of the main goals of the GTP plan is to develop a robust agricultural sector that would not only feed the country but also foster industry growth to maintain food security (Henok T. 2004).

Thomas (2013) asserts that the ability of UA to generate revenue, provide food, create jobs, and manage the environment are some of its economic significances. Urban farming is mostly practiced by low- and middle-class farmers who want to survive and reap a variety of socioeconomic and nutritional benefits, primarily by producing extra food and/or revenue.

According to estimates from the Global Organization Development Program (UNDP, 1996), 800 million people practice UA globally. Of these, 200 million are regarded as market producers, and 150 million of them are full-time employees. In 1996, UA accounted for 15% of global food production; by 2005, this percentage is predicted to rise to 30% (Jac et al., 2001). According to certain studies on the subject, up to 50% of people in certain occupied cities and as much as 40% of people in some African cities are involved in urban or peri-urban agriculture (IFPRI, 2002).

In Ethiopia, UA represents the last option for households to survive. To combat the serious issue of poverty and food insecurity, urban households complete urban farming on every accessible vacant space. Due to the lack of income and unemployment in metropolitan areas, UA is often practiced (Lamba, 1993).

UA has special characteristics with specific potentials and limits because it is primarily conducted inside city boundaries. UA's long-term advantages to cities entail the industry's contributions to urban sustainability (Nugent 1999). According to Nugent, researching UA from the perspectives of social, economic, and ecological factors helps generate a net positive effect, which validates its long-term worth to the target city.

2.2 Food Security: The Concept

Before talking about how food security relates to UA, it is important to clarify the concepts of food security and its various components in this section. Food security exists when all people, in any respect times, have physical and economic access to sufficient, safe, and nutritious food to satisfy their dietary needs and food preferences for a full of life and healthy life (FAO, 1996). The Food and Agriculture Organization of the international organization called the Planet Food Summit in Rome, where the chiefs of the world governments came together and endorsed this definition. It was also the foundation for the MDGs' main goal, "Eradicate Extreme Poverty and Hunger," which was adopted by world leaders in 2000 and is scheduled to be accomplished by 2015.

According to Schmidt and Tubiello (2007), four essential aspects of food supply make up the notion of food security: availability, stability, access, and utilization/usage. The first dimension has to do with the availability of enough food, or more specifically, the agricultural system's overall capacity to meet demand for food. The agro-climatic foundations of crop and pasture

production, as well as the full spectrum of socio-economic and cultural elements that influence where and how farmers respond to markets, are among its subdimensions.

The second dimension, stability, relates to individuals who are at high risk of temporarily or permanently losing their access to the resources needed to consume adequate food, either because these individuals cannot ensure ex-ante against income shocks or they lack enough' reserves'' to smooth consumption ex-post or both. a crucial reason for unstable access is climate variability, e.g., landless agricultural laborers, who almost wholly depend upon agricultural wages in an exceeding region of erratic rainfall and have few savings, would be at high risk of losing their access to food (Schmidhuber & Tubiello, 2007). The ability of individuals, groups, and nations to obtain enough food in the right amounts and conditions is referred to as the third dimension, access to food. It also includes people's access to sufficient resources (entitlements) to gather the right foods for a healthy diet (Schmidhuber & Tubiello, 2007). Given the legal, political, economic, and social structures of the community in which one may reside, entitlements are described as the collection of all those commodity bundles over which one might exercise authority. Accordingly, a crucial component is the evolution of real earnings and food costs as well as consumer purchasing power (Schmidhuber & Tubiello, 2007). Household purchasing power, which changes concerning market integration, price regulations, and temporal market conditions, is a major determinant of food access (UNDP et al., 2010).

Lastly, utilization includes all facets of nutrition, including food safety and quality; as a result, its sub-dimensions are linked to health, encompassing the hygienic circumstances throughout the entire organic phenomena (Schmidhuber & Tubiello, 2007). Furthermore, food utilization is determined by food safety and quality, an individual's portion size, and efficiency in converting food to energy, all of which have an impact on growth, nutritional status, and the suitable biological use of food (UNDP et al., 2010).

2.3 Theoretical Literature Review

Several theories have been presented to explain the causes of food insecurity. Among the theories is the climate theory, which links climatic occurrences to food insecurity. Cox (1981) proposed the "famine belt" idea, which establishes a clear connection between food insecurity and climate change. This idea holds that climatically related events like droughts and floods are significant

contributors to food insecurity (Cox, 1981).

The opposing hypothesis, known as the food availability theory, maintains that food scarcity arises when the population's need for food is greater than the amount of food that is readily available. The main proponents of this theory, Adam Smith and Malthus, contended that famines are mostly brought on by an abrupt drop in the availability of food. The theory's creators analyze the impact of natural drivers on harvest failures and price increases and believe that these factors are the primary causes of food insecurity. Because the idea only considered local food availability, it is open to criticism. According to the idea, crop failures brought on by natural catastrophes frequently lead to high food costs and a rise in demand for hedging against uncertainty. The poor and those who are impacted by adverse weather are more likely to become food insecure due to a decline in purchasing power (Lin and Yang 2000).

Food entitlement decline theory, another well-known theory of food insecurity, has drawn criticism for failing to acknowledge the social and political dimensions of hunger and for concentrating solely on its economic side. It disregards people as socially integrated members of families, communities, and states. Furthermore, it ignores the fact that political crises contribute to hunger just as much as economic shocks or natural disasters do (Devereux, 2001). The academics have been questioned for their belief that importing food in an environment where there is already food insecurity could be the solution to reduce the problem and save lives, Sen (Steven and colleagues, 2014; Leach et al., 1999). A key tactic to alleviate the expanding problem of food insecurity in cities worldwide is urban agriculture. Amartya Sen's "Food entitlement decline theory" is a significant theoretical framework that supports the necessity of urban agriculture (Sen, 1981). According to this hypothesis, people's ability to access and purchase food through their different entitlements—such as own production, the labor market, social security, and trade—is declining, rather than necessarily resulting in a complete food shortage.

Many urban people, especially the poor and excluded, now have less food entitlements due to the rapid pace of urbanization and economic and social inequality (Crush & Frayne, 2011). The decrease in food entitlements in urban areas has been attributed to various factors, including the rising cost of living, the loss of land for producing food on one's own, and the breakdown of conventional social safety nets. Urban gardening is a viable solution to the problem of declining access to food in urban areas. Urban agriculture can reinforce people' food rights by giving them

opportunities to participate in food production and improve their access to and affordability of nutrient-dense foods (Zezza & Tasciotti, 2010). Furthermore, urban agriculture can create jobs and revenue, enhancing urban inhabitants' financial rights (Orsini et al., 2013).

The "Food entitlement decline theory" offers a useful theoretical framework for comprehending the underlying causes of the growing problem of food insecurity in metropolitan settings. Urban agriculture presents a viable approach to mitigate the decrease in food entitlements and improve the food security of urban inhabitants.

The theory of urban resilience is the researcher's main concern. This theory strongly emphasizes enhancing cities' ability to absorb shocks and stresses, including those connected to food, and to recover from them. By increasing local food systems, lowering vulnerability, and diversifying food sources, UA is viewed as a tactic to improve community resilience. The goal of urban resilience theory is to improve our understanding of and ability to withstand shocks and pressures, recover from them, maintain essential services, and adapt to long-term changes in cities. It came about as people became more conscious of the risks and weaknesses that cities face as a result of social injustice, rapid urbanization, climate change, and economic upheavals. Urban resilience draws attention to the importance of building resilient cities that can survive shocks and recover from them, going beyond the conventional idea of catastrophe management. Resilient cities are viewed as dynamic systems that maintain a high level of life for their residents while absorbing shocks, adapting, and maintaining essential services.

Urban resilience has garnered substantial attention as cities confront various economic, social, and environmental difficulties. According to the theory of urban resilience, cities need to become able to endure shocks and pressures and then change and adapt (Meerow et al., 2016). Numerous case studies and practical investigations have shown how important urban agriculture can be in creating this kind of urban resilience.

According to Béné et al. (2018), the four main pillars of the theory of urban resilience are (1) economic resilience, (2) social resilience, (3) environmental resilience, and (4) institutional resilience. Urban agriculture has a special contribution to each of these pillars.

1. Economic Resilience: By offering chances for income generation, particularly to marginalized communities, and by diversifying the local food chain, urban agriculture can improve the

economic resilience of cities (Orsini et al., 2013).

2. Social Resilience: According to Barthel and Isendahl (2013), urban agriculture can promote social cohesiveness, community involvement, and the empowerment of marginalized groups, all of which help to reinforce the social fabric of cities.

3. Environmental Resilience: By lowering the ecological footprint of food production, increasing urban biodiversity, and encouraging sustainable resource management, urban agriculture can make cities more environmentally resilient (Grewal & Grewal, 2012).

4. Institutional Resilience: By involving a variety of stakeholders, encouraging cross-sectoral cooperation, and influencing policymaking processes, urban agriculture can support institutional resilience (Lovell, 2010).

2.4 Potentials and Constraints of Urban Agriculture

Most cities are unable to provide enough jobs and revenue to support their rapidly growing populations in general, particularly in developing nations. This equates to starvation and inadequate food intake. Undernourishment affects over 53% of Ethiopians (Headey D. and Ecker, 2013). By 2020, it is anticipated that 40 million people—up from 25 million in six East and Southern African countries—will get a portion of their food from urban gardening (Renevan, 2006).

2.4.1 Potentials of Urban Agriculture

UA is mostly carried out on ground that is unsuitable for building construction—in open spaces within cities, along riverbanks, and on the edges of metropolitan areas. According to Bryld (2003:81), "Urban agriculture brings with it great potential for enhancing the situation of the urban citizens, especially those who depend on access to locally grown food and have lower incomes."

Food security

There has been a rise in the demand for food as urbanization has accelerated in developing nations. However, as urbanization has increased, so too has the number of impoverished urban homes; many of these households struggle to make ends meet by buying an adequate amount of food for themselves (Bryceson and Potts 2005).

The urban poor engage in most urban farming, consuming the majority of the produce and selling the excess to the market (Bryld 2003, Mireri et al. 2006). For the majority of urban poor people, buying food is their biggest expense; as a result, they have little money left over for additional expenses like health care and education. They also don't eat a wide variety of foods. Therefore, it should come as no surprise that urban farming helps the impoverished in cities live better lives. If the underprivileged self-grow fruits, vegetables, chickens, and other food items, it enhances both the amount and nutritious value of food consumed (Smith 1996: in Bryld 2003: 81, UNDP 1996). The RUAF (2007:2) report highlighted the following functions of UA: Probably the most significant advantage is the contribution UA makes to food security and a healthy diet. In many circumstances, urban poor people's response to insufficient, inconsistent, and irregular food access as well as their low purchasing power is the city's food production.

Economic potential

If UA is done particularly as a formal sector, it can also be a good source of income for the impoverished in the cities. Though he claimed that urban farming has economic relevance because it helps urban farmers, especially the poor, use their non-farm income for other purposes instead of purchasing food, i.e. it improves the welfare of urban farmer households, (Bryld 2003) doubted if it has a significant contribution to the macro-economies of cities. The benefits of self-growing crops and/or engaging in other forms of UA by the urban poor were recognized by RUAF (2007), which revealed that poor households in developing nations spend 50–70% of their income on buying food. Additionally, the survey confirmed that "even the smallest-scale backyard producers with very low capital earn above-normal profits in Addis Ababa" (Staal 1997: in RUAF 2007:5)

Social advantage

A variety of urban society groups provided actors for UA. These can be males or women, native-born or immigrant, wealthy or impoverished, and so on. The industry attracts attention and suggests that it has a role in integrating urban societies and reducing poverty because it mostly employs women and other disadvantaged households (RUAF 2007, UNDP 1996). Urban farming "improves social equity by improving the health and productivity of poorer populations and by providing them with an opportunity to earn additional income," according to a UNDP report from 1996:165.

Environmental advantages

UA is typically carried out on land that is unsuitable for other uses, in marginal parts of cities and on the outskirts. As a result, it generates stunning scenes and landscapes, enhances the microclimate, and recycles nutrients (Bryld 2003; Deelstra and Girardet 1999).

2.4.2 Constraints of Urban Agriculture

Although UA has certain benefits, it is important to acknowledge its drawbacks as well. Limited land availability, poor soil quality and contamination, restricted access to water resources, zoning, and regulatory barriers, limited financial resources and investment, lack of technical knowledge and skills, social acceptance and perception challenges, and little support from local councils are some of the reasons why it is practiced in many cities in an informal sector (Bryceson 2005, Bryld 2003, and Deelstra and Girardet 1999).

Space for cultivation

Agriculture requires land. However, there is a lack of space for growing crops in cities. As Bryld (2003:82) said, "Besides feeding the poor in the cities, there is an urgent need for providing shelter for the homeless". Knowing that growing food in cities requires land, it may not be prioritized in urban land uses since the demand for urban spaces to build houses is by far higher than using spaces for agricultural activities. Argenti (2000:1) further emphasized that "…agricultural productive lands are likely to be lost in this competition."

Health problems

There may be health risks associated with UA. Its production process makes use of urban resources like water and garbage. Utilizing untreated compost, wastewater, or dirty rivers can contaminate crops and livestock and pose health risks to people. Numerous instances of health issues resulting from urban gardening have been documented (UNDP 1996). In addition to these, the main obstacles to urban farming in Addis Ababa are overuse of resources, low working capital for farming, and a lack of policy concerns with urban agriculture (ORAAMP 2000).

2.5 Food Security in Urban Context

The requirement to obtain the majority of the food needed by the household and the increased reliance on the market system and commercially prepared food are two particular features of food security in the urban setting. Therefore, the two most important requirements for achieving food security in an urban environment are employment and income (Baumgartner &Belevi, 2001). In addition to providing income and jobs to a disproportionate number of the impoverished, particularly women, sustainable food production, processing, and processing in and around cities and towns also helps to achieve the objective of a safe, affordable, and consistent food supply for the urban poor (World Bank, 2005).

