COLLEGE OF DEVELOPMENT STUDIES

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CONTRIBUTIONS OF URBAN AGRICULTURE TO HOUSEHOLD FOOD SECURITY:A CASE STUDY IN KIRKOS SUB CITY, ADDIS ABABA, ETHIOPIA

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ADDIS ABABA, ETHIOPIA

OCTOBER, 2021

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

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN FOOD SECURITY AND DEVELOPMENT

ADDIS ABABA, ETHIOPIA
OCTOBER, 2021

DECLARATION

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

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Supervisor's approval

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

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As supervisors/co-advisers of the thesis, we certify that we have read and evaluated the thesis prepared by **Firew Dereje** Entitled "Contributions of urban agriculture to the householdfood security: A Case study in Kirkos Sub city, Addis Ababa, Ethiopia 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 thesis defense session.

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As members of the Examining Board of the Thesis Open Defense, we certify that we have read and evaluated the thesis prepared by **Firew Dereje** Entitled "Contributions of urban agriculture to the household food security: A Case study in Kirkos Sub city, Addis Ababa, Ethiopia' 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.

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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 Examining Board, to the Councilof Graduate Studies (CGS) through the Centre Academic Committee (CAC) of the Centre.

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ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Messay Mulugeta for the mentorship, and encouragement throughout the research process without whom I would not have made it possible. He is such an incredible person with strong motivation, dedication and grateful for the positive attitude he has demonstrated to support me. I am grateful to my friends Marga Abdisa, Kidist Hayle (Head of Agricultural bureau at Kirkos sub city) for such an unforgettable support. Most importantly, it is of my great pleasure and proud to thank my loving and supportive wife, Ms. Frezewud Makonnen, whose love, encouragement, and guidance are with me in all aspects of my life. She is the ultimate role models and the reason to achieve more. This achievement has come to surface in the cost of the time I should have given to my wife and my kids, Firanboni Firew, Fenet Firew and Amenawit Firew, I thank them.

Last but not list I would like to thanks my external examiner Dr. Meskerem Abi for her genuine comment and make this thesis paper more qualified document.

Finally, nobody has been more important to me during my whole life journey as well as in this research work than My Mother, that I proudly dedicate this big achievement to Jalle Abdisa.

Firew Dereje

October, 2021

Abstract

In urban areas where household food security relies on household income, work opportunities and an efficient grocery store system are crucial to improving access to food. A study was undertaken to investigate the main objective of the study is to explore the contribution of urban agriculture (UA) to the household food security of urban farmers in Addis Ababa, taking Kirkos Sub city as a case study. In this study, the researcher used both quantitative and qualitative research approaches in order to ascertain and be able to describe the characteristics of variables of interests in situation. In addition, the study was also said to be explanatory in design because there is intent to establish the relationship between dependent variable of the study. In addition, sample key informants and groups were selected for undertaking Focus Group Discussion (FGD) about urban agricultural practice in the area, the challenges and opportunities in production, marketing as well as access to credit facilities. The study was used a probability sampling technique (purposive selection of areas). The specific quantitative methods of analysis employed in this study was include the statistical tools such as descriptive statistics such as frequencies, percentages, and the ordinal logistic Regression and coefficient of determination to examine the interrelations between different variables. Additionally, maps, graphs, and charts were used to organize and illustrate the data clearly and precisely were be employed questioner, interview, and KII and F G D. 48.2% of respondents were food secure, while 23.1% and 28.7% of them were mildly and moderately food insecure respectively. 33.8% of respondents believed that urban agriculture helped them to meet variety of food needs for daily consumption and the rest replied it was not sufficient to meet their daily varieties of food needed. Around 47.2% of respondents replied that UA helped them to meet all year-round food requirements and 22.6% said that UA they producing were unable to cover year-round food requirements for their household. Most of respondents replied their income was increased by urban agriculture they engaged in. Results showed that 72.3% of respondents have land resources used for urban agriculture and 27.7% replied they didn't have land resources used for farm. The ordinal logistic regression model revealed that independent variables namely, Age, family size, formal education, household head, monthly income, marital status, educational level, mainly income source, farming experience, land access and market access were found to be statistically significant predictor for house hold food security. There was food insecurity prevalence among urban agriculture engaged households therefore this needs additional supports and increasing intensity of urban agriculture types. There were input problem mainly animal feeds for livestock; thus, this need supports and interventions of governmental institutions.

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

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ACRONYMS AND ABBREVIATIONS

CSA: Central statistical Agency

FAO: Food and Agriculture Organization

FGD: Focus Group Discussion

GTP: Growth and Transformation HHs: Households

IFPRI: International Food Policy Research Institute

MoFED: Ministry of Finance and Economic Development

MoWUD: Ministry of Works and Urban Development

NGOs: Non-Governmental Organizations

UA: Urban Agriculture

UN: United Nations

UNDP: United Nation Development Plan

CHAPTER 1: - INTRODUCTION

1.1. BACKGROUND OF THE STUDY

By 2050 it's projected that more than two-thirds of the world population will live in urban areas. (Hannah R. and Max 2018). Obviously, our continued existence living standard is influenced by capacity to supply food for ourselves during a sustainable manner. The increasing rate of urbanization accentuates the vulnerability of cities for extraordinary social and ecological quandaries and bottle neck for feeding their mounting population (Derescher, 1996). Currently, urban agriculture is becoming increasingly significant as a source of household food, a trend that is closely linked to declining incomes of vulnerable urban households in the wake of neoliberal economic restructuring, high rates of urbanization, and the need to serve an emerging niche market in African cities (Arku; et. al, 2012). Meanwhile urban agriculture is an entrepreneurial activity for people at different levels of income. For the poorest of the poor, it provides good access to food. For the stable poor, it provides a source of income and good quality food at low cost. For middle-income families, it offers the possibility of savings and a return on their investment in urban property. For small and large entrepreneurs, it is a profitable business.

In urban areas where household food security relies on household income, work opportunities and an efficient grocery store system are crucial to improving access to food to it effect, urban agriculture has the paramount role since food production is usually practiced over smaller and more dispersed areas than rural agriculture, uses land and water more sparingly and efficiently, integrates systems more effectively, and produces much higher yields and more specialty crops and livestock (Mougeot, 2000). Urban Agriculture (UA) has been one in all the means for coping up with huge increase, lower wage and food insecurity experienced within the country. Since Urban agriculture (UA) has become "an old wine in a very new bottle", gaining prominence especially in developing economies because it's been known to be a viable poverty intervention strategy for the urban poor and socio-economically disadvantaged groups. Various qualitative and anecdotal evidences (Mkwambisi et al.,2011) suggests that urban agriculture encompasses a positive impact on improving malnutrition, increasing food security level of households, increasing income likewise as providing very rich micronutrients for household consumption. However, there's little attention given among government stakeholders (like policy makers, City Administration, governmental agencies, NGOs and others) towards urban agriculture. By 2020, the number of people living in developing countries will grow from 4.9 billion to 6.8 billion. Ninety percent of this increase will be in rapidly expanding cities and towns. More than half the population of Africa and Asia will live in urban

areas by 2020. More than three-quarters of Latin Americans already do (James L. Garrett August 2009). The involvement of numerous people in UA indicates its centrality in informal sector activities. On the govt. of Ethiopia, that specialize in urban re-development and resettling, and with the present tenure policy, there seems to be less attention given to expand and support the UA practices; and yet, little has been researched to justify the socio-economic relevance of UA in cities.

Attention given to expand and support the UA practices; and yet, little has been researched to justify the socio-economic relevance of UA in cities. Evidences indicate that, there'll be high rate of urbanization in Africa and Asian countries within the coming twenty years (Garrett J. and Mougeut 2000). Similarly, the trend of urbanization (in rate and real population growth) seems as in Ethiopia. Ethiopia is undergoing through rapid rates of urbanization 4.6% annul urban population growth rate (UN,2018), and rising food prices and living costs (FAO,2020). As such, UA will have a substantial role in fostering sustainable urban development agenda in the country. Despite this, however, UA in Ethiopia has gained little attention from the scientific research community. About 95% of the total crop production in Ethiopia comes from small-scale farming (AgSS, 2016) which can further be classified as rural and urban on the basis of where the farming activities take place.

Since then the study focuses on Addis Ababa city. Addis Ababa city is considerably the best place for implementation of urban agriculture thanks to the existence of suitable agro-ecology for both horticultural crop production and husbandry. The city's farming is additionally prominent for its proximity to an enormous and attractive market that enables the assembly of high-value perishable products like green leafy vegetables and dairy products like fluid milk, yoghurt and cheese the supply of various styles of agricultural inputs and services, the existence of convenient infrastructures within the city, and diversification and integration possibilities for those practicing favor urban farming within the city metropolis.

However, urban agriculture in Addis Ababa is encountering challenges that are external to the system. The shortage of specific policy and strategy, institutional instability and lack of technical support to the world, the rapidly growing population pressure, competition of other investment sectors are the profound constraints of urban farming (Mandefro, 2010). The limitation within the area of research associated with the food security contributions of the arena is additionally another shortcoming of urban agriculture. Therefore, it's highly important to grasp the contribution of urban agriculture to household food security and income level for evidence based political beliefs and for future steps taken for any improvement in contributions of UA. Thus, the motive behind finishing up this research is to explore the understanding

that urban agriculture contributes to the socio-economic development of urban household's food securities particularly and to the livelihood of urban society generally.

1.2 Statement of the Problem

In the present-day world urbanization is escalating over time within the expense of arable land. Cities throughout the globe face with unpredictable social, economic and ecological challenges, not slightest of which is a way to give to eat their growing population (UN, 2006).

The potentials of urban agriculture in Ethiopia, especially within the big cities like Bahirdar, Mekele, Hawassa, Jimma, Adama do not seem to be to be doubted just in case of Addis Ababa city; Government has recognized urban agriculture mutually of the important tools to finish poverty (Thoma, 2013). UA has been dispensed in most sub-cities of Addis Ababa; but it's not known why those urban dwellers of the sub-cities chose to have interaction in such a venture, and what constraints they're facing. Urban agriculture tremendously contributes to the improved food and nutritional security at household and community level. Its implications for food security are the increased supply of fresh and perishable food products like milk and vegetables, satisfying the consumption need of the urban poor and increased income of households engaged within the production, processing and marketing of UA products. Though, urban agriculture within the city administration of Addis Ababa has been undermined and even wasn't supported by the event policy and/or strategy.

The institutional instability and in appropriate organizational setup of urban agriculture office within the city also dropped at the inadequate facilities and limited instruction for the people engaged in urban agriculture. Generally, researches undertaken within the fields of agriculture are highly specializing in the agricultural Centre; however, within the case of urban agriculture it absolutely was not given due attention that it deserves.

To that effect, the contribution of urban agriculture to the households' food security and also the national economy wasn't statistically measured and made available. The widespread misconception of the world related to the limited awareness on the potential role of urban agriculture brought to insufficient consideration by the event actors.

On top of those, the world is constrained by exogenous factors just like the rapidly increasing growth compounded by urbanization and expansion of settlements, dwindling of land and water resources used for

urban agriculture, lack of technologies appropriates to urban agriculture, competition of other investment sectors, and threats like environmental hazards.

Many of the urban development studies in developing countries think about housing, urban services, and nonagricultural informal activities (Muluget, 2006). However, they mainly exclude or give little attention to UA; even those studies that were conducted within the area of UA, they paid attention to the environmental concerns and a touch concern to any or all food security dimensions in order that the researcher built a heartfelt aspiration to point out the importance of UA in addressing the two basic dimensions of food security, availability and access and its converging role to the achievement of the food security goal at household level. In due consideration of the above reasons, the researcher has intended to hold out study research deliberately selecting the Kirkos Sub city to examines the food security contributions of the urban agriculture within the selected urban farmers. The planners and the policy makers would be guided by the findings of such studies in formulating suitable policies that will help in increasing urban agriculture and reducing the household food insecurity.

1.3. Research Questions

Given the objectives, the following questions will be addressed in the research:

1. What are major types of urban agricultural production practices the study areas?
2. What are the key opportunities and challenges to involve in urban agriculture productions in the study area?
3. What are the facing factors are affecting urban agriculture in the study areas?