Food security and food production are the two main factors pushing people from all walks of life, especially the impoverished and those with low salaries, to farm the city. Evidence suggests that UA plays a significant and, in many cases, expanding role in ensuring household food security and the availability of food in urban areas (Mougeot, 2005). Urban food production growth is influenced by several factors, including official attitudes, household size, urban layout, personal income, and climate (Koc et al., 1999).

In developing nations, access to food in cities cannot be considered a right, and there is enough evidence from global cities that food is increasingly becoming a "basic luxury" for the urban poor in particular. Urban food production has developed into a sophisticated and prosperous industry that provides urban markets with a wide variety of nutrient-dense food items. Furthermore, a growing corpus of research is highlighting the benefits that practicing households can reap in terms of self-grown food intake, overall health and nutritional status of young ones, as well as financial savings and income generation (Mougeot, 2005).

A large portion of those involved in UA are not just self-provisioning. While UA may be the primary source of income for a small percentage of city farmers, for many others it serves as a vital secondary or even third source of income. Growing and processing food in cities generates thousands of full- and part-time jobs, as well as the possibility of creating even more. There is always food on the table for many families since it lessens the financial uncertainty that comes with unemployment and job instability (Mougeot, 2006).

2.5.1 The role of Urban Agriculture towards Reducing Urban Food Insecurity

Food insecurity and unemployment continue to be important issues in many parts of Africa despite ongoing economic processes worldwide (UN-Habitat, 2006; Mougeot, 2005), particularly in and around large urban centers. According to the FAO (2002), 33% of people in the region are undernourished, and according to reports from international organizations (UN-Habitat, 2006), the percentage of people living in urban areas in the region is expected to climb from 39.7 to 53.5% between 2005 and 2030. This could present new and significant obstacles to ensuring that households have access to basic services and food security.

Various scholarly works, such as Daniel, 1998; Devereux & Maxwell, 2001; and World Bank, 2005, demonstrate that UA has been employed by households as a means of addressing both acute and long-term food insecurity. Efforts to combat poverty and food insecurity typically focus primarily on how urban households respond to their financial circumstances (Maxwell, 1999). UA adds to household food security, particularly for girls and the elderly, and may be viewed as a survival tactic for the urban poor during times of crisis (World Bank, 2005). Regardless of the cause, a crisis in the food supply tends to affect people more in urban areas than in rural ones, with women and children are especially vulnerable when food is scarce. Food supply crises can arise in developing countries due to a variety of factors, including political instability, temperature changes, market globalization, and others (Mougeot, 2006).

The urban poor's response to an expensive or insufficient food supply led to the widespread practice of producing food (livestock and crops) in backyards across the globe. However, the corresponding rise in the demand for food in cities also made room for farming systems that focus on perishable goods, such as vegetables. These farming systems, which take advantage of every available space, the proximity of markets, and the general absence of functional chains in these farming systems, are part of a phenomenon known as UA (IFPRI, 2002).

To address food insecurity, urban households can diversify their sources of income and food by growing their food production or having more people work (including children), sending wage labor migrants, switching to cheaper foods, borrowing money or using credit, cutting back on other expenses, selling assets, sending family members to live with relatives elsewhere, and consuming less food (Devereux & Maxwell, 2001).

UA, or the production of food in or near urban areas, appears to offer a reasonable and workable option (Mougeot, 2005). For instance, research shows that UA is a vital food security strategy for low-income urban households and a highly important source of food throughout food systems in developing countries (Mougeot, 2000; Klemsu& Maxwell, 2000). Because UA can raise household earnings and supply fresh, locally grown foods to impoverished households, it may enhance household nutrition by increasing the number of micronutrients in their meals (IFPRI, 2002).

Maxwell (1999) claims that the nature of urban food insecurity has shifted from being about "feeding the cities" or preserving the overall supply to being about access at the household and individual levels. Efforts to combat poverty and food insecurity typically focus mostly on how urban households responded to the depression. Food can account for 60% to 80% of the restricted income of urban poor customers. In this context, UA becomes a compelling choice as it enhances the availability of a variety of foods, particularly fresh and perishable plant and animal products, as well as the reception of food production for domestic use and improved nutrition.

2.6 Empirical Literature Review and the Gap

2.6.1 UA as Source of Livelihoods

Despite the common misconception that agriculture is exclusively a rural endeavor, UA play a role in urban livelihoods, providing food and jobs for underprivileged homes as well as entire cities. Depending on the availability of land and regulatory constraints, UA's scope varies greatly. According to studies, urban or peri-urban agriculture employs as much as 40% of the people living in African cities and as much as 50% of those living in occupied cities. In China's major cities, peri-urban and UA supplied more than half of the demand for meat and poultry and almost 90% of the demand for vegetables in the 1980s (IFPRI, 2002). The rapid urban population and area increase is a global phenomenon. According to Prain (2006), half of the world's population currently resides in urban areas, and by 2020, an additional 1.5 billion people will do the same. It is anticipated that at least 50% of Africans will reside in cities by 2030 (Parrot, 2010). Ethiopia has a high rate of urbanization, averaging 4.3% annually, according to the Ministry of Works and Urban Development (MoWUD, 2006). The population of this country is concentrated in Addis Ababa, the capital city, at about 30%.

According to a study done on livelihood security in Lima, the capital city of Peru, which is situated in a western region of the country, urban producers employ a variety of resources that they combine to manage risks and vulnerabilities. The five types of these assets are financial, social, personal, physical, and natural. Here, densely populated areas pose one of the main risks to urban producers. Furthermore, policymakers' lack of awareness and comprehension of urban households engaged in agriculture is a problem (Villavicencio, 2008). Research conducted in Zambia's capital city Lusaka has shown that the availability of resources is the foundation of UA. The same study also demonstrated that UA can serve as a safety net for household food security and a different source of revenue (Drescher, 2000).

Callens & Seiffert (2003) state that "food security" and "household food security" are frequently used interchangeably. The simplest definition of food security is the availability of food for everyone, everywhere, at all times, to lead an active and healthy life. The primary social unit in a society, the household, is the center of food security. This distinction is crucial because initiatives targeted at enhancing food security at the home level may differ significantly from those at the national level.

The former is frequently more associated with food production, marketing, distribution, and consumption at the micro level by the general public. In addition to addressing objectives for food production, procurement, utilization, and consumption, household food security also addresses the distribution of food within the home. So, in addition to food, the emphasis is on people, households, and how they shape the food chain. A closer examination of both internal and external sources of vulnerability is provided by family food security. This can involve access to services and infrastructure, national policies, the environment, etc.

For some communities, UA has been demonstrated by households in Ethiopia to be the last in a series of survival tactics. To combat the serious issue of poverty and food insecurity, urban households complete urban farming on every accessible vacant space. Due to the lack of revenue and unemployment in metropolitan areas, UA is often practiced (Lamba, 1993). In the national capital, Axumite (1994) carried out exploratory research on five horticultural cooperatives and found that urban households in Addis Ababa turn to UA when they have no other options or are unable to meet their demands through better revenue possibilities. In her analysis of urban farmer households' survival strategies, she also noted that these households typically went through three

stages in succession as they looked for ways to improve their family's quality of life and income.

Asfaw (2018) defines a coping strategy as a change in assembly, consumption, income, assets, and migratory channels, either within or between them. Farm households use the assembly method in conjunction with risk management strategies to reduce crop loss by diversifying their crop varieties (Hardaker et al., 2004). In addition, as they quickly address the food shortage, a diversity of sources of income may be seen as a coping method. Nonetheless, these risk-attenuation techniques that households adopt are only effective for a short while. Mengestu (2011) revealed that coping methods are adopted in a way that maximizes their ability to save lives today while compromising the household's ability to produce enough food or meet its entitlements at the end of the day. Early on, depending on the level of food insecurity, households commit non-productive assets and modify their production choices in a manner comparable to where they locate their labor.

2.7 Research Gap

The impact of urban agriculture on households' access to food in Addis Ababa's Lemi-kura sub-city and its role in ensuring food security have not received enough attention from researchers. To create evidence-based information about urban agriculture and its role in ensuring food security for households, this study evaluates the sub-city's existing food security state. The study aims to fill the current literature gap in this field of study, specially from the scope of income generation. Furthermore, scholars, policymakers, and other interested parties can use the study's results to help them make defensible choices about urban agriculture in the study region.

2.8 Conceptual Framework

The conceptual framework that follows attempts to illustrate the main ideas of the research (Figure - 1). The variables specifically show how urban agriculture contributes to access to food products, and household income. These contributions can be broken down into several categories, including the contribution of UA, food security in households, goals of UA, and UA production in the study area.

During this context of a conceptual framework, the researcher will concentrate on the contribution to household food accessibility, Diversity, income, and Constraints in Practicing

UA, the role of UA, and also household food security status in the context of UA Practice.

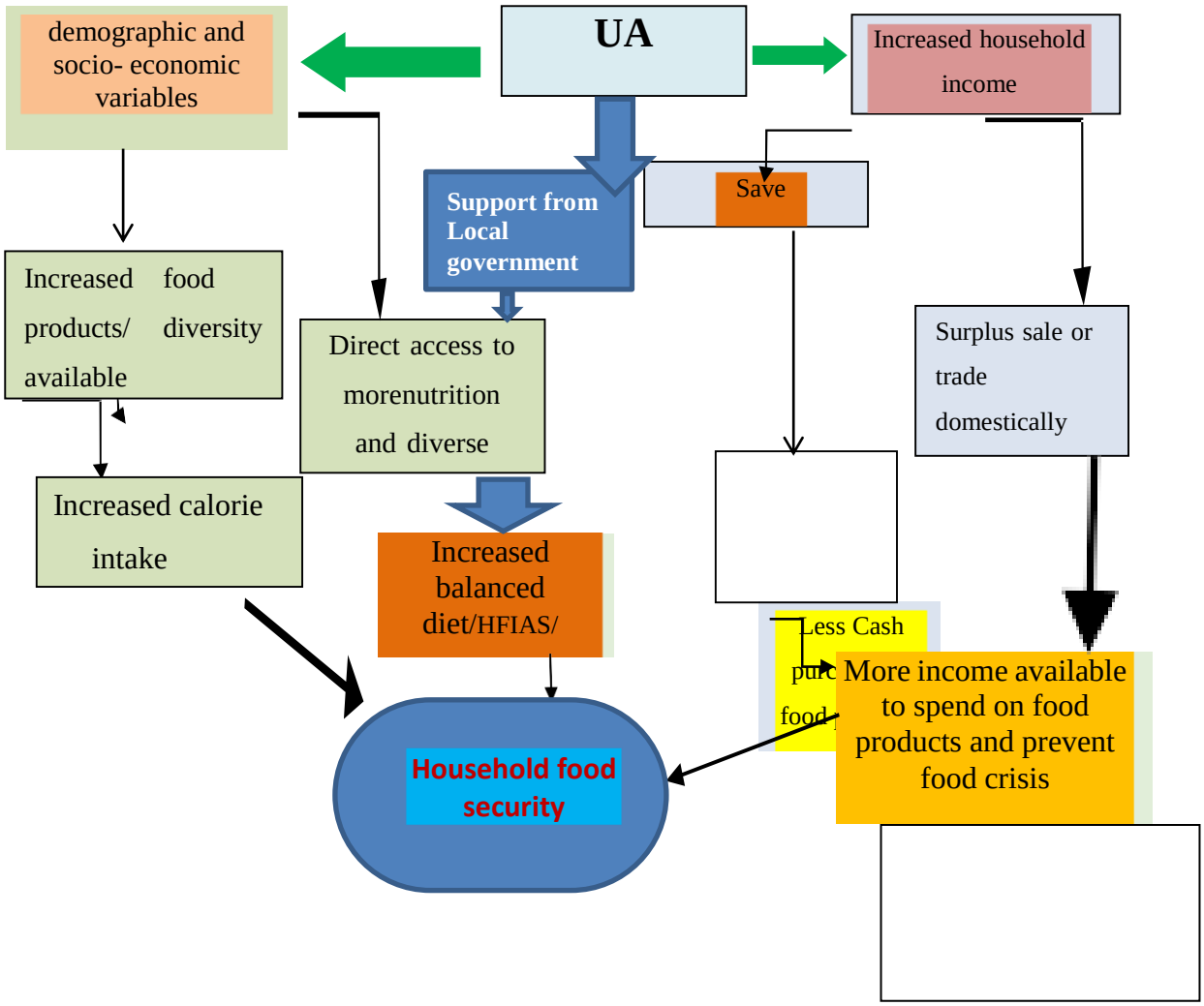

Figure 2.1: Conceptual framework of the study

Source; Adopted from Dereje (2021), and developed by Author.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Description of the Study Area

3.1.1 Location and Administration

Lemi-kura (see Figure-2), located at 2408 meters above sea level. Its coordinates are 90°1'48" North latitude and 38°44'24" East longitude. CSA (2010). The last ten years have seen significant physical growth in the sub-city. The sub- city's estimated area is projected to be 1,920,000 meters square in 2024 (source: Lemi-kura sub-city agriculture office).

Urban and peri-urban areas form the basis of the City Administration, which is further subdivided into eleven sub-cities: Addis Ketema, Akaki-kality, Arada, Bole, Gulele, Kirkos, Kolfe-Keranio, Lideta, Nifasilk-Lafto, Lemi-kura, and Yeka (see to Figure 1). In 2020, Addis Ababa had 4,794,000 residents (CSA, 2020).

Lemi-kura is one of all eleven sub-cities of Addis Ababa, the capital city of Ethiopia. It covers a vicinity of 7860.7 hectares or 78.607 square kilometers. The sub-city is roughly situated within the edge part of Addis Ababa, bounded from the South by Bole, from the East by Sheger City, and from the North by the Yekasub city. It is divided into 10 woredas/districts, 59 clusters, and 508 blocks. According to the report of the Lemi-kura sub-city office, there are 2676 households currently practicing UA. The current total population of the Lemi-kura sub-city is 382,843 (CSA, 2020, & Lemi-kura sub-city website).

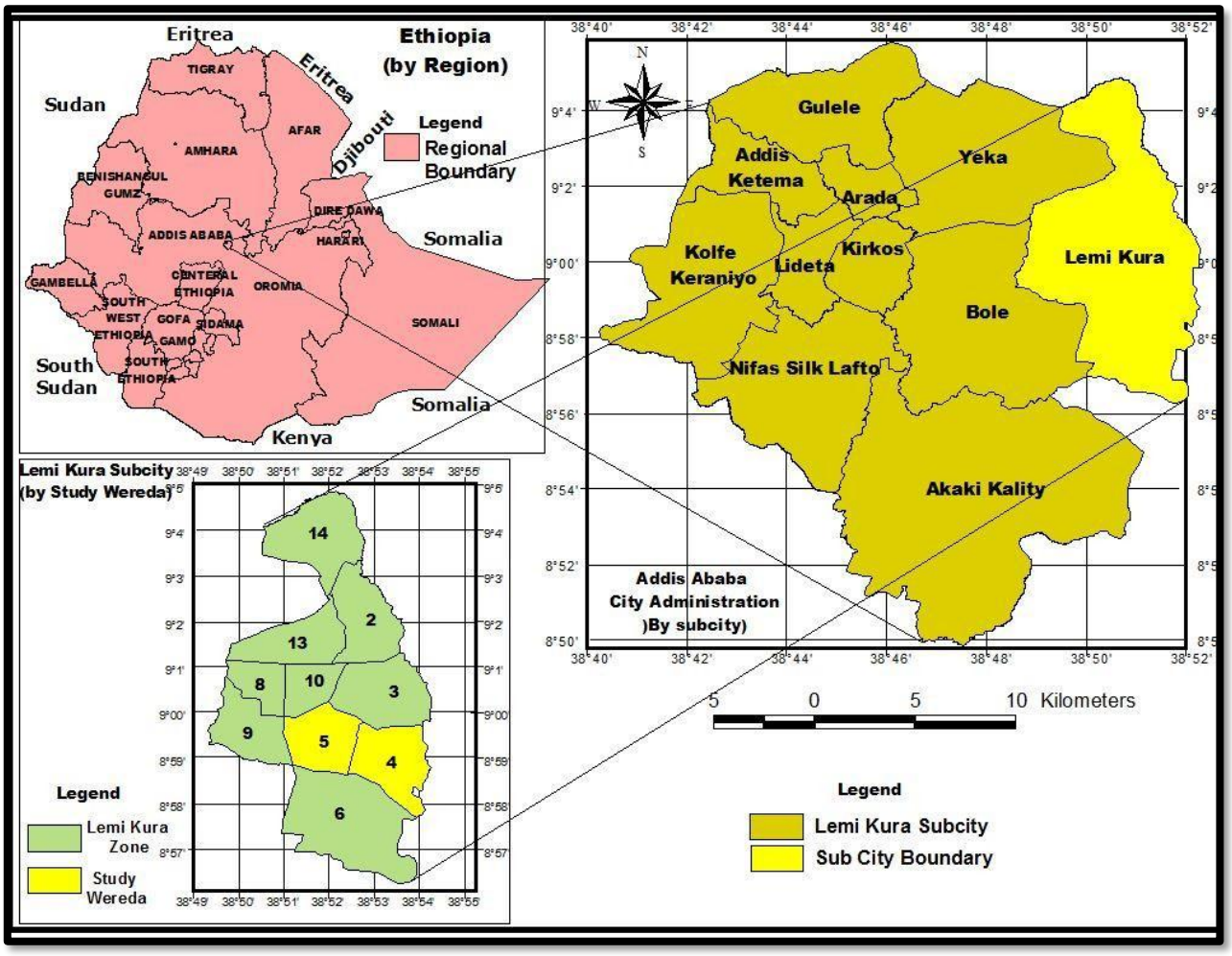

Figure 3.1: Map of the study area (source: adapted from aau geography department, 2024)

3.1.2. Biophysical and Drainage System

Lemi-kura sub-city is located at an average elevation of nearly 2,400 meters (7,900 feet) above sea level in the Ethiopian highlands. Because of the region's diverse geography, which includes mountains and hills, the sub- city's drainage patterns are influenced (2024, Lemi-kura sub-city agriculture office).

Drainage

- **River Systems**: Lemi-kura is located in the upper catchment area of several river systems. The three rivers that primarily affect the city's drainage system are the Little Akaki and Great Akaki. These rivers and their tributaries drain the sub- city's rainwater (2024, National Meteorological agency and Lemi-kura sub-city agriculture office).
- **Drainage Infrastructure**: To control rainwater runoff, the sub-city has installed a system of stormwater drainage channels, canals, and culverts. By directing the water toward rivers and other bodies of water, these drainage systems aid in preventing flooding during the rainy season (2024, National Meteorological agency and Lemi-kura sub-city agriculture office).

Climate

The climate of Lemi-kura is classified as subtropical highland (Köppen: Cwb), with monthly variations in precipitation. The average daily temperature of Lemi-kura is between 12°C (54°F) and 25°C (77°F) all year long, with some seasonal variation. It has an unimodal rainfall regime with an annual precipitation of roughly 1180 mms and a duration of June to September. Seasonality runs from January until May. This is the time of year when many city dwellers engage in urban farming. The sub-city experiences 12 to 25 degrees Celsius (54 to 77 degrees Fahrenheit) on average each year. Because of its elevation, the weather is comparatively milder than in other places of Ethiopia (2024, National Meteorological agency and Lemi-kura sub-city agriculture office).

Soil

The sub-city has a wealth of Vertisols. This soil has a high level of organic matter and is fertile. They have a high water-holding capacity and were formed from volcanic ash. This soil is appropriate for UA because it usually drains well (2024, Lemi-kura sub-city agriculture office).

3.2. Study Design and Techniques

The community-based cross-sectional study was carried out by the researcher. The reason for this is that it concentrates on a specific UA community or demographic. That means, data is gathered

from persons within the study population, which is selected either geographically or from a predetermined UA community. An investigation of their UA participation or other associated features of the community as a whole or of specific subgroups within it is the aim of a community-based cross-sectional study.

3.3 Methodological Approach

To assess one-time data collection regarding UA communities, farmer households' responses and opinions, and statistical comparison of differences in their food security situation, the research employed both qualitative and quantitative of explanatory approaches.

3.4 Data Sources

Both primary and secondary data were employed in the investigation. The population of urban farmers is the relevant demographic from which the sample was drawn, and this is where the primary data was obtained. The secondary data was gathered from a variety of sources including books, scholarly journals, government reports, statistics databases, and published research articles.

3.5 Sample Population

Those two sample weredas have 2,676 UA households from which the study made up the sample population of this study (2024, Lemi-kura sub-city agriculture office). A subset of 346 households who were reachable and available for data collection within the study's limitations was chosen to be the sample population. The sample population was selected to reflect the diversity and features of the larger population, despite its smaller size than the source group. When evaluating the results, it's critical to take the study group's representativeness into account and to acknowledge that the conclusions should be cautiously extrapolated to the larger source population. While acknowledging the inherent constraints of a smaller study sample, the study sought to capture the essence of the features of the source population and offer insightful information about the research subject at hand.

3.6 Sampling Technique and Sample Size Determination

The research was conducted in Lemi-kura, a sub-city of Addis Ababa, which is considered a study

universe. To make sure sample is representative of the population, a purposive sampling technique was employed to ensure that the sample wereda's are representative of the population. Several factors were taken into account while choosing representative Woredas for the research. First, according to the researcher's initial observations, a high number of individual farmers and public sector workers are engaged in UA and operating at the study location. In each Woredas, a considerable number of urban agricultural practitioners were accessible due to their geographic diversity, accessibility, and representation. This is the second factor. The corresponding Agricultural office of Lemi-Kura Sub-city has lists of household heads that are involved in urban farming. In this way, the 2676 households who practice urban agriculture in the sub-city served as both a "sampling frame" and possible sources of data for the research. Lastly, two woredas, Woreda 04 and 05, were purposefully chosen from ten woredas from their practice of UA, such as poultry, dairy, livestock fattening, and vegetable production, which are widely implemented by the urban dwellers in the study sites. This data was gathered from the urban agricultural and offices of the sub-city Using a random sampling technique, 346 people made up the sample for this research study.

The two woredas that were chosen for the UA participants in Lemi-kura are woreda 4 with 1390 households and woreda 5 with 1286 households. Together, the two woredas have a total of 2676 households. Using Yemane's (1967) formula, the sample size was ascertained by counting the number of UA participants in each woreda. Assuming, therefore, with a desired degree of accuracy (margin of error) of e = 0.05 (or 5%), the sample size will be calculated from the total population using the following formula:

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

Where:

n= sample size /346

N = Population size/2676

e = Precision level at 95% (α=0.05) confident interval for normal distribution data. Let's calculate the sample size using this formula:

n=2676/1+2676(0.05) ² 2676/1+6.69

2676/7.69 =346, n=346

Where,

Woreda 04=1390/2676=0.52, 0.52*347=180 Woreda 05=1286/2676=0.48, 0.48*347=166 180+167=**346**

Consequently, given a population size of 2676 and a desired margin of error of 0.05, the projected sample size using the Yemane formula is roughly 2676. Finally using proportionate to respective population 180 and 166 samples were drown of the two woredas, woredas 4 and 5, respectively. To this end, Proportional to the Population Size (PPS) was applied to proportionally distribute the sample population and the final sample households were selected using simple random sampling method.

Table 3.1: Sample size households of the study area

Lemi- kura Sub city, study woredas	Household's farmers/total population/	How to compute	Sample size
4	**1390**	**1390 * Total sample size/Total farmers =1390*347/ 2676=180**	**180**
5	**1286**	**1286 * Total sample size/Total farmers' = 1286*347/2676 = 166**	**166**
Total	**2676**		**346**

3.7 Data Collection Tool

The data collection tools were questionnaires, interviews, observation, and FGD to obtain important data on the contributions of UA to HH food security.

Questioners: A structured questionnaire was organized to conduct a household survey. The researcher built up the questionnaire in English and translated it into Amharic. The wereda expertise was the data collectors. The questionnaire, which takes 10-15 minutes to fill, included data about the economic, social, health, and environmental advantages of urban farming in the study area, as well as constraints, opportunities in practicing urban agriculture, and demographic

aspects of the respondents.

Key informant interview: A total of 12 key informant interviews were conducted to gather in-depth information on the benefits of urban agriculture, its impacts on food security, and the key challenges faced by urban farmers. The key informants were purposively selected to get detailed information from the major stakeholder groups involved in urban farming in the study area. From the urban farming community, 4 informants were chosen, including small-scale urban vegetable growers, poultry farmers, and livestock fatteners, representing the diversity of urban agricultural practices in the region. Additionally, 2 representatives from local NGOs actively supporting and facilitating urban agriculture initiatives were interviewed to understand the organizational perspectives. 3 urban agriculture participants who had directly benefited from UA programs were also included to obtain firsthand accounts. Lastly, 3 government personnel working in urban development and agricultural extension services were interviewed to gather insights into the management and policy environment surrounding urban farming. This multi-stakeholder approach allowed for a comprehensive understanding of the research topic from various angles.

Focus group discussions (FGDs): FGDs were conducted by the researcher as part of the research technique to investigate community opinions on UA as a community development strategy and its impact on food security. To examine the opinions and experiences of the researcher's target population regarding the intervention, the researcher used a purposive sample for a qualitative research approach to select participants for the focus group talks. The criteria used to select FGD participants included: residing in districts 4 and 5, representing a range of demographics such as age, gender, employment, socioeconomic status, and degree of engagement in urban farming, as well as having representation from different community associations. Initially, the investigator ascertained suitable subjects who met these criteria, guaranteeing a diverse set of perspectives. Ten to twelve people participated in each FGD to ensure a wide variety of viewpoints. The FGD questions and tools were prepared and modified by the researcher according to the study's goals and circumstances. In a secure environment, the researcher conducted FGDs alongside a proficient moderator and a co-moderator. People with a stake in or familiarity with the research issues were sought out by the researcher. This indicated that to achieve a 95% confidence level and a 5% margin of error, the researcher had to conduct at

least two FGDs in each subgroup or four FGDs overall. Notification and other relevant information about the FGD, such as the date, time, place, and any necessary materials, were sent to the chosen participants.

Secondary data review: One of the methods the study used to fully comprehend earlier efforts in the areas of the Contribution of UA in the food security context was a review of related literature. A variety of materials were examined, including books, journal articles, reports, reviews, working papers, guidelines, dissertations, and online resources. The evaluation process made use of resources from the Food and Agriculture Organization (FAO) and the World Food Program (WFP).

3.8 Data Analysis and Technique

This is a broad framework that is applied in the study to comprehend and evaluate processes or systems. A combined method of study, combining qualitative and quantitative techniques, will be employed by the researcher. The investigator intends to employ theme analysis to examine the data and present the findings through narratives and quotes. The quantitative data was coded and entered into SPSS version 23 for analysis following the end of data collection.