1.4 Objective of the study

General Objective of the research was to explore the contribution of urban agriculture (UA) to the household food security of urban farmers in Addis Ababa, taking Kirkos Sub city as a case study. The Specific objectives of the research are to:

1. Evaluate the current urban agriculture practice in the study area
2. Identify the constraints and opportunities associated with urban agriculture in the study area.
3. Assess contributions of urban agriculture to household food security in the study areas

1.5. Significance of the study

In line with the issues indicated above, studying the contribution of urban agriculture to urban farmers at large would be timely and necessary. The research outputs would improve our knowledge about the role urban agriculture plays in improving the welfare/ livelihood of the urban people; and also the study will add information to the limited research done to date on the contribution of urban agriculture (UA) to the household food security and impact of urban agriculture within the capital of Ethiopia. The study will bring new insight about urban farmers' food security and also the foremost debatable role of urban agriculture (i.e., its impact on household welfare, like food security and income). This can help researchers and different institutions to further analyze their intervention supported what works and what doesn't add the urban settings.

The research will investigate the pressing factors cause for the undermining of the world vis-à- vis its incredible role for food and livelihood security. It'll also give insight for policy makers to pay due attention to the world and consider urban agriculture collectively of the foremost livelihood and economic sources.

1.6. Scope the Study and Delimitation of the study

The scope of the study are limited to the farming activities practiced at urban level (i.e., vegetable crop production, milk and/or poultry production; and husbandry that are in high demand and have a comparative advantage over geographical region production). On top of this the study will focuses on understanding the contribution of urban agriculture on households' welfare (income and food security), taking Kirkos Sub city as a case study. Food security in its nature is complex that involves the domains of natural and social sciences, and determined by variety of things so one measuring tool can't give us an absolute finding or result.

1.7. Ethical Consideration

During the data collection process, the researcher will mindful of ethical considerations being a vital component of this research data collection process. the foremost important ethical components that the researcher founded, are going to be that of protecting the interests of the research participants, by way of confidentiality consent forms being signed before participation within this research, then to undertake and gain deeper consumer insights the researcher will inform participants of the aim of this research before getting their written consent to participate, similarly as ensuring confidentiality to safeguard their privacy.

Other key ethical considerations are that of ensuring no harm would come to any participants, respecting the dignity of all those the researcher came in to contact with for the aim of this research, will make sure that no deception will apparent within detailing this research geared toward respondents by way of communicating the research in an honest and transparent approach.

1.8. Organization of the Paper

The thesis is organized in five major chapters. The first chapter talks about background of the study with specific topics related to statement of the problem, objectives of the study, significance of the study, scope and limitations of the study, and ethical considerations during the study process. The second part describes the theoretical and empirical foundations of the research topics in the areas of the contribution of urban agriculture (UA) to the household food security of urban farmers in Addis Ababa. It also illustrates the conceptual framework of the study. The third chapter provides information related to the description of the study area and the overall research methods. It presents the research design, techniques of data collection and analysis. The results and discussion section are presented and illustrated under chapter four while chapter five includes the conclusion and major recommendations that came out of the study.

CHAPTER 2: - RELATED LITERATURE REVIEW

2.1. Urban agriculture: Definition and Characteristics of Urban Agriculture

Urban agriculture isn't easily defined, as an oversized form of urban farming systems exist internationally, with varying characteristics reckoning on local socio-economic, geographic and political conditions. the foremost widely used definition of UA was developed by Luc Mougeot(2005). Using technical criteria of UA he explained that, urban agriculture is an industry located within (intraurban) or on the perimeter (peri-urban) of a town, a city or a metropolis, which grows and raises, processes and distributes a diversity of food and non-food products, reusing largely human and material resources, products and services found in and around that geographical region, and successively supplying human and material resources, products and services largely to it populated area.

The FAO defines urban agriculture as "a dynamic concept that comprises a range of livelihood systems starting from subsistence production and processing at the household level to more commercialized agriculture. It takes place in numerous locations and under varying socioeconomic conditions and political regimes" (FAO, 2007).

According to Thomas (2013) one amongst the economic significance of urban agriculture is its capacity to make income, food supply, employment opportunity and environmental management. Low and middle-income farmers practice urban agriculture mainly to survive and achieve a mix of nutritional and socio-economic benefits, mainly to produce supplementary food and /or income.

The world organization Development Program (UNDP, 1996) estimated that 800 million people are engaged in urban agriculture worldwide. Of these, 200 million are considered to be market producers employing 150 million people on full-time basis. Urban agriculture contributed 15 percent of world food production in 1996 and this can be expected to grow to 30 percent by 2005 (Jac et.al 2001). Some investigations done on the case of urban agriculture showed that the maximum amount as 40 per cent of the populations of some African cities and up to 50 per cent in some occupier cities engage in urban or peri-urban agriculture (IFPRI, 2002).

In Ethiopia, urban agriculture is that the final sequence of survival strategies exhibited by households. Households within the urban areas answer the intense threat of poverty and food insecurity by finishing up urban farming on any vacant space available. Urban agriculture is additionally practiced thanks to shortage of income and unemployment within the urban centers (Lamba, 1993).

According to Yonas (2011), the expansion of the Ethiopian economy brought huge inflation in food and non-food goods, particularly in food commodities. The govt. had also taken some measures in 2008 by lifting certain taxes from food commodities (especially oil), further as measures to curb the surplus supply of cash. These fiscal and monetary measures might take time to scale back prices and cause improved food security of the urban dwellers especially the poor. This had a really negative welfare impact on the urban than rural households; while the agricultural households are supported by various safety net programs. Combined with huge unemployment, high cost of living, growing population, urban people have developed various mechanisms to address the changes one in all the coping mechanisms adopted by the urban dwellers has been to have interaction with urban farming.

2.2. The Concepts of Food Security

In this section, it's found to be crucial to elaborate the definitions of food security and its dimensions that are required previous discussing its linkage with the urban agriculture.

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). This definition was adopted by the heads of the planet states when gathered for the planet food summit in Rome, called by the Food and Agriculture Organization of the international organization. it absolutely was also used because the basis for the primary objective of the MDGs, "Eradicate Extreme Poverty and Hunger", adopted by the globe leaders within the year 2000 and set to be achieved by 2015.

The food security definition comprises four key dimensions of food supplies: availability, stability, access, and utilization (Schmidhuber & Tubiello, 2007). The first dimension relates to the provision of sufficient food, i.e., to the general ability of the agricultural system to satisfy food demand. Its sub dimensions include the agro-climatic fundamentals of crop and pasture production and also the entire range of socio-economic and cultural factors that determine where and the way farmers perform in response to markets.

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 exceedingly region of erratic rainfall and have few savings, would be at high-risk of losing their access to food (Schmidhuber & Tubiello, 2007).

The dimension, access to food refers to the flexibility of people, communities, and countries to get sufficient quantities and qualities of food. It also covers access by individuals to adequate resources (entitlements) to amass appropriate foods for a nutritious diet (Schmidhuber & Tubiello, 2007). Entitlements are defined because the set of all those commodity bundles over which someone can establish command given the legal, political, economic, and social arrangements of the community of which he or she could be a member. Thus a key element is that the purchasing power of consumers and therefore the evolution of real incomes and food prices (Schmidhuber & Tubiello, 2007). Food access depends largely on household purchasing power, which varies in respect to market integration, price policies and temporal market conditions (UNDP et.al, 2009).

Finally, utilization encompasses all food safety and quality aspects of nutrition; its sub dimensions are therefore associated with health, including the sanitary conditions across the whole organic phenomenon (Schmidhuber & Tubiello, 2007). Also food utilization is decided by food safety and quality, what proportion someone eats and the way well an individual converts food to energy, all of which affect proper biological use of food, nutritional status and growth (UNDP et. al., 2009).

2.3. Food Security in Urban Context

Specific aspects of food security within the urban context are, on the one hand, the need to get most of the food required by the household and, on the opposite, a greater dependence on the market system and on commercially processed food. Employment and income are, therefore, the most prerequisites for attaining food security in urban setting (Baumgartner & Belevi, 2001). Sustainable production, processing and production of food in and around cities and towns contribute to the goal of safe, affordable, and reliable food supply for the urban poor, and supply income and employment to an oversized number of poor specially women (World Bank, 2005).

There are two major forces driving people from all walks of life, particularly those on low incomes and therefore the poor, to cultivate the city: food security and income generation there's evidence to suggest that UA's contribution to urban food supply and household urban food security is important and in many instances is growing (Mougeot , 2005). Growth in urban food production depends on personal income, household size, city lay out, access to land and water, official attitudes, and climate (Koc et.al, 1999).

Urban food supplies in developing countries cannot be taken as a right and there's ample evidence from world cities that food is popping into a “basic luxury” for the urban poor particularly. Urban food

production has grown into a posh and thriving industry, in terms of practicing households and its supply of the many nutritious food items to urban markets. Also, there is a growing body of knowledge on the advantages accruing to practicing households, in terms of self-grown food intake, child nutritional status and general health, cash savings and generated income (Mougeot, 2005).

Many of these engaged in UA aren't doing only for self-provisioning. Although, UA could be a main occupation for under a minority of these who farm in cities, it's a awfully important second or perhaps third occupation for several people. Growing and processing food in cities creates lots of employment, many thousands of part-time and full-time jobs, and encompasses a potential to form more. for several families it helps to cut back the economic uncertainty that comes with unemployment and employment instability, meaning there'll always be food on the table (Mougeot, 2006).

2.3.1 The role of Urban Agriculture towards Reducing Urban Food Insecurity

Despite persistent economic process round the world, food insecurity and unemployment remain pressing problems in many parts of Africa ((UN-Habitat, 2006); (Mougeot, 2005), especially in and round the major urban centers. The FAO (2002) suggest about 33% of individuals in geographical region, undernourished and international organization (UN-Habitat, 2006) reports that the share of urban residents in geographical region is anticipated to rise from 39.7 to 53.5% between 2005 and 2030 this can bring new and severe challenges for assuring household food security and access to basic services.

Many studies like (Daniel, 1998), (Devereux & Maxwell, 2001), and (World Bank, 2005) reveal that urban agriculture has been used as a household strategy to reply to both chronic and emergency food insecurity. The responses of urban households to the financial condition are normally the main target of efforts to combat poverty and food insecurity (Maxwell, 1999). Urban agriculture may be seen as a survival strategy for the urban poor during crisis periods, and contributes to household food security especially for girls and elderly (World Bank, 2005).

Food supply crises in developing world can occur as a results of variety of factors: political instability, temperature change, market globalization, and so on regardless of the cause, a crisis in food supply tends to affect people in urban areas over in rural areas, and ladies and youngsters are particularly vulnerable when food is briefly supply (Mougeot, 2006).

As a response of the urban poor to inadequate or costly food supply, food (crops and livestock) production in urban backyards became worldwide a typical feature. But the related increase in urban food demand opened also the door for farming systems in and around cities specialized on perishable products, like vegetables, taking advantage of each open space, market proximity and also the general lack of functional cold chains of these farming systems are a part of a phenomenon called Urban Agriculture (UA) (IFPRI, 2002).

Urban households reply to food insecurity by virtue of diversifying their sources of food and income through increased own production of food or increased labour participation (including children), transmit wage labor migrants, substitute cheaper foods, borrow or buy on credit, reduce other expenditures, sell assets, send household members to remain with kin elsewhere, and reduce their food intake (Devereux & Maxwell, 2001).

Urban agriculture or food production conducted in or around urban regions, seems to produce a sensible and pragmatic solution (Mougeot, 2005). as an example, reports indicate that urban agriculture is a very important source of food throughout developing-country food systems and a critical food security strategy for poor urban households (Mougeot, 2000); (Klemsu & Maxwell, 2000). Urban agriculture may improve household nutrition because it provides a source of fresh, locally grown crops that increase the micronutrients in poor households' diets and it can increase household incomes (IFPRI, 2002).

According to (Maxwell, 1999) the character of urban food insecurity has changed from the matter of "feeding the cities" (or maintaining aggregate supply), to it of access at household and individual level. The responses of urban households to the depression are normally the main target of efforts to combat poverty and food insecurity. Poor urban consumers can spend from 60% to 80% of their limited income on food. Here, urban agriculture becomes a stimulating option because it contributes to the mixture supply, specifically of fresh and perishable plant and animal food, also on food production reception for home consumption and better nutrition.