3.8.1 Ordinal Logistic Regression Model

The specific quantitative approach of analysis used in this investigation is the ordered logistic regression model of analysis. This method of statistical analysis looks at the link between dependent variables and a group of independent variables all at once. In scenarios where there are several independent variables, it expands on the idea of simple linear regression, which examines the relationship between one dependent variable and one independent variable. The aim is to find the coefficients in the ordered logistic regression model that best capture the direction and strength of the interactions between each dependent variable and the independent variables. These coefficients show how the values of the dependent variables are influenced by the combined values of the independent variables. The ordinal logistic model is appropriate when modeling an ordinal dependent variable, such as household food security (food secure, mildly food insecure, moderately food insecure, severely food insecure), etc. Similar to ordinary least squares regression, the ordinal logistic regression model finds statistically significant

relationships between explanatory variables and dependent variables, which makes it particularly useful. However, ordered probit distinguishes uneven differences between ordinal categories in the dependent variable, in contrast to simple least squares regression (Agrist, 2003).

The ordered logistic regression model can be represented mathematically as Logit (P ($Y \leq k \mid X1, X2, ..., Xp$)) = $\alpha k - \beta 1X1 - \beta 2X2 - ... - \beta pXp$

The Wald Statistic: This alternative test is frequently used to evaluate the significance of each independent variable's logistic regression coefficient, or, more specifically, to evaluate the logistic regression model's null hypothesis that a given logit coefficient is zero. The researcher would conclude that the parameters associated with these variables are significantly different from zero and that the variables should be included in the model if the Wald test is significant for a given explanatory variable or group of related explanatory variables. In the paper's results section, the analysis's qualitative and quantitative outputs are methodologically presented.

3.9 Description of Study Variable

3.9.1 Dependent Variable

The dependent variable is the response, often known as the criterion variable. The dependent variable is considered to be caused by or affected by the independent treatment conditions as well as any additional independent factors. The dependent variable in the research is household food security. The Household Food Insecurity Access Scale (HFIAS) is used as the main indicator to measure the household's food security.

Household Food Insecurity Access Scale (HFIAS):

This variable's quantitative value is ascertained by looking at how the research participant answers nine common questions. The HFIAS approach is followed to determine the dependent variable. The four-category outcome is then dichotomized into the first category (food secure and mildly food insecure) and the second category (moderately and severely food insecure) to evaluate the component linked with food security status using HFIAS. Value 1 is marked for the first group (severely food insecure), 2 is coded for the second category (sometimes food insecure) and finally, 3 is coded for the 3rd category (often food insecure).

3.9.2 Independent Variables

An independent variable does not depend on the other variables against which it is being assessed. Reviewing related empirical works (Ashwini, 2021; Abafita and Kim, 2014; Zakari et al., 2014; Sultana and Kiani, 2011) serves as a guide for the identification of independent variables. These studies served as a guide for us as we identified two major categories of factors: institutional support variables (input supply and extension service) and demographic and socioeconomic characteristics (sex, age, education, past farm experience, family size, and farm/garden land size).

Sex of the household head (GENDER): It's a dummy variable that reads 1 if the head of the household is male and 0 otherwise. In contrast to households headed by women, male-headed households in rural Ethiopia are more likely to engage in agricultural activities. Sex has a noteworthy and beneficial impact on engaging in UA, according to empirical research (Zakari et al., 2014). Suggesting that households headed by men are more likely to engage in UA than households headed by women. Thus, the head of the household's sex is assumed to positively impact UA involvement in this study.

Age of the household head (AGE): Age is expressed in years and is a continuous variable. Households may gain farming experience and interest in UA as they age. Regarding the direction of influence, Ashwini (2021) discovered that age had a favorable effect on UA participation. Thus, the age of the head of the home is assumed to positively impact UA role in this study.

Education level of the household head (EDU): It speaks of the length of time the head of the home spent in formal schooling. A formal education improves a person's capacity for information processing and fast decision-making. This could involve households' capacity to weigh the benefits and drawbacks of UA and make decisions swiftly. An empirical study verified that the education level of the household head will have a significant and beneficial impact on the household head's participation in UA (Sultana and Kiani, 2011). Therefore, it is anticipated that the household head's degree of education will positively affect his or her role in UA in this study.

Prior experience in agriculture (EXPAGR): It implies the head of the household's previous agricultural experience. It's a dummy variable with a value of 1 for yes and 0 for no. Compared

to their peers, those who have worked in agriculture in the past are more likely to participate in UA. An empirical study found that past agricultural experience had a strong and beneficial impact on UA engagement (Abafita and Kim, 2014). Therefore, it is anticipated in this study that past agricultural expertise will positively impact UA role.

Household size (HHSIZ): It speaks to the overall number of occupants in the home. Misgana (2014) revealed a strong and favorable relationship between household size on participation in UA. Having more household members may result in a higher demand for food and, thus, more involvement in UA. Thus, a positive relationship between household size and UA membership is hypothesized in this study.

Garden/Farmland size (LANDSIZ): It refers to the total size of farmland or gardens that the household owns. Increased farmland may provide greater opportunities for UPA involvement. Empirical research, however, finds conflicting results about the direction of effect. In contrast to Tilksew and Fekadu (2014), who reported considerable and negative influence, Fekadu and Mequanent (2010) reported significant and favorable influence. However, the size of the garden or farm is thought to positively affect the number of households participating in UA in this study.
Availability of input supply (INPUT): It is a dummy variable with the value 1 indicating that a household has access to inputs and 0 otherwise. The availability of input supplies, such as fertilizer and seeds, will promote household involvement in UA. The availability of input supply was found to have a significant and favorable influence on involvement in UA by Wali and Janekarnkij (2013). Thus, the present study postulates that the availability of input supply positively impacts families' engagement in user-authorized content UA.

Extension contact (EXTENSION): It is a dummy variable that indicates if a home has access to extension services; if so, it is set to 1. If not, it is set to 0. Having access to extension services may raise household knowledge of the benefits of UA and, consequently, participation. Extension contact was found to have a strong and favorable impact on involvement in UA by Wali and Janekarnkij (2013). Thus, the present study postulates that households' participation in UA is positively impacted by extension contact.

CHAPTER FOUR: RESULT AND DISCUSSION

The study's econometric and descriptive findings are both discussed in this chapter. The results of the econometric analysis portion indicate a substantial correlation between the dependent and independent variables, whereas the descriptive statistic result includes demographic information. This thesis section's subjects are data presentation, analysis, and interpretation. The presentation, analysis, and interpretation of the information gleaned from the accomplishment tests, observations, interviews, and questionnaires addressed four main study topics. The researcher aims and result inquiries' topics inform the organization of this chapter.

The chapter's opening portion contains information on the demographics of the research participants. The statistical analysis and an explanation of the findings follow. To provide a thorough understanding of food security, a triangulation of variables and conclusions is combined with descriptive and multinomial statistics, depending on the requirements of each topic under consideration. The Statistical Package for Service Solution (SPSS) version 20, which makes it easier to turn organizational activity data into tables, graphs, and charts, can also be used by the researcher to examine the data. The factors influencing food security are also discussed in this chapter using an ordinal logistic regression model.

4.1 Descriptive Statistics

4.1.1 Household Head Age, Sex, and Family Size

In the study, 346 participants or households were surveyed through questionnaires and conducted by households engaged in urban agriculture at Lemi-kura sub-city, wereda 04 and 05 respectively. As can be observed below in Table 2, The sample size tends toward elderly and middle-aged respondents; the two largest age categories are 51 and above (29.5%) and 31–40 years old (32.9%). The youngest age group, comprising 11% of the sample, was made up of respondents in the 41–50 age range, who accounted for 26.6% of the sample. The sample is predominately masculine in terms of gender, with 70.2% of respondents being men and 29.8% being women. The sample's notable gender imbalance may make it more difficult to conclude the viewpoints and experiences of female urban farmers.

Table 4.1: Urban farming Household head age, sex, and family size

Variable	Characteristics by age and sex category	Number of Respondents	Percentage
Age of respondent	20-30	38	11.0
	31-40	114	32.9
	41-50	92	26.6
	51 and above	102	29.5
Sex of respondent	male	243	70.2
	female	103	29.8
Family size	1-5	179	51.7
	6-10	146	42.2
	11 and above	21	6.1

With more than half (51.7%) of respondents having one to five members, household size also seems to be concentrated in the medium range. 42.2% of respondents belonged to larger households with six or more members, whereas only 6.1% belonged to extended families with eleven or more members. All things considered, this demographic profile indicates that the attitudes and practices surrounding urban agriculture that are shown in this data are most typical of middle-aged to older male respondents who live in medium-sized homes. Significant insights from younger adults, women, and larger families may be absent due to their underrepresentation. Investigating how these important factors—age, gender, and household size—relate to and might affect urban agriculture participation, difficulties, and results would be beneficial to strengthen the analysis.

4.1.2 Household Education and Prior Experience

The statistics suggest that respondents with a high degree of practical farming expertise but a low level of formal education make up the majority of the urban agricultural research sample. The respondents' educational backgrounds exhibit a pronounced bias toward the lower end of the scale. Thirty-one percent of the sample can only read and write, and over thirty percent (35.3%) are illiterate. Twenty-two percent of the respondents are in primary school (grades 1–8). Only 13.3% of people have completed secondary school (9–12 graders), 4% have had technical or

vocational training, and 2.3% have a university degree or above. Higher degrees of education are far less prevalent. This educational profile is in stark contrast to the interviewees' extensive farming experience.

Table 4.2: Household education and Prior experience in agriculture

Variable	Characteristics	Number of Respondents	Percentage
The education level of the household	Unable to read and write	122	35.3
	read and write	80	23.1
	1 to 8	76	22.0
	9 to 12	46	13.3
	TEVT	14	4.0
	Degree and above	8	2.3
Farm experience	less than 5 years	33	9.5
	6 to 10 years	28	8.1
	11 -20 years	41	11.8
	Over 20 years	244	70.5

70.5 of them have been involved in urban agriculture for more than 20 years. 11.8% more have 11–20 years of experience, whereas lesser percentages have only been farming for 6–10 years (8.1%) or fewer than 5 years (9.5%). By linking these two factors, the evidence indicates that long-term, experiential learning rather than traditional agricultural education is the primary source of the urban agriculture practices and knowledge shown in this study. The fact that many of the respondents had decades of practical farming experience but were illiterate or poorly educated highlights the value of traditional, community-based agricultural knowledge in urban environments. This demographic profile does, however, also draw attention to any obstacles that may arise when implementing novel farming methods, strategies, or market-oriented procedures that would call for additional formal training. It will be necessary to carefully take into account the unique educational backgrounds and learning preferences of this demographic when developing effective urban agriculture interventions and support services. Overall, the urban farmers in our sample have a distinct profile due to their high level of practical expertise

combined with less formal schooling. Designing pertinent and effective urban agriculture programs that are suited to the needs and talents of this target population requires an awareness of and comprehension of this setting.

4.1.3: Household Marital Status and Income

When it comes to household composition, 90.8% of respondents live in homes led by men, which makes up the majority of the sample. At just 9.2% of all families, women are the heads of home. Within these urban agricultural groups, roles, decision-making, and resource allocation are probably affected by this notable gender disparity in family leadership. When it comes to marital status, married respondents make up the bulk of the sample (75.7%), with lesser numbers being single (6.9%), divorced (5.8%), or widowed (11.6%). The majority of married people indicate that family and kinship structures are significant in the urban agriculture practices that this study has documented. The data indicates a significant dependence on agricultural activities as the primary source of income for 70.8% of families. For 22.3% of the respondents, employment outside of agriculture is their main source of income; government jobs (4.3%) and casual labor (2.6%) are less popular. This significant reliance on agriculture as the primary source of household income is consistent with the observation that most respondents (70.5%) had been farmers for more than 20 years. The interplay between long-standing agricultural knowledge and livelihoods centered around agriculture highlights the critical role urban farming plays in these communities' economic health.

Table 4.3: Household marital status and income

Variable	Characteristics	Number of households	Percentage
household type	Male-headed	314	90.8
	Female-headed	32	9.2
marital status	single	24	6.9
	married	262	75.7
	divorce	20	5.8
	widowed	40	11.6
main income source	from agricultural activity	245	70.8
	non-agricultural activity	77	22.3
	casual labor work	9	2.6
	government employer	15	4.3

Furthermore, the data highlights the critical economic importance of urban farming for these communities, given that 70.8% of families rely heavily on agriculture as their primary source of income and that most respondents (70.5%) have been farmers for more than 20 years. The interaction between traditional agricultural knowledge and livelihoods focused on agriculture highlights the need to comprehend and assist urban farmers with their particular opportunities and challenges to maintain the viability of these essential sources of income (Cofie et al., 2003; Thornton, 2008).

When combined, the variables representing the household makeup, marital status, sources of income, and income levels indicate that the sample is primarily married, male-headed families for which urban agriculture is a major and long-standing economic activity. Designing urban agriculture interventions and support services that successfully address the requirements and make use of the target population's existing skills requires an understanding of this context.

4.2. The Role of Urban Agriculture in the Study Area

A substantial majority of respondents (83.5%) stated that they farm for both household consumption and marketing purposes, indicating that urban farming serves a dual purpose of both generating supplemental income through the sale of surplus crops and ensuring food security through self-production. Only 16.2% of respondent’s farm exclusively for household

consumption, and even fewer (1%) do so for commercial purposes. This varied range of motivations highlights the critical role urban agriculture plays in supporting local food systems and household economies. When it comes to the affordability of food, the data shows that although 75.7% of respondents can afford to buy food, a significant 24.3% believe they cannot. This suggests that a significant segment of the population views urban agriculture as a vital tool for guaranteeing household food security, rather than just as a means of subsistence.

Table 4.4: The role of urban agriculture in the study area

Variable	Characteristics	Number of households	Percentage
Engaging in urban agriculture	for household consumption	56	16.2
	for marketing purpose	1	.3
	both	289	83.5
Afford to buy foodstuff	yes	262	75.7
	no	84	24.3
Contribute to the environment	by recycling wastes	207	59.8
	by making green environments	113	32.7
	by regulating environmental temperature	26	7.5
Create permanent and temporary jobs	yes	159	46.0
	no	187	54.0

Given that 75% of the participants can still afford to purchase food, it is possible that urban farming will be a vital additional source of income and subsistence, especially for the 25% of households that struggle to get food. It's interesting to note that, when it comes to the benefits that urban agriculture provides to the community, every respondent agreed. The data indicates that urban farmers contribute to the environment in a variety of ways, such as recycling waste (59.8%), creating green spaces (32.7%), and regulating local temperatures (7.5%). This indicates that urban farmers are highly cognizant of the ecological value of their work and how urban

agriculture can help alleviate some of the environmental issues that cities face. On the other hand, the data also shows a more mixed effect in terms of job creation.