2.4 Empirical Literature Review and the Gap

2.4.1 Urban Agriculture as Source of Livelihoods

Although agriculture is typically perceived as only a rural activity, it can even be a part in urban livelihoods, serving as a source of food and employment for poor households and for entire cities. The extent of urban agriculture varies widely counting on land availability and legal restrictions. Studies show that the maximum amount as 40 percent of the population in African cities and up to 50 percent in occupant cities are involved in urban or peri-urban agriculture. Within the 1980s urban and peri-urban agriculture in China's largest cities met quite 90 percent of vegetable demand and over 1/2 meat and poultry demand (IFPRI, 2002).

In light of the livelihood security, the study conducted in city of Lima, capital of Peru located within the western of geographical area revealed that urban producers use a spread of assets, which they combine so as to handle risks and vulnerabilities. These assets are divided into five categories: natural, physical, human, financial and social. Here, one in all the principal threats to urban producers is rampant populated area. Additionally, urban households involved in agriculture affect an absence of recognition and understanding from policy makers (Villavicencio, 2008). Studies undertaken within the capital of Zambia, Lusaka revealed that the premise for urban agriculture is that the availability of resources. Also, the identical study showed urban agriculture can act as an alternate income-generating activity and as a buffer for household food security (Drescher, 2000).

According to Callens & Seiffert, (2003), Often, the term 'food security' and 'household food security' are intermingled Food security is defined in its most basic form as access by all people at all times to the food needed for a healthy and active life. The focus of food security is the households as the basic social unit in a society. This distinction is important because activities directed towards improving household food security may be quite different from those aimed at improving national level food security. The former often being more related to micro-level production, marketing, distribution and acquisition of food by the population as a whole.

Household food security is also concerned with food distribution within the household and priorities related to food production, acquisition, utilization and consumption. The focus is thus not just on food but also on people and households and how they give shape to the food chain. Household food security gives a closer look at vulnerability factors within the household as well as external sources of vulnerability. This can include national policies, environmental conditions, access to infrastructure and facilities, etc.

The study dole out in five East African cities: Addis Ababa; Dar es Salaam; Kampala; Kisumu and Nairobi. found that urban livestock keeping, the one segment of UA, benefits the poor and provides the way of diversifying livelihood activities that are accessible to vulnerable groups like female-headed households, children, retired people, the sick and widows, also as providing a source of locally produced food projects for people living near the livestock keepers. The study also revealed that Livestock are kept as social safety nets, retirement policies, deposits for funerals, sources of food and income. Urban livestock keeping is of great relevance to those in need of a social insurance strategy (Richards & Godfrey, 2003).

The case study research conducted within the city of Nairobi indicated that several land holdings potentially increase the diversification and intensification of food-production systems. As a results of this diversification of crops and livestock-rearing, household income increased in several ways. First, if they were marketed, the excess food crops and livestock still as their products fetched extra income. Second, the increased availability of food crops relieved the households' income from food purchases. Therefore, households' food security was enhanced by increased availability and access to diversified diets (Njogu, 2008).

In Ethiopia, urban agriculture has been shown to be a conclusion by households in their sequence of survival strategies. Households within the urban areas answer the intense threat of poverty and food insecurity by completing urban farming on any vacant space available. Urban agriculture is additionally practiced thanks to shortage of income and unemployment within the urban centers (Lamba, 1993).
Exploratory research conducted by Axumite (1994) in national capital on five horticultural cooperatives discovered that urban households in Addis Ababa start urban agriculture after they lack options and/or fail to satisfy their needs with better income options. She also put the survival strategies of urban farmer households as that urban farmer households more experienced three common sequential stages while searching for better income and better survival options for themselves and their members of the family.
According to Asfaw (2018) considers coping strategy as a shift between or within the assembly, consumption, income, assets and migration paths. The assembly path is indeed related to risk management that the farm households employ to scale back crop loss through diversification of crop varieties (Hardaker et al., 2004). It could also see the coping mechanism through diversification of the income sources as they promptly react to the food scarcity.

However, such measures adopted by the households to attenuate risks remain effective for under limited periods of some time. According to Mengestu (2011) reported that the coping mechanisms are sequentially adopted in an exceedingly way that the actions taken would, the utmost amount as possible, save life today without risking the end of the day food production or entitlement capacity of the household. At early stage, so on crop the extent of food insecurity, households adjust their production decisions similarly as labor location and commit non-(or less) productive assets.

2.4.2 Urban Agriculture and Food Security

2.4.2.1 Potentials of Urban Agriculture

Urban agriculture is principally practiced within the outskirt and vacant spaces of town, and along rivers sides and concrete fringes where land isn't suitable for building construction. As Bryld (2003) puts it "urban agriculture brings with it great potentials for enhancing true of the urban citizens, especially those with very cheap incomes who are obsessed on the access to locally grown food".

a. Food Security

Acceleration of urbanization in developing countries has been in the middle of increased demand for food consumption. this may be seen in Ethiopia (Dereje, A. Margaret P. and Wubetu B, 2007). Yet, the amount of poor urban households has also significantly been rising together with urbanization, so do many households who cannot afford to shop for enough food for his or her own consumption (Bryceson and Potts 2005). per Thomas P. (2013) report, "given the correct support, urban farmers could supply over 42% of the vegetable demand in Addis-Ababa".

b. Economic Potential

Urban farming may also be a decent source of income for the urban poor, if it's especially practiced as a proper sector. However, Bryld (2003) doubted whether it's a big contribution to macro economies of cities although he stated that urban farming has an economic relevance because it's helping urban farmers, especially the poor, to use their non- farm income for other purposes rather than purchasing food (i.e., it improves the welfare of urban farming households).

RUAF (2007) reported that the poor households in developing countries spend 50 to 70% of their income to buy foods; hence, the muse appreciated the advantages of self-growing crops and/or participating in other styles of urban agriculture by the urban poor. The report also confirmed that "in national capital, above-normal profits are earned by even the smallest- scale backyard producers with very low capital" (RUAF 2007). This finding also agrees with RUAF's report.

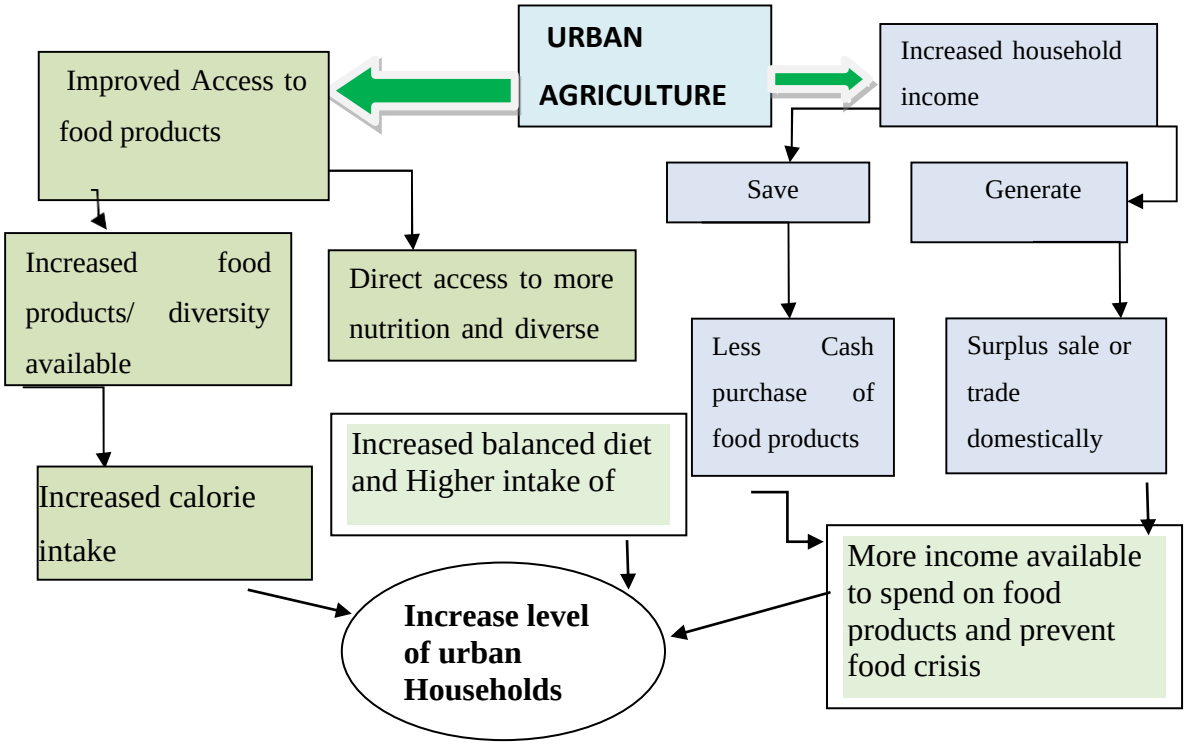
2.4.3 Literature Gap

Limited research conducted in this area concerning about urban agriculture to food security and its contribution to households food security in Addis Ababa kirkos sub-city. Therefore, this research is aimed to come up with research based knowledge about the urban agriculture and its contribution to households food security, by assessing the present situation associated with food security of households within the sub-city area and thus to fill the research gap within the area. Moreover, the researchers, the government bodies and other stakeholder used the scientific evident information about the matter of the study area.

2.6. Conceptual Framework

The following conceptual framework, it's tried to portray the overall concepts of the study (Figure 1). Specifically, it indicates that the contributions of urban agriculture to food security and income of the households which is able to be divided into multiple dimensions, namely in definition of urban agriculture, purposes of urban agriculture, advantages of urban agriculture and practicing urban agriculture production. During this context of conceptual frame work, researcher will concentrate on contribution in urban agriculture to household food accessibility, Diversity, income and Constraints in Practicing urban agriculture, and also household food security status in the context of urban agriculture Practice.

Figure 1: Conceptual framework (Source: Researchers own Construction based on two key pathways of contributions of UA to HHs food Security**)**



Urban agriculture benefits the economy, environment, and well-being of those active in the industry, as well as residents who enjoy its products. It plays a role in programs and projects that target health and nutrition, the environment, enterprise development, income generation, water and sanitation, youth and women, and food production and supply. Urban agriculture is mainly practiced in city open spaces, along riversides and urban fringes where land is not suitable for building construction. As Bryld (2003) puts it "urban agriculture brings with it great potentials for enhancing the situation of the urban citizens, especially those with the lowest incomes who are dependent on the access to locally grown food.

The contribution of urban agriculture to food security and healthy nutrition is probably its most important asset. Food production in the city is in many cases a response of the urban poor to inadequate, unreliable and irregular access to food, and the lack of purchasing power. In most cases, urban agriculture is practiced in marginal spaces in cities and outskirts where lands are not suitable for other use. It, therefore, creates beautiful scenarios and landscapes, and improved microclimate, and nutrient recycling (Bryld 2003). Urban agriculture is, therefore, contributing a lot in reducing the problems of urban household food insecurity by improving access to fresh and low-priced food and raises the nutritional status of the residents.

CHAPTER 3: DESCRIPTION OF THE STUDY AREA AND THE RESEARCH METHODS

3.1. Description of the Study Area

The case study area Addis Ababa (see Figure 2) is that the economic and political capital of Ethiopia, lies at an altitude of 2408 meters above water level, located at 9^0 1’48’’N latitude and $38^0$44’24” E longitude CSA (2005). Its average daily temperature is 16^0C, means annual precipitation is about 1180 mms and has unimodal rainfall regime ranging from June to September. The season occurs from January to May. During the time of year, many urban dwellers engage in urban farming. the town has shown extensive physical growth since the past 10 to twenty years. In 1984, the world of town was only 224 square-kilometers; and by 2009, its total area was estimated to be 530.14 square kilometers (ORAAMP 1999).

The City Administration is created from urban and peri-urban areas; and it's divided into eleven (11) sub-cities, namely; Addis Ketema, Akaki-kality, Arada, Bole, Gulele, Kirkos, Kolfe-Keranio, Lideta, Nifasilk-Lafto, Lemmi kura and Yeka sub-cities (see Figure 2). The population of Addis Ababa in 2020 was 4,794,000 (CSA, 2020).