A majority of respondents (54%) report no such employment consequences, despite 46% of them reporting that their efforts in urban farming have resulted in the establishment of temporary or permanent jobs. This implies that the economic advantages of urban agriculture might not be spread equally, with certain homes and individuals reaping greater rewards than others in terms of creating jobs locally. Overall, the data presents a complex picture of urban agriculture as a multimodal livelihood strategy that benefits the participating households and their larger communities by offering food security, additional income, and significant environmental services. However, the results also show how important it is to learn more about how these benefits are distributed and how to guarantee more equitable access and impact, especially for the 25% of respondents who still have trouble affording food. This information can help researchers create focused interventions and policies that promote urban agriculture's contribution to the creation of resilient and sustainable local food systems.

4.3. UA Types and annual revenue in the Study Area

4.3.1. Revenue from Livestock Production

As can be observed in Table 4.5, by the Production of Poultry, 184 households are involved in this industry, the data shows that poultry is a large animal enterprise in the region. These chicken farmers can make up to 770,000 birr in revenue year, with a minimum of 545,000 birr. This wide variation of income points to the possibility of different chicken production scales, with some people running smaller backyard flocks and others running larger, more commercially focused enterprises. These 184 households seem to rely heavily on the chicken industry for their protein and revenue. Another significant kind of livestock is dairy, with 102 households reporting income from dairy products. Dairy revenue must achieve a minimum of 790,000 birr and a maximum of 1,120,000 birr annually. The dairy revenue range is bigger than that of poultry, suggesting that dairy farms are often larger and more focused on the commercial side of things. For the rural households in the area, dairy is probably a major source of both cash revenue and dairy products.

There are 121 households that produce sheep and goats, with an average yearly income of 810,000 birr and a maximum of 980,000 birr. This kind of cattle seems to be a valuable addition to other agricultural pursuits, giving milk, meat, and maybe wool or hair. While there are more fluctuations in poultry and dairy, the revenue range indicates a reasonably homogenous level of output. Only 54 households grow beef, yet those that do so are able to generate the greatest income levels among the livestock categories that have been documented. The yearly revenue threshold for beef is 1,340,000 birr, with a maximum of 1,760,000 birr. This suggests that even if fewer homes produce beef, for those who are able to do it on a large scale, it may be an extremely profitable business. The livestock activity with the fewest representation is beekeeping, with only thirty households reporting earnings. These honey producers are still able to bring in between 230,000 and 380,000 birr annually, nevertheless. Beekeeping does not seem to be as commercially significant as the other animal categories in this region, but it may offer a supplemental source of revenue and honey for domestic use.

All in all, this data offers a useful overview of the many livestock production activities that are occurring; the local agricultural economy and household earnings are derived from the production of poultry, dairy, sheep/goats, beef, and beekeeping. Diverse revenue ranges indicate that cattle firms have different production scales and market orientations.

Table 4.5: UA types in the study area/Animal type

Variables	Livestock	Category	Number of households	Percentage	Revenue per year	
					Min	Max
Animal type	Poultry	Yes	184	53.18	545,000 birr	770,000 birr
		No	162	46.82		
	Dairy	Yes	102	29.48	790,000 birr	1,120,000 birr
		No	244	70.52		
	Sheep and goat	Yes	121	34.97	810,000 birr	980,000 birr
		No	225	65.03		
	Beef	Yes	54	15.61	1,340,000 birr	1,760,000 birr
		No	292	84.39		
	Beekeeping	Yes	30	8.67	230,000 birr	380,000 birr
		No	316	91.33		

4.3.2. Revenue from Crop Production

According to the data [Table 4.6], the average yearly income of households in these metropolitan regions that produced cereal crops (wheat and barley) was 222,500 birr. This indicates that cereal crops are a major source of revenue for the 177 households examined and have a large influence in the urban agricultural economy. Similarly, the data shows that the 97 households participating earned an average of 280,000 birr annually from fruit and tree products. This demonstrates the important role perennial crops have in supporting urban farmers' livelihoods.

Finally, the average annual income of the 179 households that grew vegetables was 264,000 birr. This highlights the vital function that vegetable production plays in the urban agricultural system and the consistent revenue streams that it may produce. All of these results show the various ways that various urban agricultural activities, such as growing vegetables, fruits, and trees, and cereal crops, support the household incomes and way of life in the two sample weredas. This emphasizes how vital urban agriculture is to these communities on a larger scale.

Table 4.6: UA types in the study area/crop type

Variables	Crop	Category	Number of households	Percentage	Revenue per year	
					Min	Max
Crop type	Cereal crops [wheat and barley]	Yes	177	51.1	210,000 birr	235,000 birr
		No	169	48.9		
	Fruit and tree	Yes	97	28.5	270,000 birr	290,000 birr
		No	249	71.95		
	Vegetables	Yes	179	51.75	255,000 birr	273,000 birr
		No	167	48.25		

4.4. The Challenges Associated with Urban Agriculture in the Study Area

The statistics on the prevalence of diseases show some alarming tendencies. Particularly concerning is the discovery that 7.5% of respondents report a high incidence of illnesses interfering with their urban farming operations. This implies that diseases, pests, and other health

problems seriously threaten the community's urban agriculture systems' sustainability and productivity. The fact that 41% of respondents reported having a moderate disease burden emphasizes how common these issues are with agricultural health. Even the 51.4% who claim minimal disease prevalence suggests that a sizeable majority of urban farmers are still experiencing some level of difficulty with plant or animal health issues. These disease-related issues can take many different forms, which makes urban agriculture less viable. Urban farmers may see a decline in their economic returns due to crop losses, lower yields, and higher mitigation measure investments. Health problems with livestock can decrease the amount of meat, milk, and eggs produced, which reduces the ability of integrated urban farming methods to provide food and revenue.

Another significant obstacle that arises in the study area is credit availability. The majority of respondents (43.9%) name the absence of collateral as the main obstacle, which is followed by the lending institutions' bureaucracy (36.1%) and the requirement for initial deposits (19.9%). These results are consistent with the body of research on the financial difficulties encountered by urban farmers, especially those with few resources and a disadvantaged social standing. Their capacity to make investments in the infrastructure, inputs, and other vital resources required to maintain and grow their urban farming businesses can be seriously hampered by a lack of access to reasonably priced finance. Lack of storage facilities is another major issue; 89.9% of respondents said there were not enough storage sites. This may undermine the post-harvest losses, weakened product quality, and diminished market competitiveness that threaten urban agriculture's capacity to make a profit.

Table 4.7: The challenges associated with urban agriculture in the study area

Variable	Characteristics	Number of households	Percentage
Disease prevalence	maximum	26	7.5
	Average	142	41.0
	Minimum	178	51.4
Problems with credit access	lack of collateral	152	43.9
	lack of initial deposit	69	19.9
	bureaucracy of credit institution	125	36.1
Enough storage area for production	yes	311	89.9
	no	35	10.1
Additional fodder for livestock	maximum	271	78.3
	Average	72	20.8
	Minimum	3	.9

In many urban environments, small-scale farmers frequently struggle with a lack of adequate storage facilities, underscoring the need for focused investments and initiatives to solve this problem. Significant obstacles to obtaining more fodder, a necessary component of systems including cattle in urban agriculture, are also shown by the data. Significantly, 78.3% of participants indicate a high level of scarcity, whereas 28.8% experience moderate scarcity. The health, productivity, and general sustainability of integrated urban farming methods involving animals may be adversely affected by this lack of supplemental feed. When taken as a whole, these results provide a complicated picture of the various difficulties that urban agriculture practitioners in the research area encounter. Urban farming faces numerous obstacles to its long-term survival and growth, ranging from infrastructure deficits and input scarcity to disease prevalence and financial restraints. To fully realize the potential of urban agriculture as a sustainable livelihood strategy and a contribution to food security and environmental resilience in the community, policymakers and development practitioners need to take a holistic approach to these challenges and design comprehensive interventions that address the interconnected nature of these constraints.

4.5 The Opportunities Associated with Urban Agriculture in the Study Area

A mixed picture emerges from the data, with 30.3% of respondents indicating strong, 56.9% indicating moderate, and 12.7% indicating low levels of support. It's interesting to note that 11.8% of respondents in the "others" group say they practice urban agriculture but are unaware of the support resources. This raises the possibility of a mismatch between the goals of policy and the realities that urban farmers face in their daily lives. Unlocking the potential offered by urban agriculture may require enhancing the openness and usability of government assistance programs (Opitz et al., 2016; Russo et al., 2014). Another important consideration is agricultural fertility, with the majority of respondents (88.4%) reporting moderate fertility levels. Although just 2.9% of respondents think the soil quality is poor, the fact that only 8.5% think it is good shows how important soil management techniques are for increasing the productivity of urban farming systems. Composting and applying biochar are two urban-adapted soil amendment methods that can assist enhance soil health and nutrient availability (Orsini et al., 2013; Specht et al., 2014).

There is a similar split in the statistics about input supplies: 49.7% of respondents said they had access to the inputs they needed, while 50.3% did not. For urban agriculture to be successful, a consistent supply of high-quality seeds, fertilizer, and other gardening inputs must be guaranteed. This problem can be addressed with the support of community-based seed banks, urban-focused distribution networks, and local suppliers (Opitz et al., 2016; Russo et al., 2014). The high reported coverage of extension services (99.4%) is encouraging because it can greatly increase the productivity and sustainability of urban farming practices by providing timely and relevant agricultural advice. The potential offered by urban agriculture can be further enhanced by preserving and bolstering these extension services, with an emphasis on technical expertise unique to urban areas (Specht et al., 2014; Thornton et al., 2017)

The data on the size of the land and gardens shows that, of urban farms, the majority (65%) are medium-sized, with 34.7% being tiny and only 0.3% enormous. This is in line with the usual spatial limitations found in urban settings and emphasizes how intensive, high-yield farming methods, such as rooftop gardening and vertical farming, can enhance the productivity of few land resources (Orsini et al., 2013; Specht et al., 2014).

Through the resolution of issues and the utilization of opportunities presented by this data, policymakers and urban planners can establish a conducive atmosphere for flourishing and sustainable urban agriculture. Urban farming has the potential to contribute to food security, livelihood creation, and environmental resilience in the study region. This potential can be unlocked by integrating these findings with a larger understanding of the local context and drawing from the body of previous research.

Table 4.8: The opportunities associated with urban agriculture in the study area

Variable	Characteristics	Number of households	Percentage
Government and policy support	maximum	234	30.3
	Average	66	56.9
	Minimum	5	12.7
	Others	41	11.8
Fertility status of farmland	poor	306	2.9
	moderate	10	88.4
	good	30	8.7
Input supplies	yes	172	49.7
	no	174	50.3
Extension service	yes	344	99.4
	no	2	.6
Land/garden size	small	120	34.7
	medium	225	65.0
	large	1	.3

4.6 Food Security Status of Households

4.6.1 Household Food Insecurity Access-related Situations/Indicator/

In this study, respondents who were involved in urban agriculture were asked to rate their level of food security using the HFIAS, which took into account one aspect of food security: access. The nine FAO-recommended HFIAS questions were used to evaluate the respondents' state of

food security. There are nine general questions and a four-week (30-day) memory time for each topic. The original response inquired as to whether the condition in issue had happened during the previous four weeks, and if so, on what frequency.

Table 4.9: HFIAS indicator categories

HFIAS category	HFIAS category score	Range of food security (0-27)
Food secure access (1)	HFIAS category = 1	0 to 1
Mildly Food Insecure access (2)	HFIAS category = 2	2 to 8
Moderately Food Insecure access (3)	HFIAS category = 3	9 to 16
Severely Food Insecure access (4)	HFIAS category = 4	12 to 27

Source: Adopted from Jennifer, C, Anne, S., and Paula, B., (2007).

A popular indicator designed to gauge food insecurity at the household level is the Household Food Insecurity Access Scale (HFIAS) (Coates et al., 2007). Food secure, slightly food insecure, moderately food insecure, and severely food insecure are the four different levels of food insecurity that households are classified into using this standardized measure. The HFIAS offers important insights into the degree of food insecurity faced by households by evaluating variables like concern over food access, poor food quality and quantity, and the effects of inadequate food. The focused activities and policies intended to address food insecurity within a specific setting can then be informed and guided by the information provided.

Table 4.10: Food security status of households in the Study Area, the Affirmative responses to items on the Household Food Insecurity Access – related conditions

HFIAS	Occurrence		Frequency		
	Yes	No	Rarely (1)	Sometimes (2)	Often (3)
1. In the past four weeks, did you worry that your household would not have enough food?	**67**	**279**	**42**	**25**	**-**
2. In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	**110**	**236**	**79**	**31**	**-**
3. In the past four weeks, did you or any household members have to eat a limited variety of foods due to a lack of resources?	**101**	**245**	**61**	**40**	**-**
4. In the past four weeks, did you or any household member have to eat some foods that you did not want to eat because of a lack of resources to obtain other types of food?	**32**	**314**	**12**	**7**	**13**
5. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	**45**	**301**	**24**	**15**	**3**
6. In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	**44**	**302**	**25**	**19**	**-**
7. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	**16**	**300**	**16**	**0**	
8. In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	**0**	**346**	**-**	**-**	**-**
9. In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	**0**	**346**	**-**	**-**	**-**

4.6.2 Household Food Insecurity Access – Prevalence

For the study's target groups, the HFIAS prevalence, a categorical indicator of food insecurity access scale is calculated as; Percentage of respondents = (Number of respondents / Total sample size) x 100.