More specifically, Kirkos sub-city is geographically located at 9˚2′6″N 38˚45′28″E. Kirkos is one in all the ten sub-cities of Addis Ababa, the capital city of Ethiopia. It covers a vicinity of 1464.72 hectares. The sub-city is roughly situated within the central a part of Addis Ababa, nearby the middle, bounded from the South by Nifase silik lafto, from West by lideta, from East by Bole and from North by Arada sub-cities (Figure 3). it's divided into 11 woredas, 31 sub-woredas, 111 sefers, and 316 blocks. According to the report of kirkos sub city urban agriculture office, there are 1100 households currently practicing urban agriculture.

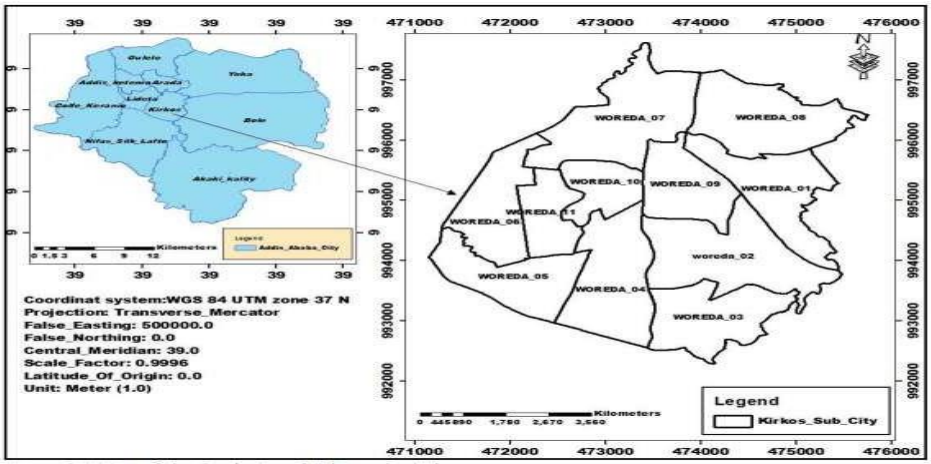


Figure 2: Map of the study Area (Source: Adopted from Kirkos sub city land administration)

3.2. Research Methods

3.2.1 Research Design and Approach

There are several research designs in use supported the character and kind of the research being done. During this study, the researcher used both quantitative and qualitative research approaches so as to determine and be read to describe the characteristics of variables of interests in situation.

Additionally, study the additionally said to be explanatory in design because there's intent to ascertain the link between variable of the study Co relational research aims to determine if there's significant association between independent and variable quantity (Reid, 1987). The study was used descriptive research design. Descriptive approach has advantage in explaining, describing in details and it's best in analyzing the issues. The most purpose of descriptive research design is to explain accurately the characteristics of a selected study group (Inaam, 2016) where the contribution of UA to household food security is explored.

3.2.2 Sampling technique and sample size Determination

The study was carried out in one of the 11 sub-cities of Addis Ababa known as Kirkos subcity considered as the universe. The purposive sampling technique was employed for the selection of study site. The sub-city is selected for many reasons. The first one is that based on the preliminary observation of the researcher there is high number of individual farmers in the study site participating on urban agriculture activities endowed. The second, knowing that few researches are done so far on this issue, the study will improve knowledge about the food security contributions of urban agriculture plays in the study area and can be one of the baseline references. And finally,

it is assumed that research findings have good representing value for other cities in the country and similar urban areas elsewhere. The use of Woreda will be found to be suitable to select representative study sites within the sub city. Each Woreda has independent urban agriculture administration office which represents directly the sub-city administration office. Different criteria will be considered in selecting representative Woredas for the study. A major criterion will be the availability of significant number of urban agriculture practitioners within each Woreda. This information is obtained after contacting the Kirkos Sub-city Urban agricultural and MSE offices. Finally, as per the information obtained from the urban agricultural and MSE offices of the sub-city, four Woredas namely, Woreda 06, 07, 08 and 10 have been purposively selected from 11 woredas where the four sub-systems of urban agriculture such as poultry, dairy, livestock fattening and vegetable production are widely implemented by the urban dwellers in the study sites.

The lists of the household heads who are engaged in urban farming are obtained from the respective Agricultural office of Kirkos Sub-city. Thus, the 1100 individuals practicing urban in the sub city were used as a "sampling frame" as much as they are potential data sources for the study. To that effect, the sample size will be determined from the entire population based on the following formula.

To make generalization about the whole population different sampling designs and procedures will used to get the truly representative sample (Israel, 1992). Thus, this section presents the sampling designs and procedures that are employed for this study.

When the response for the attributes being measured is assumed a dichotomous, the use of Yamane's (1967) tables and formulas to determine sample size is more appropriate (Israel, 1992). Since the dependent variable in this study is dichotomous, the researcher used Yamane's formula to determine the sample size for the survey respondents, i.e.

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

n= Sample Size,

N= Total Population and

e= Precision level at 95% (α=0.065) confident interval for normal distribution data.

Thereforethe sample size: N=1100 and e, at α=0.065

n=1100 /1+1100 (0.065) ², n= 195

Table 1: Calculation of the determination of Sample size in each wereda

Sample size Determination in Study Area

Kiros Sub cities woredas	Household's farmers/total population/	How to compute	Sample size
6	254	254 * Total sample size / Total farmers =254*195/1100	45
7	260	260 * Total sample size / Total farmers =260*195/1100	46
8	367	367 * Total sample size / Total farmers =367*195/1100	65
10	219	219 * Total sample size / Total farmers =219*195/1100	39
Total	1100		195

3.2.3 Data collection techniques

For this study the researcher was be employed questioner, interview, observation and focus group discussion in order to get important data on the contributions of UA to HHs food security.

Questioners: A structured questionnaire was regulated. The researcher was builds up the questionnaire in English and converted into Amharic. The questionnaire, which takes 24-30 minutes to fill, included data about Economic, social, health and environmental advantages of urban farming in study area, constraints, opportunities in practicing UA as well as demographic aspects of the respondents was performed.

Key informant interview: Interview was conducted to key informants from government officers to get data on the advantages of UA, budget allocation and challenges for the urban farming and management.

Focus group discussion (FGD): enterprise, agricultural officers and business peoples was participated FGDs.

Secondary data review: A review of related literatures was one of the techniques that the study applied to thoroughly understand previous works in the areas of Contribution of UA in food security context. Different books, journal articles, reports, reviews, working papers, guidelines, dissertations, and internet sources were reviewed. Resources from World Food Program (WFP) and Food and Agriculture Organization (FAO) were included in the review process.

The researcher was used mixed method of research which involves qualitative and quantitative approaches. The collected data was analyzed using quantitative measure. In qualitative studies typically involve interviews and observations without formal measurement. Qualitative research is commonly used as a source of hypotheses for later testing in quantitative research, Marczyk, G. et al (2005).

3.2.4 Sampling techniques

The relevant population from which the sample derived would be the population of urban farmers instead of the urban population as a full. The study was used a purposive selection of areas. because of limitation in resource and time, the sample size considered is restricted. Nevertheless, the findings of the study would be quite adequate enough to grant insights about the contribution of urban agriculture in food security and income in study area.

Addis Ababa has been selected purposively for two main reasons. Firstly, it is the largest city in Ethiopia harboring more than 30% of its population as urban farmers; thus, it is assumed that it holds many of the urban farmers and represents in their urban socio-economic circumstance, Secondly, from 11 woredas four woreds were purposively selected and from the whole 1100 population a total of 195 respondents was used for the study. This was selected based on sample size determination formula from Yamane (1967).

3.2.5. Techniques of data analysis

The examination of farmer's households' responses and opinions and statistical comparison of variation in their food security situation as well as the contributions associated with urban agriculture was analyzed by using both qualitative and quantitative methods. Following the completion of data collection, data was being coded and entered into SPSS version 20 for analysis. Quantitative data was analyzed using Stata software to describe key findings for the HFIAS.

The specific quantitative methods of analysis employed in this study was include the statistical tools such as descriptive statistics such as frequencies, percentages, and the ordinal logistic Regression and coefficient of determination to examine the interrelations between different variables. Additionally, maps, graphs, and charts were used to organize and illustrate the data clearly and precisely.

Descriptive statistics analysis was used for both specific objectives two and three (current urban agriculture practices and opportunities and constraints of urban agriculture in the study site. Ordinal logistic regression models is the most commonly utilized multivariate technique that examines the relationship between an ordinal category of dependent variable and two or more metric independent variables. In this study the Ordinal logistic regression model was used to investigate the relationship between household's food securities with the independent variables of family size, years of experiences by the households, annual income obtained from Urban agriculture and the assets owned by households. In the case of ordinal logistic regression, the dependent variable should preferably be measured on a though an ordinal scale was also used. Independent variables should preferably be measured on interval scales, nominal scales, though ordinal scale measurements are also acceptable.

3.2.6 Household Food Insecurity Access Scale (HFIAS)

Food and Nutrition Technical Assistance (FANTA) Project and its partners have identified a set of questions. Household food insecurity access scale generic questions that will be used to distinguish the food secure from food insecure households. The HFIAS consists of two types of related questions. The first question type was called an occurrence question.

There will be nine occurrence questions that ask whether a specific condition associated with the experience of food insecurity ever occurred during the previous four weeks (30 days). Each of the questions in table 3 will be asked with a recall period of four weeks (30 days). The respondents will first asked an occurrence question – that is, whether the condition in the question happened at all in the past four weeks (yes or no). If the respondent answers "yes" to an 30 occurrence question, a frequency-of-occurrence question is asked to determine whether the condition happened rarely (once or twice), sometimes (three to ten times) or often (more than ten times) in the past four weeks, (FANTA, 2007).

Example: 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 four weeks)

Table 2: Distribution of HFIAS category Score in their range of food security

No	Occurrence Questions
1	In the past four weeks, did you worry that your household would not have enough food?
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
3	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?
4	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?
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?
6	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?
7	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?
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?

The HFIAS indicator categorizes households into four levels of household food insecurity (access): food-secure, mild food insecure, moderately food insecure and severely food insecure. Households are categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently.

Table 3: HFIAS indicator Categories

HFIAS category	HFIAS category Score	Range of food security (0 to 27)
Food secure(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).

3.2.7 Ordinal Logistic Regression Model

Ordinal logistic model is suitable for modeling with an ordinal dependent variable for example, household food security (food secure, mildly food insecure, moderately food insecure and severely food insecure) etc. Ordinal logistic regression model is especially appropriate because like ordinary least squares regression, it identifies statistically significant relationship between explanatory variables and dependent variable. But unlike ordinary least squares regression, ordered probit discerns unequal differences between ordinal categories in the dependent variable (Agrist, 2003).

Let Yij be an ordinal response variable with j categories for the i^{th} subject, alongside with a vector of covariates Xi. A regression model establishes a relationship between the covariates and the set of probabilities of the categories. $p_{ij} = P(y_{ij} = y/x_{ij})$. Usually, regression models for ordinal responses are not expressed in terms of probabilities of the categories, but they refer to convenient one-to-one transformations, such as the cumulative probabilities $p_{ij} = P(y_{ij} = y/x_{ij})$ We note that, the last cumulative probability is necessarily equal to 1, so the model specifies only J-1 cumulative probabilities.

An ordinal logistic regression model for an ordinal response Yi with categories is defined by a set of J-1 equations where the cumulative probabilities $p_{ij} = P(y_i = y/x_i)$ related to a linear predictor $\beta^T x_i = \beta_o + \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_j x_{ij}$ through logit transformation, i.e. The parameters α_j, called thresholds or cut points, are in increasing order ($\alpha_1 < \alpha_2 < \cdots < \alpha_{J-1}$).

It is not possible to simultaneously estimate the overall intercept β_0 and all the J-1 thresholds: in fact, adding an arbitrary constant to the overall intercept,β_0, can be counteracted by adding the same

constant to each threshold α_j . This identification problem is usually solved by either omitting the overall constant from the linear predictor ($\beta_0 = 0$) or fixing the first threshold to zero ($\alpha_1 = 0$). The vector of the slopes β is not indexed by the category index j, thus the effects of the covariates are constant across response categories.