Table 4.11: Prevalence of Food Insecurity in the Study Area 2024

HFIAS category	Number of respondents	% of the total respondents
Food secure	213	61.5%
Mildly food insecure	95	27.4%
Moderately food insecure	38	10.9%
Severely food insecure	0	0
Total	346	100.0

In order to determine the prevalence of food insecurity in the study area, 346 respondents in total were surveyed for the study [Table 4.11]. According to the findings, 213 homes, or 61.5% of all respondents, were categorized as having a secure supply of food. This implies that the food in these households was consistently safe, nourishing, and in adequate quantity to suit their dietary requirements and food choices for a healthy and active life.

Nonetheless, 95 out of the respondents, or 27.4%, were classified as having mild food insecurity. This indicates that although these households were not necessarily consuming less food or suffering from the more serious effects of food insecurity, they did experience some degree of doubt or anxiety about their capacity to receive enough food. Additionally, 10.9% of the respondents, or 38 people, were categorized as moderately food insecure. Due to a shortage of resources, households in this category probably had to make compromises regarding the type and/or quantity of food they ate. The dietary status and general health of the impacted individuals and their families may be impacted by this.

The survey did not find any homes that were highly food insecure, as seen by the 0% prevalence in this category. This finding is noteworthy. This shows that although there is food insecurity in the research area, the people assessed did not exhibit the most severe cases of hunger or food deprivation. These results emphasize the significance of comprehending the subtleties of food insecurity in the research region and the possible role of urban agriculture to mitigating the different degrees of food insecurity that the community faces. Enhancing food security and the general well-being of the community may depend on targeted actions and policies that support and encourage sustainable urban food production.

4.7 Determinants of Household's Food Security

A household's food security is impacted by several socioeconomic, demographic, and environmental factors. The main factors influencing household food security include income, sources of livelihood, asset ownership, credit availability, education level, household size, and access to agricultural inputs, according to Bashir and Schilizzi (2013). The ability of a household to obtain enough food that is safe, nutritious, and meets their dietary needs and food preferences for an active and healthy life is greatly influenced by these elements (FAO, 2006). For example, increased asset ownership and household income are positively correlated with better food security because they make it possible to buy a variety of nutrient-dense foods (Tiwari & Joshi, 2012). Comparably, education level especially that of the head of the household can improve food security by raising awareness of and capacity for making decisions about food production, storage, and consumption (Bashir et al., 2012). Targeted actions to improve family food security in the context of urban agriculture output can be informed by an understanding of these important variables.

The researcher used an ordinal logistic regression analysis to identify the variables influencing the phenomenon of household food security. The researcher postulated that independent variables would influence the food security of households. (Table 15) presents the findings from the ordinal logit analysis of the independent factors that were thought to have an impact on household food security.

Table 4.12: Model Fitting Information

Model	-2Log Likelihood	Chi-Square	df	Sig.
Intercept Only	204.029			
Final	123.592	80.437	11	.000
Link function: Logit.				

The difference between -2log-likelihood for a model fitted with independent variables and -2log-likelihood for a null model (at step 0, before any variables have been added to the model) is distributed chi-square with degrees of freedom equals the difference between the numbers of parameters in the full and null models. The above table reveals that the small p-value from the LR test (0.000) would lead us to conclude that at least one of the regression coefficients in the model is not equal to zero. This shows that the final model is a better fit than the empty model (without any predictors)

4.7.1 Goodness-of-Fit

This table assessing goodness of fit involves investigating how the predicted values a closer to the observed values. The Pearson and deviance chi-square test was found to be not significant (p-value > 0.05), which shows that model estimates adequately fit the data. These results suggest a good fit model.

Table 4.13: Goodness of Fit Test

Chi-Square		Df	Sig.
Pearson	88.816	15	.070
Deviance	108.733	15	.105

Link function: Logit.

4.7.2 Pseudo R-Square

Greater R2 values suggest that more of the variation in the outcome can be explained up to a maximum of one. R2, or the coefficient of determination, is a statistical measure used in linear regression that describes the percentage of variance in the outcome that can be accounted for by

the explanatory factors. Three approximations are calculated in place of the identical R2 statistic that is obtained for linear regression for logistic and ordinal regression models (see Table 13). The pseudo-R2 values in this case (Nagelkerke = 54.6%, for example) show that all independent or explanatory factors account for a sizable amount of the variation in food security status. Based on Nagelkerke R2 (pseudo R2), the aforementioned result showed that the fitted model's predictive power is 54.8%. This demonstrates that the model explains 54.8% of the variation in the dependent variable.

Table 4.14: Pseudo R-Square (R2)

Cox and Snell	.486
Nagelkerke	.548
McFadden	.306

Link function: Logit.

The explanatory variable and the log odds of the variable quantity have an inverse connection, as indicated by a negative check in the "Estimate" column. A positive coefficient, on the other hand, denotes a positive correlation with the variable quantity's log odds. The researcher used the odds ratio to interpret the parametric statistic in the logistic model. Rather than relying on log (odds), the percentages ratio shows how each explanatory variable directly affects the likelihood of food security in the home. If the odds ratio estimate is larger than 1.0, it means that the household's level of food security exceeds that of the reference category. Food security in a family is less likely than it is for the reference category of each variable if the estimate is less likely than 1.0.

Table 4.15: The Parameter Estimates of Household's Food Security

Estimate		Std. Error	Wald	Df	Sig.	Odds ratio	95% Confidence Interval OR	
							Lower Bound	Upper Bound
Intercept= 14	4.6980							
Intercept = 2	6.4250	1.7370	13.6830	1	0.000			
Family size	-18.3930	1.4910	152.1210	1	0.000			
Formal education	12.4740	0.8910	195.8170	1	0.000			
Age								
20-30 years(ref.)								
31-40	0.9159	0.2036	4.5020	1	0.000	2.500	1.6700	3.7200
41-50	0.6774	0.2332	2.9110	1	0.000	1.970	1.2400	3.1100
Above 50 years	0.9934	0.1867	5.3200	1	0.585	2.700	0.8700	3.8900
Household head								
Male household head(ref.)								
Female household head	-0.4778	0.2004	-2.3800	1	0.000	0.620	0.4200	0.9200
Marital status								
Married (ref.)								
Unmarried	-3.2010	1.3200	-42.1760	1	0.000	0.040	0.0060	0.2400
Educational level								
Elementary (1-8) school (Ref.)								
High school (9-12)	0.4237	0.0980	4.3200	1	0.000	1.520	1.2600	1.8500
TVET and college graduate	0.6167	0.1871	3.3000	1	0.003	1.850	1.2800	2.6700
Degree and above	0.7501	0.2320	3.5000	1	0.007	2.130	1.3500	3.3800
Mainly income source								
From Agricultural activity(ref.)								
Nonagricultural activity	-0.0579	0.1267	1.6000	1	0.001	0.950	0.7400	1.2300

Causal labor work	-0.0072	0.1361	-0.0600	1	0.750	0.990	0.7500	1.3000
Governmental employer	-0.1129	0.1305	-0.9100	1	0.823	0.890	0.7000	1.1200
Monthly income range								
2000 and less (ref.)								
2001-4000	0.2499	0.1139	2.1900	1	0.025	1.284	1.0270	1.6050
4001-6000	0.3151	0.2266	1.3910	1	0.012	1.373	1.0790	2.1370
6001-8000	0.4865	0.1875	2.6120	1	0.008	1.627	1.1260	2.3490
8001-10,000	0.0000	0.0000	0.0000	0	0.000		0.0000	0.0000
Above 10,000	0.5955	0.1418	4.2900	1	0.007	1.824	1.3740	2.3950
Farming experience								
Less than 5 years (ref.)								
5-10 years	0.2277	0.0833	2.7500	1	0.000	1.260	1.0600	1.4800
11-20 years	0.2551	0.0958	3.0100	1	0.002	1.300	1.0800	1.6100
Land access								
Yes (ref.)								
No	-0.7017	0.2084	-3.3700	1	0.000	0.500	0.3300	0.7500
Market access								
Yes (ref.)								
No	-2.4560	1.0200	-20.1340	1	0.002	0.080	0.0200	0.1500
The major types of UA practicing								
Livestock production (ref.)								
Crop production	-1.8440	0.4370	17.807	1	0.000	0.158	0.0750	0.3521
Poultry production	-0.2130	0.1201	-1.0890	1	0.000	0.808	0.5732	1.1856
Ref. = Reference category								

Thus, the final model shown in the Table 4.15 can be understood as follows in terms of odds ratio: Since their significance values are less than 0.05 (5% level of significance), all of the independent variables—age, family size, formal education, household head, monthly income, marital status, educational level, and primarily income source, farming experience, land access, and market access—were found to be statistically significant predictors of household food security. When all other variables in the model were held constant, the adjusted odds of a household being food secure versus the joint categories of mildly and moderately food insecure for households in the age groups of 31–40 years and 41–50 years were 2.50 and 1.970 more likely than those of compared to the age groups lies between 20–30 years. This suggests a direct correlation between the age of the household head and the likelihood of food security in the home. When all other model variables are maintained constant, the probability of households being food secure instead of slightly or moderately food insecure would fall by 18.39 if the family size increased. This suggests that the risk of mild to severe food insecurity has grown as the number of household members or dependents has increased. This result is consistent with those of Idrisa et al. (2008), Goshu (2016), Dawit and Zeray (2017), but it is at odds with that of Ajaero (2017), who discovered that households with more dependents had greater levels of food security. Additionally, while the other factors in the model are held constant, the likelihood of being food secure would increase by 12.47 times if more members of the household attended formal school as opposed to the slightly or moderately food insecure categories.

In comparison to the combined categories of slightly and moderately food insecure, the likelihood or chance of being food secure was 0.62 times lower for female-headed households than for male-headed households. The results of Tefera (2010) corroborate this outcome. Similarly, when all other model variables were held constant, the probability of food security for single urban farmers was 0.62 times lower than that of married farmers when compared to the combined categories of mildly and moderately food insecure. The adjusted chances were 1.52, 1.85, and 2.13 for urban farmers with a university degree or higher, TEVT and college graduates, and high school graduates (9–12). When all other variables in the model were held constant, they suggest that the adjusted odds of being food secures were 1.52, 1.85, and 2.13 times higher for urban farmers who attended high school (9–12), TEVT and college graduate, and university degree and above, compared to the combined categories of mildly and moderately food insecure and moderately food insecure. This demonstrates that the likelihood of being food secure was

higher for household heads who had finished more education than for those who were mildly or moderately food insecure. This indicates that compared to less educated urban farmers, better-educated urban farmers are probably secure in their food supply. This is consistent with earlier research by Aschalew and Ayalneh (2009) and Abdi and Ejigayhu (2012), which discovered that a household head with a higher degree of education raises the likelihood that the home will achieve food security.

When all other model variables were held constant, the probability of being food secure versus the combined categories of mildly and moderately food insecure was 0.95 times lower for households whose primary source of income was non-agricultural than it was for households whose primary source of income was agricultural. This suggests that urban agriculture has a role in ensuring the food security of households. The adjusted odds were 1.28, 1.37, 1.62, and 1.82 for households with average monthly incomes between 2001–4000 Birr, 4001–6,000 Birr, 6001–8000 Birr, and over 10,000 Birr, respectively. Keeping other variables in the model constant, they suggest that the adjusted odds of food security versus the combined categories of mildly and moderately food insecure are 1.28, 1.37, 1.62, and 1.82 times more likely for households whose average monthly income lies between 2001–4000 Birr, 4001–6,000 Birr, 6001–8000 Birr, and above 10,000 Birr, respectively, than the odds for households whose monthly income range was less than 2000 Birr.

This demonstrates that the monthly income range and household food security are positively or directly correlated. Additionally, we can conclude that there was a greater likelihood of food security when household income increased every month, which is consistent with or supported by the findings of Arene C. and Anyaeji R. (2010). For homes with 5–10 years of farming experience and 11–20 years of farming experience, the probabilities of being food secure instead of slightly or moderately food insecure were 1.26 and 1.30 times higher than for households with less than five years of farming experience. This further demonstrates the favorable correlation between farming expertise and food security. It demonstrates that the likelihood of food security improved with each extra year of farming experience. For households with land access for farming, the probability of being food secure was 0.5 times lower than the odds for those without land access for farming, when compared to mildly and moderately food insecure households.

Similarly, households with market access for their product were 0.08 times less likely to be Food Secure than mildly or moderately food insecure compared to households without such access. This finding, which was corroborated by Regass N. (2011) in the southern Ethiopian woreda of Sidama, demonstrated that market access significantly and inversely affects the food security of households.

Finally, the probability of food security for households engaged in crop and poultry production was 0.158 and 0.808 times lower than that of households engaged in animal production, respectively, when compared to mildly and moderately food insecure households. This shows that, when all other model variables are held constant, sample urban farmers with larger livestock sizes have a higher likelihood of achieving greater food security than those with smaller animals. This study supports the findings of Demeke et al. (2011), who showed that the likelihood of a household being able to acquire food increases with the amount of animal resources.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Using Lemi-kura Sub city as a case study, the goal of this research was to investigate the role of urban agriculture to the household food security of urban farmers in Addis Ababa. The study discovered that 61.5% of respondents were food secure, compared to mildly and highly food insecure respondents who made up 27.4% and 10.9% of the sample, respectively, according to the researcher's methodological study.

The study's analysis shows how important urban agriculture is to ensuring food security. Perhaps urban agriculture's most important advantage is the contribution it makes to nutrition and food security (Rene Van Veenhuizen, 2000). Since then, every independent variable including age, family size, formal education, household head, monthly income, legal status, educational level, primary source of income, farming experience, land access, and market access has been a statistically significant predictor of household food security based on the results of the study analysis using the ordinal logistic regression model.