Cumulative logits

One way to use category ordering forms logits of cumulative probabilities are:

$p_{ij} = p(y_i \leq j) = \pi_{i1} + \pi_{i2} + \cdots + \pi_{ij}$ or

$$p_{ij} = p\left(y_i \leq \frac{j}{x_i}\right) = \pi_1(x) + \pi_2(x) + \cdots + \pi_j(x)$$

The cumulative logits are defined by:

$$logit\left[p\left(Y \leq \frac{j}{x}\right)\right] = log\left(\frac{p(Y \leq \frac{j}{x})}{1 - p(Y \leq \frac{j}{x})}\right) = \boldsymbol{In}\left[\frac{\pi_1(X) + \pi_2(X) + \cdots + \pi_j(X)}{\pi_{j+1}(X) + \pi_{j+2}(X) + \cdots + \pi_J(X)}\right]$$

Proportional Odds Model

A model that simultaneously uses all cumulative logits is:

$$logit\left[p\left(Y \leq \frac{j}{x}\right)\right] = \boldsymbol{In}\left[\frac{\pi_1(X)+\pi_2(X)+\cdots+\pi_j(X)}{\pi_{j+1}(X)+\pi_{j+2}(X)+\cdots+\pi_J(X)}\right] = \alpha_j + \beta_1 x_i + \cdots + \beta_p x_p = \alpha_j + \beta^T X$$

Where y is food security status (secure, mildly insecure, moderately and severely insecure)

X_1 is family size, X_2 is formal education, X_3 is age ..and X_P is major type of UA practicing

Each cumulative logit has its own intercept. The α_j are increasing in j, since P(Y$\leq J/X$) increases in j for fixed X , and the logit is an increasing function of this probability. It is based on the assumption that the effects of the independent variables x1 ,x2...xp are the same for all categories, on the logarithmic scale.

The Wald Statistic: The Wald statistic was an alternative test, which is commonly used to test the significance of individual logistic regression coefficients for each independent variable (that is to test the null hypothesis in logistic regression model that a particular logit coefficient is zero). If for a particular explanatory variable or group of explanatory variables, the Wald test is significant, then we

would conclude that the parameters associated with these variables are significantly different from zero, so that the variables should be included in the model.

Both qualitative and quantitative outputs of the analysis are systematically presented, tabulated, and triangulated for better understanding in the result section of the paper.

CHAPTER 4: RESULT AND DISCUSSION

This part of thesis deals with presentation, analysis and interpretation of data. The data obtained through the questionnaires, observations, interviews, achievement test were presented, analyzed and interpreted so as to answer three basic research questions raised. The organization of this chapter is based on the themes of the specific objectives and result questions. The chapter starts with information on the demographics of the research respondents, present statistical analysis and provides explanation for statistical outputs. Descriptive and inferential statistics are included depending on the requirement of each topic under discussion accompanied with triangulation of variables and results to provide a detail perspective on the food security. In addition , Statistical package for social sciences SPSS version 20, which help the researcher to convert the activity data of the organization into table, graphs, charts have been applied to analyze the data and also the determinants of food security are presented in this chapter using Ordinal logistic regression model.

4.1. Demographics of the sample

4.1.1 Household headed and age

In the study, 195 participants or households were surveyed through questionnaires and conducted households engaged in urban agriculture. Of those households 79% were male headed household while 21% of them were female headed household. This revealed that majority of the households were male headed. Concerning sex of respondents 79.0 % of the respondents were male and 21% of them were females. Regarding age of respondents, age distributions of the household members varied highly and the lowest proportion household's age was in the age group of 20-30 years. The age of respondents ranged from 20-30 years to above 50 years and the age group 31-40 consisted of 51.3 % of the respondents. This indicates that the proportion of households was high on group of ages lie between 31-40 years representing 51.3%. And also the age group 20-30 consisted 7.2% of the participants. Which indicates that the proportion of households was less on group of ages lie between 20-30 years representing 7.2%.

Table 2: household's sex and age

Variables	Category	N	Percentage (%)
Household head	Male headed	154	79.0
	Female headed	41	21.0
	Total	195	100
Age	20-30	14	7.2
	31-40	100	51.3
	41-50	50	25.6
	Above 50	31	15.9
	Total	195	100

4.1.2 Marital status and religion

For the study, the marital statuses of the respondents 86.2 % respondents were married and 13.8% were unmarried. This demonstrates that majority of the respondents were married. With regards to religion, majority of households were orthodox believers or followers representing 55.9% while the minorities of them were protestant followers representing 19.5%.

Table 2: Respondents by marital status and religion

Variables	Category	N	Percentages (%)
Marital status	Married	168	86.2
	Unmarried	27	13.8
	Total	195	100
Religion	Muslim	48	24.6
	Orthodox	109	55.9
	Protestant	38	19.5
	Total	195	100

4.1.3 Educational level and monthly income range

For the study, monthly income range 26.7 % of respondents got monthly income ranging from ETB 2000 and less, while 31.8 % of the obtained monthly income ranges from 2000 to 4000. On the other hand, about 26.7% of respondents had a monthly income ranging from ETB 4001 to 6000 and 18.46% of urban farmers had a monthly income ranging from ETB 6001 to 8000. The rest 14.9 % of

respondents got monthly income greater than 10,000 ETB.

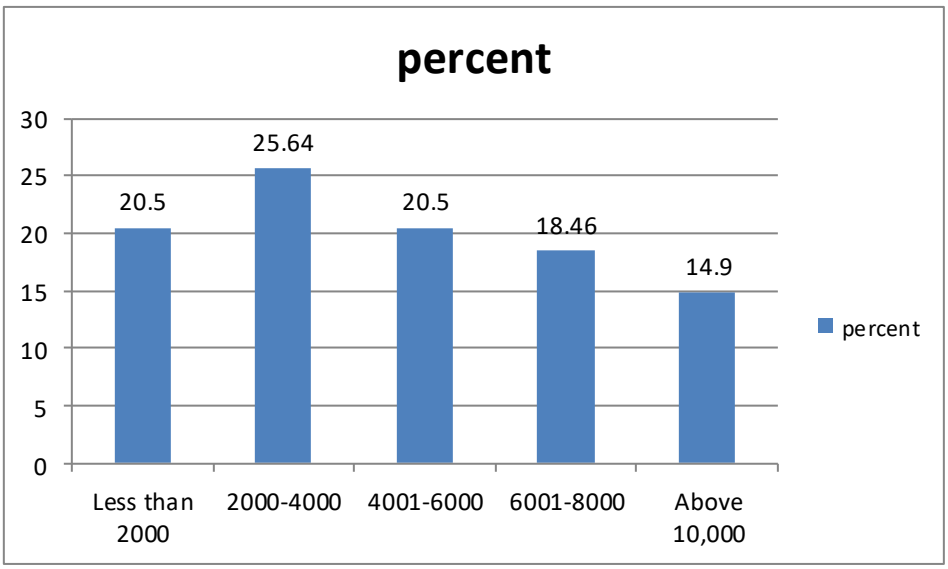


Figure 3: Monthly Income Range of Respondents

Among the farmers/ respondents, it was showed that 92.8% of the urban farmers have at least attended primary education (50.3% attended secondary education, 9.7% attended primary education, 13.3% have diploma and TVE college, 19.5% have university degree and above) and 7.2% of urban farmers or respondents were not attended education (uneducated) but they can write and read.

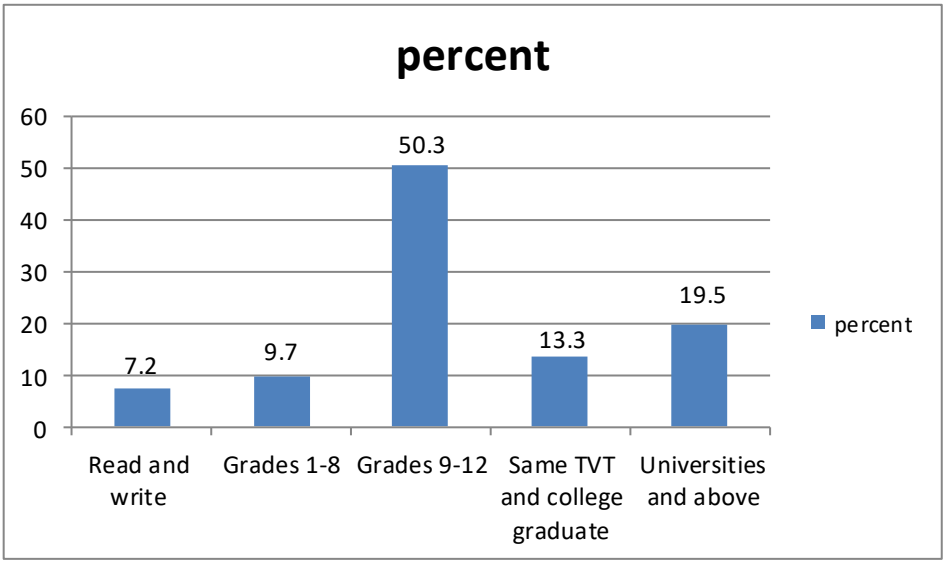


Figure 4: Education Levels of Respondents

4.1.4 Family size and formal education

In this study, both variables namely family size and number of household members attended formal education are continuous variables. The average or mean family size was 5.71 with the minimum size of the household was one and the maximum number of members in a single household was 10. And also, the average number of household members attended formal education was 4.89 with the minimum number of the household member was one and the maximum number of members in a single household was 10.

4.2. Food security status of house holds

4.2.1. Household food insecurity access -related conditions

HFIAS was used in this study to assess urban agriculture engaged respondents' status of food security (taking into consideration one component of food security: access). The respondents' food security situation was assessed against the nine HFIAS questions recommended by FAO. It has 9 generic questions and each of the questions asked has a recall period of four weeks (30 days). The reply initially asked if the condition in the question had occurred in the last four weeks, and if so, how often (yes or no). In cases when a responder replies "yes" to an occurrence question, he or she is asked how often the condition has occurred in the last four weeks (Coates, Swindale, and Bilinsky, 2007). But if the respondent said no to the first question, there was no need to go to the second. First, the date should be coded frequency-asked-questions as 0 for all cases where the answer to the corresponding occurrence question was no, and then the score is calculated for each individual by summing up the codes for each frequency-of-occurrence question. If the individual response to all nine frequency-of-occurrence questions was "sometimes," the code would be 2. As a result, a maximum score of 27 is possible, and a minimum score of 0. Therefore, the higher the score, the more food insecure (access) the individual is. Individuals HFIAS in the past four weeks who scored lower on this scale reported fewer instances of food insecurity (access to food).

As can be observed in Table 3, 48.2% of respondents were food secure, while 23.1% and 28.7% of them were mildly and moderately food insecure respectively. The food insecurity status of irrigation adopters in the current study is in line with but greater to some extent than in the study conducted (Girma Zewdie,2019) which states as (15%) are food secure, (18.5%) are food insecure without hunger, (31.7%) are food insecure with moderate hunger and (34.8%) are food insecure with severe hunger. The contribution of urban agriculture to food security and nutrition is probably its most important asset (Rene Van Veenhuizen, 2000). Renewed interest in looking at alternative strategies for improving urban livelihoods, for income generation and for urban food security and nutrition among others has

arisen with the increase in urban poverty, food insecurity and malnutrition now seen as shifting from rural to urban areas. Many urbanites have turned to UA as a livelihood strategy and source of income and in most countries complements rural agriculture and increases the efficiency of national food system (FAO, 2007).

As in point the translation of words of one of Key informants operating urban agriculture on the contribution of urban agriculture to ensure food security was set as follows:

'…. Most of urban agriculture participants were primarily poor households.UA mostly helped engagers to improve households' food security status, income generation and in creating job opportunities. In addition, UA helped in improving diet diversity consumed among households."

Table 3: 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)	Some times (2)	Often (3)
1. In the past four weeks, did you worry that your household would not have enough food?	**125**	**70**	**24**	**45**	**56**
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?	**45**	**80**	**22**	**23**	**-**
3. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	**101**	**94**	**45**	**56**	
4. In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	**100**	**95**	**44**	**38**	**18**

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**	**150**	**45**	**0**	
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**	**101**	**45**	**0**	**0**
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?	**0**	**195**	**0**	**0**	**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**	**195**	**-**	**-**	**-**
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**	**195**	**-**	**-**	**-**

4.2.2. Household food insecurity access – prevalence

The HFIAS prevalence, a categorical indicator of food insecurity access scale was computed for the study target groups.

Table 4: Prevalence of Food Insecurity in the study area 2021

HFIAS category	**Number of respondents**	**% from the total respondents**
Food secure	94	48.2%
Mildly food insecure	45	23.1
Moderately food insecure	56	28.7

Severely food insecure	0	0
Total	195	100.0

Result showed us 33.8% believed that urban agriculture helped them to meet variety of food needs for daily consumption and the rest replied it was not sufficient to meet their daily varieties of food needed. Around 47.2% of respondents replied that UA helped them to meet all year-round food requirements and 22.6% said that UA they producing were unable to cover year-round food requirements for their households (Table4.3). 23.6% of respondents said that they face shortage of food for three (June to August).

4.2.3. Contribution of UA to Households

Table 5: Contribution of UA to Households

Variables	Responses	N	%
Does urban agriculture helped you to meet variety of food needed daily?	Yes	66	33.8
	No	129	66.2
	Total	195	100
Do you meet all year-round food requirements of your household members from own production?	Yes	92	47.2
	No	44	22.6
	Total	136	69.7
Would you tell us the specific time when food shortage occurs?	whole year	14	7.2
	nine months(March to November)	13	6.7
	six months(December to may)	19	9.7
	three months(June to August)	46	23.6
	Missing system	103	47.2
	Total	195	100

The result showed that 72.8% of respondents replied their income was increased by urban agriculture they engaged in, but 27.2% of them responded that there was no income increment by urban agriculture

they engaged in.(figure1). This study supports findings of Egal et al (2001) which stated as at the household level, UA is a source of income, provide direct access to a bigger number of nutritionally richer foods (vegetables, fruit, and meat) and hence increase diet diversity. additionally, UA can increase the steadiness of household food consumption against seasonality or other temporary shortages, and may increase the time mothers spend taking care of their children, as opposition non-agricultural activities which are more likely to be located further far from home. Another important advantage of UA is its role in poverty alleviation. Unemployed and partially employed persons, youth, home-bound mothers, and elderly persons can supplement family food and income through small-scale farming. UA, therefore, is a very important antidote to urban unemployment because it alleviates urban poverty among people who have migrated to town but cannot find gainful employment in some cases; UA can have advantages over rural agriculture thanks to its proximity to the urban market and proximity to selling points of inputs. Both conditions are critical where transport infrastructure is insufficient and transport costs are high. Proximity to the market may be a natural advantage for producing perishable crops (fruits and vegetables, flowers) and "perishable livestock products (for example, dairy produce, pork, poultry). (Jacsmit et al,1996).

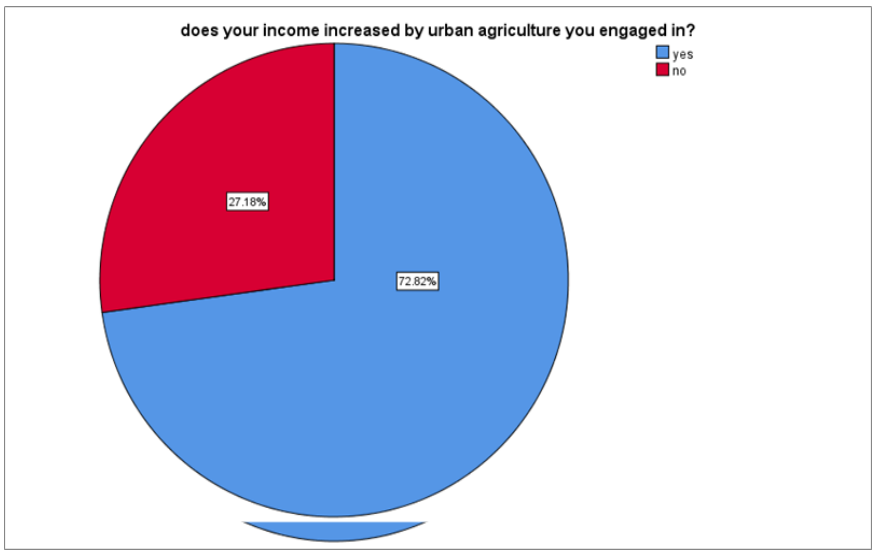


Figure 5: Impacts of Urban Agriculture on Household's

3.6% of respondents perceived that engagement in urban agriculture helped them to their households to became food secure and 49.7% of respondents replied that whether or not they were engaged in urban agriculture, they perceived that their households were food insecure. this idea align with the findings of (Ayaga, .et al., 2005) which says employment and income provided by UA also offers the potential to

alleviate food insecurity. the first effect is thru non-wage employment of urban farmers themselves and members of the family and neighbors within the busy season further as food processors and distributors, mostly within the informal sector. It appears that relatively few paid jobs exist in UA beyond the intensive, commercial sector that exists around many cities producing livestock and dairy products in addition as horticultural and floricultural products.

4.3. Urban Farming Practices

4.3.1. Farm Experiences of Households

UA (UA) is that the growing of plants and therefore the raising of animals for food and other socioeconomic purposes within and around cities/towns, including related activities like the assembly and delivery of inputs, processing and also the marketing of products. Unlike rural agriculture, UA is integrated into the urban socioeconomic and ecological systems, embedded in and interacting with the urban ecosystem, uses urban residents as laborers, uses typical urban resources (like organic wastes and wastewater for irrigation), links directly with urban consumers, has direct impacts on urban ecology, is competing for land with other vital urban functions, and is influenced by urban policies and plans (UNESCAP, 2012; www.ruaf.org/urban-agriculture).

Result indicated that majority of respondents (72.3%) are engaged urban agriculture since five years or they need experience but five years. About 21% of households have an experience five to 10 years in urban agriculture.

A case in point is the translation of words of FGD/focus group discussion on the types, area of production and aims of production in the study area as follows:

'.....Among the major types of AU practiced in the study area were: livestock production, crop production and poultry production were the main types practiced and this UA types were practiced along riverside, home garden areas ,in backyards and in urban fringe areas. Concerning aims of production were for both household's consumption and marketing purpose; some of producers only produce for consumption only."

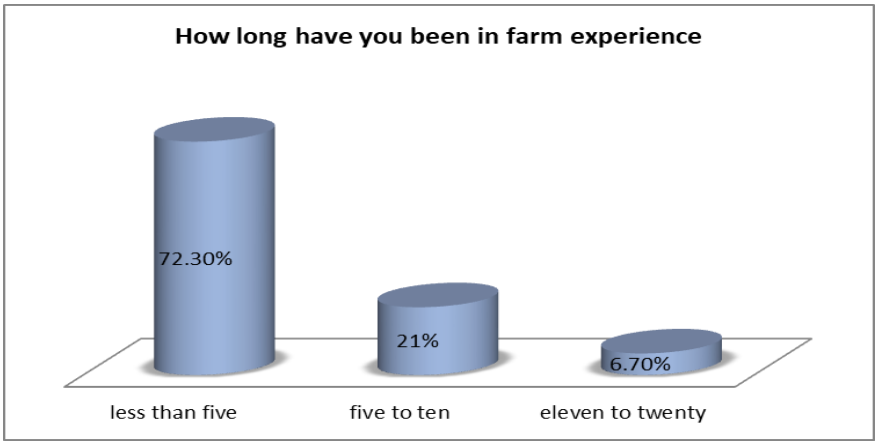


Figure 6: Farm Experience of Households

33.3% of respondents replied that they engaged in urban agriculture for household consumption and most of respondents (60%) engaged in agriculture for both household consumption and marketing purpose. The rest 6.7% of respondents work on UA for marketing purpose only. Majority of respondents (54.4%) carried out urban agriculture along river side, while 31.8% did in backyards and 7.7% and 6.7% carried out in home garden area and in urban fringe areas respectively (Table 4.4) 33.8%, 20.5%, and 13.3% of households engaged in crop production, poultry, and livestock production. 33.8% of respondents in crop production, 20.5% and 13.3% of respondents were participating in poultry and livestock production. This finding align with finding of (Mekuria Delelegn and Messay Mulugeta,2018) which stated as most UA practitioners in capital of Ethiopia and also the small towns in close proximity are low-income earners who practice UA mainly for survival and achieve a mix of nutritional and socioeconomic benefits. UA in and round the city involves livestock keeping, predominantly dairy cows, sheep and chickens; egg production and also the cultivation of rain-fed and irrigated crops, mainly vegetables but also cereals and pulses, on homesteads, river banks, school compounds and other open fields. The UA sector in national capital and also the surrounding towns comprises individuals; farmers organized in micro-enterprises, cooperatives and some commercial enterprises. The place for UA during this area can generally be divided into two categories: the primary category is farming on backyard and open spaces around houses and riversides; while the second category is found in 134 peri-urban areas (outskirts) within the traveling distance from residence to farmlands.

Table 6: Farms Practice Status of Respondents.

Variables	Response	N	No in %
Purpose for engaging in UA	For household consumption	65	33.3
	For marketing	13	6.7
	For both	117	60.0
	Total	195	100%
Where do you carried out UA?	Along river side	106	54.4
	home garden area	14	7.2
	in backyards/in open space	62	31.8

	in urban fringe areas	13	6.7
	Total	195	100.0
The major types of UA you are practicing	livestock production	26	13.3
	crop production	66	33.8
	poultry production	40	20.5
	Total	132	67.7

4.4. Constraints of urban Agriculture

4.4.1. Lack of Access to Resources

Results showed that 72.3% of respondents have land resources used for urban agriculture and 27.7% replied they didn't have land resources used for farm. Majority of respondents got land resources from land shared for sharecropping. In some extent respondents raised that there was scarcity of land for UA (table 4.5).This finding supports the idea raised in findings of Jac Smit etal,(1996) which stated joined of the foremost important constraints to UA is that the limited availability and poor access to the fundamental inputs to agricultural production (that is, water, land, seeds, and fertilizers) also because the necessary facilities and services to adequately process and store agricultural products and transport them to available markets. Another key constraint is insufficient access to credit. this concept of finding align the concept raised in findings of Drescher et al. (1999), the foremost critical institutional constraints to urban agriculture include lack of access to farming land in addition on farming inputs like seeds, fertilizer, pesticides, and implements. Urban food markets are often designed, sometimes since colonial times, to import food from rural areas, while the input producing businesses also are oriented towards serving rural agriculture. Thus, both the input and output market systems and infrastructure often favor rural agriculture (UNDP, 1996).

Table 7: Constraints of Urban Agriculture

Variables	Responses	N	%
Do you have natural capitals or land resource for UA?	Yes	141	72.3
	No	54	27.7
	Total	195	100.0
How do you get natural capitals or land resource for UA?	Through land distribution	13	6.7
	inherited from parents	13	6.7
	Purchased	6	3.1
	Sharecropping	124	63.6
	Total	156	80.0
What happened to the size of land holding over the last decades	Decreasing	9	4.6
	No change	145	74.4
	Total	154	79.0
How do you rate the sufficiency of your land holding for farming?	Scarce	66	33.8
	Sufficient	99	50.8
	Others	25	12.8
	Total	190	97.4
Do you have enough storage area for your product	Yes	64	32.8
	No	105	53.8
	Total	169	86.7
Do you have lack of additional fodder and water to livestock? Indicate their level of importance?	High	36	18.5
	Moderate	88	45.1
	Total	124	63.6

4.4.2. Institutional or organizational constraints

Concerning institutional constraints there was a perception that indicates government policy was highly important but there was less concerns regarding inclusion of UA in urban planning. Additionally, to the current there have been moderate prevalence's of diseases, thus veterinary services to livestock rising were in medium. 69.2% of respondents replied that there have been supports from government institutions. Consistent with Mougeot (2001), lack of positive government policy on and recognition of

urban agriculture as a viable sector are prevalent in most developing countries. Most policies on agriculture, food, health, nutrition and environmental policies are silent on urban agriculture. Lack of official recognition of urban agriculture often results in a sense of insecurity among urban farmers, thereby limiting their commitment to investment during this sector. Similarly, some credit agencies, researchers, development agencies and market agents generally don't view urban agriculture as a major industry (UNDP, 1996). As a consequence, the sector's benefits don't seem to be being fully realized by those urban populations who require nourishment.