Respondents mentioned the scarcity of land for UA to some extent. This result validates the idea put out in Jac Smitetal's 1996 findings. The lack of facilities and services required to properly process, store, and transport agricultural products to markets is one of the main obstacles to UA. These include limited availability and poor access to the inputs that are essential to agricultural production, such as water, land, seeds, and fertilizers.

A significant impediment is inadequate financial availability. Government policy was seen as being extremely crucial when it came to institutional restraints, but there were fewer worries when it came to UA's inclusion in urban planning. Furthermore, the current state of disease prevalence is modest, meaning that the rise in veterinary services for livestock is also moderate. 56.9% of those surveyed said that they had received assistance from governmental bodies. According to Mougeot (2001), the majority of developing nations lack supportive government policies and acknowledgment of urban agriculture as a viable industry.

With the development in urban poverty, food insecurity, and malnutrition now perceived as moving from rural to urban regions, there is a renewed interest in observing alternative solutions

for improving urban livelihoods, generating revenue, and improving urban food security and nutrition, among other issues.

5.2 Recommendations

According to the findings, food insecurity is common among households involved in urban agriculture; as a result, governmental organizations, particularly the Addis Ababa Urban Agriculture Bureau, and non-governmental organizations (NGOs) need to provide more support and increase the intensity of urban agricultural initiatives. The relevant government organizations and stakeholders in the sub-city need to address several significant obstacles before they can completely reap the benefits of urban agriculture.

- ✓ Make investments in services and infrastructure for urban agriculture:
    - Create urban agricultural extension services to give urban farmers access to inputs (such as seeds, tools, and irrigation systems), technical support, and training.
    - Create community-based facilities for marketing, processing, and storing agricultural products to strengthen the connections between markets and the value chain. The other main issue is expanding urban farmers' access to water resources and encouraging water-efficient irrigation techniques.
- ✓ Incorporate Urban Agriculture into Strategies for Urban Food Security:
    - Carry out a thorough evaluation of urban agriculture's present and future contributions to the Lemi-Kura Sub-city's food supply, accessibility, and consumption.
    - Create focused initiatives and programs that connect school feeding programs, neighborhood food distribution systems, yelemat tirufat, green legacy, and social safety net projects with urban agricultural production.
    - Encourage the integration of the regional food system and ties between urban and rural areas to increase the food system's overall resilience.

- ✓ Encourage research, observation, and assessment

    - Make research investments to gain a deeper understanding of the Lemi-Kura Sub-city's urban agriculture context, obstacles, and potential.

    - Create a strong system of monitoring and assessment to keep tabs on the effectiveness of urban agricultural projects and their effects on other development outcomes, such as food security.

    - Provide learning and knowledge-sharing platforms to let stakeholders share best practices and research findings.

Finally, Extension services and focused training programs could provide urban farmers with sustainable farming methods. Urban producers would also be able to reach a larger market and create steady revenue streams by setting up dependable supply networks, storage facilities, and direct-to-consumer sales channels. Through concerted policy and investment, the Ethiopian government can address these limitations holistically and establish a thriving urban agricultural sector that improves food security, generates green jobs, and builds climate resilience in the nation's fast-expanding cities. Through concerted policy and investment, the Ethiopian government can address these limitations holistically and establish a thriving urban agricultural sector that improves food security, generates green jobs, and builds climate resilience in the nation's fast-expanding cities.

REFERENCES

Abafita, J. and Kim, K.R., 2014. Determinants of household food security in rural Ethiopia: An empirical analysis.Journal of Rural Development/Nongchon-Gyeongje, 37(1071- 2016-86950), pp.129-157.

Africa: The case of Southern Niger. Sustainability, 6(3), pp.1191-1202. African Journal of Business Management, 5(34), pp.12972-12979.

Agresti, A. (2003). Categorical data analysis. 3. Hoboken, NJ: Wiley. AgSS. Agricultural Sample Survey 2015/2016: Report on Area and Production of Major Crops. Addis Ababa: Central Statistics Agency; 2016.

Argenti O. (2000). Feeding the Cities: Food Supply and Distribution. Achieving Urban Food and Nutrition Security in the Developing World. IFPRI, 2020Focus3.Brief5 of10.Washington.

Ayenew, H. Y., Edriss, A. K., Giller, K. E., Nissen, T. M., & Leeuwis, C. (2021). Opportunities and challenges of urban agriculture in Ethiopia: A systematic review. Sustainability, 13(7), 3816.

Barthel, S., & Isendahl, C. (2013). Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities. Ecological economics, 86, 224-234.

Béné, C., Mehta, L., McGranahan, G., Cannon, T., Gupte, J., & Tanner, T. (2018). Resilience as a policy narrative: potentials and limits in the context of urban planning. Climate and Development, 10(2), 116-133.

Bryceson D.andPotts (2005), Lynch et al. (2001) African Urban Economies: Viability, Vitalityor, Vitiation. P. Macmillan. London.

Bryld E. (2003). Potentials, problems, and policy implications for urban agriculture in developing countries. Agriculture and Human Values 20: 79-86, 2003. Kluwer Academic Publishers, Netherlands.

BryldE.(2003). Potentials, Problems, and policy implications for urban agriculture in developing countries. Agricultural and Human Values 20:79-86.

Catherine Brinkley, Jacqueline S. Kingsley, in Advances in Agricultural Animal Welfare, 2018.

Coates, J., Swindale, A., & Bilinsky, P. (2007). Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide. Washington, DC: Food and Nutrition Technical Assistance Project, Academy for Educational Development, 34(4), 1-32.

Cox G. (1981). 'The Ecology of Famine', in J. Robson (ed.), Famine: Its Causes, Effects and Management, New York: Gordon and Breach

Crush, J., & Frayne, B. (2011). Urban food insecurity and the new international food security agenda. Development Southern Africa, 28(4), 527-544.

CSA (Ethiopia) 2005.Statistical Abstract of Ethiopia. CSA, Addis Ababa, Ethiopia.

CSA (Ethiopia) 2012. Statistical Abstract of Ethiopia. CSA, Addis Ababa, Ethiopia.

CSA (Ethiopia) 2020. Statistical Abstract of Ethiopia. CSA, Addis Ababa, Ethiopia.

Daniel, M., (1998, June).Does Urban Agriculture Help Prevent Malnutrition, Evidence from Kampala. FCND Discussion Paper No.45, p. 46.

Deelstra, T. and H. Girardet (2004) Urban agriculture and sustainable cities. In de Zeeuw, H. et at. (eds.) Growing Cities, Growing Food. DSE, Feldafing, Germany.

Dejen, G. (2020). Wastewater-irrigated urban vegetable farming in Ethiopia: A review on their potential contamination and health effects: Cogent Food & Agriculture, Vol. 6(1). doi.org/10.1080/23311932.2020.1772629.

Dereje, F (2021). Contributions of urban agriculture to household food security: A case study in Kirkus sub city, Addis Ababa, Ethiopia. International Journal of Urban Sustainable Development, 13(2), 125-138. https://doi.org/10.1080/19463138.2021.1897064.

Dessie, T ., Zewdie, Y., Yilma, Z., Ayalew, W. and Haile, A. (Eds. UNDP (2003). http://hdr.undp.org/reports/global/2003/indicator/pdf/hdr03_table_13.pdf(refe rencedatApril7, 2007).

Dessie, T., Zewdie, Y., Yilma, Z., Ayalew, W. and Haile, A. (Eds.). 2023. Yelemat Tirufat: An Overview of the initiative and lessons of experience from selected livestock development interventions in Ethiopia. Nairobi, Kenya: ILRI.

Devereux S. (2001). Livelihood insecurity and social protection: A re-emerging issue in

rural development. Development Policy Review, 19, 507-519. doi:10.1111/1467-7679.00148

Drescher, A.W., (1996). Urban micro-farming in central Southern Africa: A case study of Lusaka, Zambia. African Urban Quarterly, 11(2-3), pp.229-248.

Drescher, M. (2000). Urban Agriculture in the Seasonal Tropics: The Case of Lusaka, Zambia. Egbuna N. (2008). Urban Agriculture: A strategy for poverty reduction in Nigeria.

Environmentally Sustainable Development in Sub-Saharan Africa.

FAO, (2020) Food and Agriculture Data. Rome: Food and Agriculture Organization of the United Nations; 2020. Available from: http://www.fao.org/faostat/en/#data.

FAO. (1996) Rome Declaration on World Food Security and World Food Summit Plan of Action.

Firew Dereje (2021) Contributions of urban agriculture to household food security: a case study in Kirkos sub city, Addis Ababa, Ethiopia study.

Food and Agriculture Organization. (2010). Fighting poverty and hunger: What role of urban agriculture? Rome, Italy: Author.

Gallaher, C. M., Kerr, J. M., Njenga, M., Karanja, N. K., & WinklerPrins, A. M. (2013). Urban agriculture, social capital, and food security in the Kibera slums of Nairobi, Kenya. Agriculture and human values, 30(3), 389-404.

Garrett J. and Maugeut, (2000) Overview. Achieving Urban Food and Nutrition Security in the Developing World. IFPRI, (2020) Focus 3. Brief1of 10. Washington.

Gordon prain& Diana Lee-Smith (2010) Urban Agriculture in Africa: What Has Been Learned?

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

Headey D. & Ecker O. (2013). Re-thinking the measurement of food security: from first principles to best practice. Food Security.doi:10.1007/s12571-013-0253-0.

Henok T. (2004). A socio-economic impact of urban agriculture in the case of Addis Ababa

IFPRI. (2002). living in the city: Challenges and Options for the Urban Poor. Washington, DC:

International Food Policy Research Institute in M. Drescher, For Hunger- Proof Cities. Ottawa: International Development Research Center. Koc, M., MacRae, R., Mougeot, L.J., & Welsh, J. (1999). Sustainable Urban Food Systems. In M. International Development Research Institute.

InWikipedia.https://en.wikipedia.org/wiki/K%C3%B6ppen_climate_classification

Jac Smit, Annu Ratta and Janis Bemstein. 1996. Urban Agriculture an Opportunity for Köppen climate classification.(2024, January 26).

Klemsu, R., & Maxwell, D. (2000). Urban agriculture in the global south. Routledge.

Lamba, D. (1993). Urban Agriculture Research in East Africa: Record, Capacities and Opportunities. Ottawa, Canada: International Development Research Center, London: Macmillan Press.

Leach M, Mearns R., & Scoones L. (1999). Environmental entitlements: Dynamics and institutions in community-based natural resource management. World Development, 12(2), 225-247

Lin JY, Yang DT. (2000). Food availability, entitlements and the Chinese famine of 1959–1961. Econ J 110:136–158

Lovell, S. T. (2010). Multifunctional urban agriculture for sustainable land use planning in the United States. Sustainability, 2(8), 2499-2522.

Mandefro,N.(2010). Urban Agriculture Situation Analysis in Addis Ababa City Administration. Maugeot, Luc J.A. (2000). "Urban Agriculture: Definition, Presence, Potentials and Risks, and Policy Challenges". (IDRC), Ottawa, Canada.

Maugeot, Luc J.A. (2000). "Urban Agriculture: Definition, Presence, Potentials and Risks, and Agbamu, J . U. (2006). Essentials of Agricultural Communication in Nigeria

Maxwell, D 1995, Labor, land, food and farming: a household analysis of urban agriculture in Kampala, Uganda, Unpublished PhD Dissertation, University of Wisconsin-Madison, United States of America.

Maxwell, D. (1999). Urban Livelihoods, Food, and Nutrition in Greater Accra, Ghana.

Meerow, S., Newell, J. P., & Stults, M. (2016). Defining urban resilience: A review. Landscape and urban planning, 147, 38-49.

Messay, M., Addis Ayano and Bechaye Tesfaye (2017). Data on Land Use Land Cover Changes in Peri-Urban Addis Ababa, Ethiopia: Empirical pieces of evidence from Koye-Feche and Qilinto Peri-Urban Areas. In Journal of Data in Brief, Volume 12, ELSEVIER publisher (in press)

Mkwambisietal(2011).Urban Agriculture and Poverty Reduction: Evaluating How Food Production in Cities Contributes to Food Security, Employment and Income in Malaw i: in Journal of International Development.

MoFED (2006). Ethiopia: Building on Progress: Planlan for Accelerated and Sustained Development to End Poverty (2005-10). Vol. I. Main Text. Addis Ababa.

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

Mougeot L.J.A. (1994). African city farming from a world perspective. Pp. 1-22. In Cities Feeding People: An Examination of Urban Agriculture in East Africa. A.G. Egziabher, D. Lee- Smith, D.G.

Mougeot, L. (2006). Growing Better Cities: Urban Agriculture for Sustainable Development. MoWUD (2006).Ethiopia: Annual rate of Urbanization report, unpublished.

Mougeot, L. J. A. (2000). Urban agriculture: Definition, presence, potentials and risks, and policy challenges. Cities Feeding People Series, Report 31. International Development Research Centre.

Nugent1999.Measuring the Sustainability of Urban Agriculture. For Hunger-proof City Sustainable Urban Food Systems. M. Koc, Rod M., L. J. A. Mougeot and J. Welsh (Eds). IDRC.Ottawa, Canada.

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.

Poulsen, M. N., McNab, P. R., Clayton, M. L., & Neff, R. A. (2015). A systematic review of urban agriculture and food security impacts in low-income countries. *Food Policy*, *55*, 131-146.

Prain G. (2006): UrbHarvestest: ACGIAR global program on UPA. UPA in the Asian and Pacific region. Available at: http:/www.agnet.org/activities.sw/2006/ 2010.

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

Richards, J., & Godfrey, S.(2003). Urban Livestock Keeping Sub-Saharan Africa. RUAF (2007). What is urban agriculture? http://www.ruaf.org/node/512

RUAF (2007). Why is urban agriculture important? http://www.ruaf.org/node/513 Schmidhuber, J., & Tubiello, F.N.(2007).Global Food Security Under Climate Change.