Table 8: Institutional or Organizational Constraints

Variables	**Responses**	**N**	**%**
Does government and policy support for your urban agriculture? Indicate their level of importance?	High	119	61.0
	Moderate	40	20.5
	Low	31	15.9
	Total	**190**	97.4
How does disease prevalence and veterinary service to livestock rising? indicate their level of importance	High	6	3.1
	Moderate	104	53.3
	Total	110	56.4
Does government supports in your agricultural activities?	Yes	135	69.2
	No	39	20.0
	Total	174	89.2

4.5 Determinants of Household's Food security

We employed ordinal logistic regression analysis to determine factors affecting household food security phenomenon. We hypothesized independent variables were expected to affect the household food security. The result of the ordinal logit analysis of the hypothesized independent variables which were expected to affect the household food security is provided in Table 14.

4.5.1 Model Fitting Information

Table 9: Model fitting Information

Model	-2 Log 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 model fitted with independent variables and -2log-likelihood for null model (at step 0, before any variables have been added to the model) is distributed chi-square with degrees of freedom equal 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 good fit than the empty model (without any predictors).

4.5.2 Goodness-of-Fit

Table 10: Goodness of Fit Test

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

Link function: Logit.

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), that shows that model estimates are adequately fit the data. These results suggests good fit model.

Table 11 Pseudo R-Square **(**R^2**)**

Pseudo R-Square	
Cox and Snell	.486
Nagelkerke	.548
McFadden	.306

Link function: Logit.

In linear regression, R^2 (the coefficient of determination) summarizes the proportion of variance in the outcome that can be accounted for by the explanatory variables, with larger R^2 values indicating that more of the variation in the outcome can be explained up to a maximum of one. For logistic and ordinal regression models it not possible to compute the same R^2 statistic as in linear regression, so three approximations are computed instead (see table 13). Here, the pseudo R^2 values (e.g. Nagelkerke = 54.6%) indicates that all explanatory or independent variables explains a relatively high proportion of the variation between food security status. The above result revealed that the predictive power of the fitted model is 54.8% assessed through Nagelkerke R^2 (pseudo R^2). This shows that 54.8% of the variation in the dependent variable is explained by the model.

4.5.3. The Determination of Household's Food security

Table 12: The Determination of Household's Food security

Parameter Estimates

	Estimate	Std. Error	Wald	Df	Sig.	Odds ratio	95% Confidence Interval OR	
							Lower Bound	Upper Bound
Intercept= 1	4.6980	1.7550	7.1650	1	0.007			
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
Family size in age category								
1-3 age group(ref.)								
4-6 age group	0.3005	0.1709	1.7600	1	0.078	1.350	0.9600	1.8800
7 and above	-0.2049	0.1761	-1.1600	1	0.245	0.820	0.5700	1.1500
House hold 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
Rate of Sufficiency of land holding for farm								
Scarce (ref.)								
Sufficient	0.3391	0.2236	1.5200	1	0.134	1.410	0.9100	2.2000
Other	-0.0496	0.2002	-0.2500	1	0.709	0.960	0.6700	1.5100
Fertility status for farm land								
Poor (ref.)								

Moderate	0.0062	0.1139	0.0600	1	0.895	1.050	0.8100	1.2600
Good	0.1112	0.1211	0.9000	1	0.453	1.200	0.8900	1.5100
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

A negative check in column labeled "Estimate" indicates an inverse relationship of explanatory variable with the log odds of the variable quantity. In contrast a positive coefficient indicates a positive relationship to the log odds of the variable quantity.

To interpret the parametric statistic in logistic model we used odds ratio. The percentages ratio indicates the effect of every explanatory variable directly on the chances of household food security instead of on log (odds). Estimates of odds ratio greater than 1.0 indicate that the household's food security is bigger than that for the reference category. Estimates less likely than 1.0 indicate that household's food security is a smaller amount likely than that for the reference category of every variable. So, the ultimate model presented in above Table is interpreted in terms of odds ratio as follows: The result from Table 4.10 depict that all the independent variables namely, Age, family size, formal education, household head, monthly income, marital status, educational level, mainly income source, farming experience, land access and market access were found to be statistically significant predictor for house hold food security since their significance values are less than 0.05 (5% level of significance).

The adjusted odds of house hold food secure versus the joint categories of mildly food insecure and moderately food insecure for house hold in 31-40 years age group and 41-50 years age groups were 2.50 and 1.970 more likely than that of compared to the age groups lies between20-30 years while keeping other variables in the model constant. This indicates that there is direct relationship between the odds of house hold food security and age of household head.

If the house holds family size increase, the probability of households being in a food secure would decrease by 18.39 instead of mildly or moderately food insecure while the other variables in the model are held constant. This indicates as number of house hold member or dependency increase had increased the risk of mildly and moderately food insecure. This finding in line with the finding of Idrisa et al (2008), Goshu (2016), Dawit and Zeray(2017) but disagreed with the finding of Ajaero(2017) he found households with higher number of dependents to be more food secure. And if the number households members attending the formal education is increase, the chance of being food secure would increase by 12.47 instead of mildly or moderately food insecure categories while the other variables in model are held constant.

The probability or chance of being food secures versus the combined categories of mildly food insecure and moderately food insecure for female headed households was 0.62 times less likely than that of male headed households. This result is supported by Tefera (2010) findings. Similarly, the probability of being food secures versus the combined categories of mildly food insecure and moderately food insecure for unmarried urban farmers was 0.62 times less likely than that of married farmers while the other variables in model are held constant.

The adjusted odds for urban farmers who attended high school (9-12), TVT and college graduate and university degree and above were 1.52, 1.85, and 2.13 respectively. They imply that the adjusted odds of being food secures versus the combined categories of mildly food insecure and moderately food insecure for urban farmers who attended high school (9-12), TVT and college graduate and university degree and above were 1.52, 1.85, and 2.13 more likely than the odds for households those attended elementary school (1-8), respectively, keeping other variables in the model constant. This shows that the chance of being food secure relative to mildly and moderately food insecure was increased per additional completed education of the participant (household head). This reveals that the more educated urban farmers are more likely food secure than less educated urban farmers. This is in line with previous studies by Aschalew and Ayalneh (2009) and Abdi and Ejigayhu (2012), found that a household head with advanced education level increases the chance of household attaining food security.

The probability of being food secures versus the combined categories of mildly food insecure and moderately food insecure for those households that their main income from nonagricultural activities was 0.95 times less likely than the odds for households that their main income from agricultural

activities while the other variables in model are held constant. This indicates that urban agriculture has own contribution on household food security.

The adjusted odds for households whose average monthly income range lies between 2001-4000 Birr, 4001-6,000 Birr 6001-8000 Birr and above 10,000 Birr were 1.28, 1.37,1.62 and 1.82, respectively. They imply that the adjusted odds of being food secure versus the combined categories of mildly food insecure and moderately food insecure for households whose average monthly income lies between 2001-4000 Birr, 4001-6,000 Birr 6001-8000 Birr and above 10,000 Birr were 1.28, 1.37, 1.62 and 1.82 times more likely than the odds for households whose monthly income range was less than 2000 birr, respectively, keeping other variables in the model constant. This shows that there is positive or direct relationship between household food security and monthly income range. And also we can conclude that the chance or probability of being food security was increased when the monthly income of household increased, which is similar or supported by Arene C. and Anyaeji R. (2010) findings.

The chance of being food secure instead of mildly or moderately food insecure for households who had 5-10 farming experience and 11-20 years farming experience were 1.26 and 1.30 times more likely than the odds for household who had less than five years farming experience. This also shows the positive relationship between farming experience and food security. It reveals as per additional year of farming experience, the chance of being food security was increased. The probability of being food secure compared to mildly and moderately food insecure for households who had land access for farm was 0.5 times less likely than the odds for who had no land access for farm. Similarly the chance of being food secure compared to mildly and moderately food insecure for households who had market access for their product was 0.08 times less likely than the odds for who had no market access for their product. This result supported by Regass N. (2011) in Sidama woreda southern Ethiopia showed that market access has inverse and significant effect on household food security.

Lastly the chance of being food secure compared to mildly and moderately food insecure for household who are practicing crop production and poultry production were 0.158 and 0.808 times less likely than the odds for household who are practicing livestock production. This demonstrates that those sample urban farmers with large livestock size have better chance to earn more food security when compared with crop and poultry production while the other variables in model are held constant. This study is consistent with Demeke et al (2011) findings, revealed that as the livestock resources increases, the chance of being the household to secure food increases.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The purpose of this study was to explore the contribution of urban agriculture (UA) to the household food security of urban farmers in Addis Ababa, taking Kirkos Sub city as a case study. Based on our methodological analysis, we found that 48.2% of respondents were food secure, while 23.1% and 28.7% of them were mildly and moderately food insecure respectively.

The analysis of the study reveals that the role of urban agriculture in food security is crucial**.** The contribution of urban agriculture to food security and nutrition is perhaps its most vital asset (Rene Van Veenhuizen, 2000). Since then**,** the study analysis result according to the ordinal logistic regression model revealed that each one the independent variables namely, Age, family size, formal education, household head, monthly income, legal status, educational level, mainly income source, farming experience, land access and market access were found to be statistically significant predictor for house hold food security.

Results showed that 72.3% of respondents have natural resources used for urban agriculture and 27.7% replied they didn't have natural resources used for farm. Majority of respondents got natural resource from land shared for sharecropping. In some extent respondents raised that there was scarcity of land for UA (table 4.5). This finding supports the concept raised in findings of Jac Smitetal,(1996) .One of the foremost important constraints to UA is that the limited availability and poor access to the essential inputs to agricultural production (that is, water, land, seeds, and fertilizers) still because the necessary facilities and services to adequately process and store agricultural products and transport them to available markets.

Another key constraint is insufficient access to credit. Concerning institutional constraints there was a perception that indicates government policy was highly important but there was less concerns regarding inclusion of UA in urban planning. Additionally, to the present there have been moderate prevalence's of diseases, thus veterinary services to livestock rising were in medium. 69.2% of respondents replied that there have been supports from government institutions. In step with Mougeot (2001), lack of positive government policy on and recognition of urban agriculture as a viable sector are prevalent in most developing countries.

Renewed interest in observing alternative strategies for improving urban livelihoods, for income generation and for urban food security and nutrition among others has arisen with the rise in urban poverty, food insecurity and malnutrition now seen as shifting from rural to urban areas. Many

urbanites have turned to UA as a livelihood strategy and source of income and in most countries complements rural agriculture and increases the efficiency of national food system (FAO, 2007).

Most policies on agriculture, food, health, nutrition and environmental policies are silent on urban agriculture. Lack of official recognition of urban agriculture often results in a sense of insecurity among urban farmers, thereby limiting their commitment to investment during this sector. Similarly, some credit agencies, researchers, development agencies and market agents generally do not view urban agriculture as a big industry (UNDP, 1996). So, the concerning bodies should be applied the above constraints solution.

5.2. Recommendations

The finding discussed that there is food insecurity prevalence among urban agriculture engaged households therefore this needs additional supports and increasing intensity of urban agriculture types by governmental institutions (especially Addis Ababa Urban Agriculture Bureau) and NGOs. Urban agriculture stakeholders should continuously provide a technical advice, improved agricultural inputs and other necessities for those urban households engaging in urban agriculture. The farmers should be supported by providing functional, practical, and productive education and improved agricultural technologies, supplies and improved access to markets, as well as building the capacities of the local offices of urban agriculture through training to develop extension experts. There were input problem mainly animal feeds for livestock; thus, this need supports and interventions of governmental institutions mainly Addis Ababa Urban Agriculture Bureau in coordination with Federal Ministry of Agriculture.

Resources constraints like land, availability of water and storage facilities should be available by government and NGO's.