Sen, A. (1981). Poverty and famines: an essay on entitlement and deprivation. Oxford University Press.

Senkgoa, D. (2006). A socio-economic analysis of urban agriculture in S.A. Journal of Urban Agriculture, 12(3), 45-67.

Steven E, Mauelshagen F, Luterbacher J, & Werner J. (2014). The Irish Famine of 1740-1741: Famine Vulnerability and 'Climate Migration. Climate of the Past 9, no.3.

Tewodros Firdissa (2007) Livelihood Dependence on Urban Agriculture in Addis Ababa, Ethiopia, Norwegian University of Life Sciences, As, Norway

Thomas P. Z. Mpofu (2013) An evaluation of the performance of urban agriculture in Addis Ababa, Ethiopia.

TinkerI. (1994). Urban Agriculture is already feeding cities. In Cities FeedingPeople: An Examination of Urban Agriculture in East Africa. A.G. Egziabher, D. Lee-Smith, D.G. Maxwell, P.AiMemon, L.J.A. Mougeot and C.J. Sawio, IDRC, Ottawa.

UNDP (2010). The input and output market systems and infrastructure in developing countries. UNDP (1996). Urban Agriculture: Food, Jobs and Sustainable Cities. United Nations Development Program One UN Plaza, New York.

UNDP. (1996). Urban Agriculture: Food, Jobs, and Sustainable Cities. New York: UNDP Habitat UN-Habitat (2001). Statistics-Table1: Population of slum areas at mid-year, by region and country.

UN-Habitat. (2006) the State of World Cities 2006/07. Nairobi: United Nations Center for Human Settlements

Van Veenhuizen, R. and Danso, G. (2007). Profitability and Sustainability of Urban and Peri-urban Agriculture. Agricultural Management, Marketing, and Finance Occasional Paper.FAO, Rome Italy

W. Bank, Agriculture Investment Source Book. Washington, DC: The International Bank for Reconstruction-World Bank. Washington, D.C: International Development Research Institute.

Walters, A.S and Midden, S.K. (2018). Sustainability of Urban Agriculture: Vegetable Production on Green Roofs. MDPI- agriculture, 8(11). doi.org/10.3390/agriculture8110168

World Bank. (2005). Agriculture and Rural Development: Urban and Peri-urban Agriculture World Food Summit 96/3b (p. 35). Rome: Food and Agriculture Organization.

Yared, G., Heyaw, T., Pauleit, Sand Mengistie, K.(2019).Urban green infrastructure planning in Ethiopia: The case of emerging towns of Oromia Special Zone Surrounding Journal of Urban Management, Vol.8(1). doi.org/10.1016/j.jum.2018.09.004.

Yemane, T. (1967). Statistics: An introductory analysis (2nd ed.). New York, NY: Harper and Row.

Zakari, S., Ying, L. and Song, B., 2014. Factors influencing household food security in West Sultana, A. and Kiani, A., 2011. Determinants of food security at household level in Pakistan.

Zezza, A., & Tasciotti, L. (2010). Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. Food policy, 35(4), 265-273.

APPENDICES

Appendix 1: Household Questionnaire for the Role of Urban Agriculture in Food Security in Lemi-kura sub-city.

Introduction, Confidentiality and Consent:

My name is Alemseged Hailemariam I am an MSc student at Addis Ababa University College of Development Studies. I am undertaking research entitled: The Role of Urban Agriculture in Household Food Security in Addis Ababa: Case Study in Lemi-kura Sub-city. This study helps people who participate in UA, especially in Lemi-kura, wereda 04, and 05 households and gives valuable information that helps to investigate the UA participants at the household level. I am going to kindly invite you to be part of this research study. Before you decide to be part of this research you can talk to me if there is anything you are not comfortable with about the research. If there is any word that you don't understand while I am giving the information, please stop me and ask me, and I will explain to you. If you do not wish to continue, you have the right to withdraw from the study, at any time Please, answer the following questions by ticking the appropriate option (if provided) or writing unrestrictedly for open-ended questions. Please answer all questions freely, but objectively.

Therefore, your genuine, honest, and timely response is vital for completing this study on time. Therefore, I kindly ask you to give your response to items/questions carefully. Finally, I confirm that the information you shared with me will be kept confidential and only used for academic purposes. Your honest answers to these questions will help us better understand the situation. We would greatly appreciate your help in responding to this survey. The survey will take about 30 minutes to an hour.

Thank you for your assistance and for sparing your precious time.

Date _____

Signature_____

Sincerely,

I. Household information

1. Address of Household: Region _____city _____sub-/city _____wereda_____
2. Age of respondent_____
3. Sex of respondents 1) male 2) female
4. Family size female _____male _____total_____
5. Family size in age category: 1. 1-3 2. 4-6 3.7& more
6. Number of Household members attending formal education by gender: 1) Male _2) Female 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 7. Illitrate
10. Religious;1) Muslim 2) Orthodox 3) Protestant 4) Waqefata5) Catholic
11. Main householder income source? 1) From agricultural activity 2) Nonagricultural 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) 4,100 – 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 years 2) 6 to 10 years 3) 11 – 20 years 4) Over 20 years
14. Garden/Farmland size (land size) 1) Small (less than 1 hectare) 2) Medium (1 to 5 hectares) 3) Large (more than 5 hectares)

The role of urban agriculture in household food security in the study areas

15. Why you are engaging in urban agriculture? 1) For household consumption 2) For marketing purposes or sale 3) both

16. If you engage in urban agriculture for home consumption; according to your self-assessment, is your household food secure? 1) Yes 2) No

17. If your answer is "Yes" for question 15, does your urban agriculture meet a variety of food needs for daily consumption; vitamins, protein, and carbohydrates? 1) Yes 2) No

18. If your response is "Yes" for Question 16, do you meet all year-round food requirements of your household members from your production? 1) Yes 2) No

19. If your response is "No" for Question 17, why? 1) No place to produce more food 2) no support from the government 3) less access to inputs

20. Is there a time of the year when your household encounters a shortage of specific foods?

    1) Yes 2) No

21. If your response is 'yes' to question no 19, would you tell us the specific time?

    1) Whole year 2) Nine months (March- November) 3) Six months (May- November) 4) Six months (December- May) 5) Six months (March-August) 6) Three months (June – August) 7) Three months (March-May) 8) Three months (December-February)

22. Do you afford to buy foodstuffs from the market to meet food requirements for your household consumption? 1) Yes 2) No

23. Do your household members work in non-crop production and livestock herding activities?
    1) Yes 2) No

24. If your response is "Yes" for question 22, on average how much do they earn monthly?

    1) Less than 2000 2) 2001-4000 3) 4001-6000 4) 6001-8000 5) above 8000 birrs.

25. According to your perception urban agriculture can have environmental benefits?

    1) Yes 2) No

26. If your answer is "Yes" for question 24, how does it contribute to the environment?

    1) by recycling wastes

    2) by making a green environment 3) by regulating environmental temperature

27. Does your urban agriculture create permanent and temporary jobs for other rather than household members? 1) Yes 2) No

28. If your response is "Yes'' for question 26, do you specify in numbers? 1) 2 2) 3-5 3) 6-8 4) more than 8 people

29. Does your income increase by the urban agriculture you engaged in? 1) Yes 2) No

30. If your response is "Yes" for question 28, 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 crops	***kg***	***single price***	***total price***
1	**From Cereal crop production**			
	Barley			
	Wheat			
	Teff			
	Millet			
2	**From root and tuber crop production**			
	Beet root			
	Potato			
	Carrot			
3	**From vegetation crop production**			
	Tomato			
	Cabbage			
5	**From fruit tree production**			
	Mango			
	Avocado			
	Orange			
	Papaya			
	Banana			
	Subtotal of crop income			
	List of livestock production	***Number of and Liter***		***birr***
	From cow milk production			
	From Oxen fatting			
	From sheep and goat			
	From chicken to egg and meat			
	From beekeeping (Honey in Kg)			
	Sub- total livestock production			
	Total annual income			

Household Food Insecurity Access Scale (HFIAS) Measurement Standard Tool

No.	Question	Response Options	CODE
1.	In the past four weeks, did you worry that your household would not have enough food?	0= No (skip to Q2) 1=Yes	….| ├
1. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past weeks)	….| ├
2.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	….| ├
2. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past weeks)	….| ├
3.	In the past four weeks, did you or any household members have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes	….| ├
3. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past weeks)	….| ├
4.	In the past four weeks, did you or any household member have to eat some foods that you did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q5) 1 = Yes	….| ├

4. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past weeks)	….| +
5.	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes	….| | –
5. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3= Often (more than ten times in the past four weeks)	
6.	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0= No (skip to Q7) 1 = Yes	….| | –
6. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….| | –
7.	In the past four weeks, was there ever no food to eat of any kind in your household because of a lack of resources to get food?	0 = No (skip to Q8) 1 = Yes	….| | –
7. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten	

		times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
8.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes	….|__|
8. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	….|__|
9.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished) 1 = Yes	….| | –
9. a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past weeks)	….| | –

Evaluate the current urban agriculture practice in the study area

31. Are you engaged in urban agriculture? 1) Yes 2) No
32. Did you get input supplies, such as fertilizer and seeds? 1) Yes 2) No
33. Did you access UA-related extension services from the government? 1) Yes 2) No
34. Do you have natural capital or land resources for urban agriculture? 1) Yes 2) No

If "yes" for question 31, how do you get natural capital or land resources for urban agriculture?

1) Through land distribution 2) Shared with relatives3) Inherited from parents

4) Purchased 5) Sharecropping

35. Where do you carry out urban agriculture? 1) Along riverside 2) home garden area 3) In backyards/ open space 4) In urban fringe areas 5) Roadsides
36. What are the major types of urban agriculture practiced in your farmland by you and your household members? 1) Livestock production 2) crop production 3) poultry production 4) beekeeping 5). mixed of all
37. 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
38. 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
39. If you are producing **cereal crops**, on which crop you are engaging and more benefiting you? Specify it. 1). wheat, 2). Barley, 3). Millet, 4). Teff 5). Mixed of all
40. If you are producing **Root and tuber crops**, on which crop you are engaging and more benefiting? Specify it. 1). beetroot, 2). Potato, 3). carrot
41. If you are producing a **vegetation crop**, on which crop you are engaging and more benefiting? Specify it. 1). Cabbages, 2). Tomato
42. If you are producing a **Fruit tree**, on which crop you are engaging and more benefiting? Specify it.

1) . Mango, 2). Avocado, 3). Orange, 4). Papaya, 5). Banana

Identify the challenges and opportunities associated with urban agriculture in the study area.

43. Do you have enough land access for your urban agriculture? 1) Yes 2) No

44. What happened to the size of land holding over the last decades?

    1) Increased 2) Decreased 3) No change

45. If your response is 'decreasing', to question no. 50, what were the reasons?1) Large household size

    1) Decline in quality of land3) Redistribution of land 4) Expansion of urbanization 5) others

46. How do you rate the sufficiency of your land holding for farming?

    1) Scarce 2) Sufficient 3) Others

47. What is the fertility status of your farmland? 1) Poor 2) Moderate 3) Good

3) How far is your farmland from your home in a minute? 1) less than 10 minutes 2) 10 to 20 minutes more than 30 minutes

48. Do you have access to credit services from micro-institutions to supplement your urban agriculture? 1) Yes 2) No

49. If your response is "No" for question 47, what is the main problem? 1) lack of collateral 2) lack of initial deposit 3) bureaucracy of credit institution

50. Do you have good market access for your agricultural product? 1) Yes 2) No

51. Do you have enough storage area for your products? 1) Yes 2) No

52. Have you sharecropped and/or rented out your plot to other peasants every year?

    1) Yes 2) No

53. If your response is ‘yes’ to question 52, why did you sharecrop out? 1) Lack of draft power 2) Lack of seed access 3) Unable to purchase technological inputs 4) Illness 5) Elderly and unable to operate it 6) Having large farm size

54. Do you have a shortage of land for livestock rising? Indicate their level of importance.

    1). High 2). Moderate 3). Low

55. Do you have a lack of additional fodder and water for livestock rising? Indicate their level of importance. 1). High 2). Moderate 3). Low

56. How are disease prevalence and veterinary services to livestock rising? Indicate their level of importance. 1). High 2). Moderate 3). Low

57. How do government and policy support your urban agriculture? Indicate their level of importance. 1). High 2). Moderate 3). Low

Appendix 2: Checklist for focus group discussion

1. What is the main agricultural practice in your wereda? From crop and livestock.

.....

2. How do you evaluate the contribution of urban agriculture in your wereda? Related to ensuring Food security?

.....

3. What are the main challenges of urban agriculture in your wereda? Related to access to the market, the government supports and other...

.....

4. What is the possible solution to solve the problem related to urban agriculture in your wereda?

.....

5. According to your perception, what is the contribution of urban agriculture to the environment?

.....

6. Does urban agriculture support job creation and other social interactions in your wereda?

.....

Appendix 3: Checklist for Key Informant Interview

1. What is the extent of urban farming in your area?

.....

2. What do you think about the main factors for UA productions in your residence area?

.....

3. What proportions of the people in your wereda are engaged in urban farming?

.....

4. Which crops and livestock are commonly produced in your wereda? 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 are urban farmers in your wereda are food secured?

.....

7. What problems do the urban farmers face in crop and livestock production?

.....

8. How, do you evaluate the role of urban agriculture for household livelihood in your wereda? In terms of food access and income generation

.....

9. Did UA contribute to job creation in your wereda? 1) Yes 2) No
10. According to your self-assessment UA can contribute to the environment in your wereda? How?

    1) By waste recycling 2) by making a green environment 3) by conserving nature 4) by balancing environmental temperature 5) if more explain it.....