Institutional constraints like less attention for agricultural office, in accessibility of credit should be solved by Addis Ababa city government. The Addis Ababa UA bureau should be the responsibility to initiate and encourage concerned bodies to give appropriate attention to urban farming. Finally, Collaborations of governmental offices are needed to solve UA engaged farmers to enhance the food security status of urban residents.

References

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.*

Ajaero C.K. (2017). *A gender perspective on the impact of flood on the food security of households in rural communities of Anambra State, Nigeria. Food Security, 9 (4), 685–695*

Alem Yohanes & Söderbom M.(2011). *Household-Level Consumption in Urban Ethiopia: The Effects of a Large Food Price Shock. World Development, xx(x), 146–162*

Aniedu C. (2006). *Gender factors in access and use of improved yam technologies by farmers in Southeastern Nigeria. Unpublished PhD thesis*

Arene, C.; Anyaeji, R. *Determinants of food security among households in Nsukka Metropolis of Enugu*

Argenti O. (2000). *Feeding the Cities: Food Supply and Distribution. Achieving Urban Food and Nutrition Security in the Developing World. IFPRI, 2020 Focus 3*

Armar-Klemesu (2006). *Urban Agriculture and Food Security, Nutrition and Health. Pap 4 Baumgartner, B., & Belevi, H. (2001). A Systematic Overview of Urban Agriculture in*

Aschalew F, Ayalneh B. *Determinants and dimensions of household food insecurity in Dire Dawa Town, Ethiopia. East Afr J Sci. 2009;3(2):134–41.*

Bryld E. (2003). *Potentials, Problems, and policy implications for urban agriculture in developing countries. Agricultural and Human values 20:79-86.*

CSA (Ethiopia) 2005. *Statistical Abstract of Ethiopia. CSA, Addis Ababa, Ethiopia. CSA (Ethiopia) 2012. Statistical Abstract of Ethiopia. CSA, Addis Ababa, Ethiopia.*

Daniel Senkgoa, (2006), *A Socio-economic Analysis of urban agriculture in S.A.*

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

Davies, S. (1996). *Adaptable Livelihoods: Coping with Food Insecurity in the Malian Sahel.*

Dawit D. and Zeray N. (2017). *Determinants of rural household food security in Wolaita Zone: the*

case of Humbo Woreda. Journal of Poverty, Investment & Development 32, 65-82

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.*

Demeke AB, Keil A, Zeller M. *Using panel data to estimate the effect of rainfall shocks on smallholder's food security and vulnerability in rural Ethiopia. Climate Change 2011;108:185–206.*

Dereje Alemu, Margaret P. and Wubetu Buta (2007). *Socio-Economic Analysis of Homeless Population in Urban Areas a Case Study of Northern Ethiopia.*

Developing Countries. Swiss Federal Institute for Environmental Science & Technology Bryceson D. and Potts (2005*), Lynch et al.(2001) African Urban Economies: Viability, Vitality or Drescher et al. (1999), constraints of urban agriculture in cities.*

Drescher, A.W., 1996. *Urban microfarming 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.*

Egal, F, Valstar, A. and Meershoek S. (2001) *Urban Agriculture, Household Food Security and Nutrition in Southern Africa, Mimeo, FAO: Rome*

Ejigayhu S, Abdi-Khalil E. Determinants of food insecurity in Addis Ababa City, Ethiopia. *J Econ Sustain Dev. 2012;3(3). www.iiste .org ISSN 2222–1700 (Paper) ISSN 2222–2855.*

Emodi A. (2009). *Analysis of rice innovation system in Southeastern Nigeria. Unpublished PhD research findings seminar. University of Nigeria Nsukka*

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

FAO (2002). *Food security and trade: an overview. In Trade and Food security: Conceptualizing the Linkages Expert Consultation. Rome 11–12 July 2002. 49*

FAO (2004). *The Status of urban agriculture in developing countries.*

FAO (Food land Agriculture Organization of the United Nations).2001.*the special programfor food security, urban and peri-urban agriculture, A briefing guiding for the successful*

implementation of Urban and Peri urban agriculture in developing countries of transition, Rome ,Italy

FAO, (2010) Fighting poverty and hunger. *What Role for urban agriculture? August 2010.*

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

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

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

Garrett J. and Maugeut, (2000) Overview. *Achieving Urban Food and Nutrition Security in the developing World. IFPRI, (2020) Focus 3. Brief 1 of 10. Washington.*

Goshu M.T. (2016). Determinants of Rural Food Security and Child Nutrition: *The Case Study of Gubalafto District of Amhara Regional State, Ethiopia (Unpublished PhD thesis). Department of Economics, Aligarh Muslim University Aligarh, India*

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

Hovorka et al (2009). *Women Feeding Cities: Mainstreaming Gender in Urban Agriculture and Food Security. Practical Action Publishing Ltd. U.K. Pp 5-20.*
https://population.un.org/wup/Download/.

Hubert de.B. (2010). *Overview. Sustainable Urban Agriculture in developing countries.*

Idrisa Y.L., Gwary M.M. and Shehu H. (2008). *Analysis of food security status among farming households in Jere Local Government of Borno State, Nigeria. Agro-Science, 7 (3), 199-205*

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.*

Jac Smit, Annu Ratta and Janis Bemstein.1996. *Urban Agriculture An Opportunity for 4*

Environmentally Sustainable Development in Sub-Saharan Africa

Koc, R. MacRae, L. J. Mougeot, & J. Welsh, For Hunger - *Proof Cities (p. 252). Ottawa: International Development Research Institute.*

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

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 Agbamu, J. U. (2006). Essentials of Agricultural Communication in Nigeria*

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

Mekuria Delelegn and Messay Mulugeta,2018. *The Status of Urban Agriculture in and Around Addis Ababa, Ethiopia.*

Mireri et al (2006). *Urban Agriculture in East Africa: Practice, challenges and Opportunities.*

Mkwambisi et al (2011). *Urban Agriculture and Poverty Reduction: Evaluating How Food Production in Cities Contributes to Food Security, Employment and income in Malawi: in Journal of International Development.*

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

MoFED (Ethiopia*) Fiscal year Report 2010/11.*

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

Mougeot, L. (2000). *The Concept of Urban Food Security, For Self-reliant Cities: Urban Food Production in a Globalizing South. In L. J. Mougeot, For Hunger- Proof Cities (p. 34). Ottawa:*

Mougeot, L. (2000). *The Concept of Urban Food Security, For Self-reliant Cities: Urban Food Production in a Globalizing South. In L. J. Mougeot, For Hunger- Proof Cities (p. 34). Ottawa: International Development Research Institute.*

Mougeot, L. (2005). *The Social, Political and Environmental Dimensions of Urban Agriculture.*

Mougeot, L. (2006). *Growing Better Cities: Urban Agriculture for Sustainable Development.*

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

Njogu, E. W. (2008). *Household Food Security Among Urban Farmers in Nairobi, Kenya. In M. Redwood, Agriculture in Urban Planning: Generating Livelihoods and Food Security (p. 17).*

Nugent (1999). *Measuring the Sustainability of Urban Agriculture. For Hunger-proof Cities: sustainable Urban Food Systems. M. Koc, Rod M., L. J. A. Mougeot and J. Welsh (eds). IDRC.Ottawa, Canada.*

Okolo D. (2006). *Agricultural development and food security in Sub-Saharan Africa: The case of Nigeria, FAO working paper No. 5.*

ORAAMP (2000). *Urban agriculture in Addis Ababa. Addis Ababa city Council, Addis Ababa, Ethiopia.*

ORAAMP 1999. *Land use and city structure studies of Addis Ababa and the Metropolitan area: Executive summary report. Addis Ababa city Council. Addis Ababa, Ethiopia. Ottawa, Canada: International Development Research Center.*

Parrot L. (2010) *Urban and peri urban horticulture and the capability approach, the case of Cameroon. 50*

Policy Challenges*". (IDRC), Ottawa, Canada.*

Prain G. (2006): *Urban harvest: A CGIAR global program on UPA. UPA in the Asian and Pacific region. Available at: http:/www.agnet.org/activities.sw/2006/ 2010.*

Ravallion (2001) and Godrland et al., (2004): *Econometric Analysis, 5th Ed, Washington DC. Renevan V. (2006). Cities Farming for the Future; Urban Agriculture for Green and Productive Cities, RUAF Foundation.*

Regass N. *A small holder farmers coping strategies to household food insecurity and hunger in Sidama Woreda Southern Ethiopia. EJESM. 2011;4(1):39–40.*

Richards, J., & Godfrey, S. (. (2003). *Urban Livestock Keeping in Sub Saharan-Africa.*

S. and Stringer, L.C., 2013. *Is rainfall really changing? Farmers' perceptions, meteorological data, and policy implications. Climate and development, 5(2), pp.123- 138.*

Salau E. and Attah A. (2012). *A Socio-Economic Analysis of urban agriculture in Nasarawa State, Nigeria, www.patnsukjournal.net/currentissue.*

Schmidhuber, J., & Tubiello, F. N. (2007). *Global Food Security Under Climate Change. 6.*
Shahidur R, .Khandker, *Gayatri B.Koolwal and Hussain A.Samad (2010). Handbook on Impact*

Shahidur R., Gayatri B. and Hussain A. (2010): *Handbook on Impact Evaluation, Quantitative Methods and Practices, The World Bank, Washington Dc..*

Simelton, E., Quinn, C.H., Batisani, N., Dougill, A.J., *Dyer, J.C., Fraser, E.D., Mkwambisi, D., Sallu, State Nigeria. Pak. J Soc. Sci. 2010, 30, 9–16.*

Tefera, M.Messay (2010). *Food security attainment role of urban agriculture: A case study of Adama town Central*

Tewodros F. (2007).*Livelihood Dependence on Urban Agriculture in Addis Ababa, Ethiopia.*

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

UN Habitat (2013). *State of the World's Cities 2012/2013: Prosperity of Cities (p. 207). UNDP (1996). Urban Agriculture: Food, Jobs, and Sustainable Cities. UNDP, Volume One.*
UN. Population Division of the United Nations' *Department of Economic and Social Affairs. World Urbanization Prospects: The 2018 Revision. 2018. Available from:*

UNDP (2010). *The input and output market systems and infrastructure in developing countries. 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. (2006), *Cities farming for the future, in: van Veenhuisen René (Ed.), Urban*

agriculture for green and productive cities, RUAF Foundation, IIRR, IDRC, Ottawa, Canada, pp. 117.

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.*

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

Yonas Alem (2011), *Essays on Shocks, Welfare, and Poverty Dynamics: Micro econometric Evidence from Ethiopia. ISSN 1651-4297 online, Sweden.*

Appendices

Appendix 1: Household Questionnaire for Contribution of Urban Agriculture to food Security in Addis Ababa

Introduction, Confidentiality and Consent:

My name is Firew Dereje I am a student in Addis Ababa University college of development Studies I am undertaking research entitled: **To explore the contribution of urban agriculture to household's food security of urban farmers in Kirkos Sub City, Addis Ababa, Ethiopia** Please, answer the questions that follow by ticking the appropriate option (if provided) or writing unrestrictedly for open-ended questions. Please answer all questions freely, but objectively.

So, your genuine, honest and timely response is vital for the accomplishment of this study on time. Therefore, I kindly ask you to give your response to items/questions carefully. Finally, I confirm you that the information that you share with me was be kept confidential and only used for the academic purpose. Your honest answers to these questions will help us better understand the existing 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 _____kebele_____
2. Age of respondent____ 1) 20-30 2) 31-40 3) 41-50 4) 51 and above
3. Sex of respondent 1) male 2) female
4. Family size female _____ male _____ total_____

5. Family size in age category: 1. 1-3 2. 4-6 3.7& more
6. Number of Household members attending formal education: 1) Male ___ 2) ___ 3) Total___
7. Household type 1) Male headed 2) Female headed
8. Marital status of household 1) Married 2) Unmarried 3) Divorced 4) Widowed 5) Other
9. Education level of household? 1) Read and write 2) Grade 1 to 8 3) Grade 9 to 12 4) Same TVT and college graduate 6) University degree and above
10. Religious;1) Muslim 2) Orthodox 3) Protestant 4) Waqefata5) Catholic
11. Main householder income source? 1) From agricultural activity 2) 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) 4,000 – 6,000 4) 6,000 – 10,000 birr 5) above 10,000 birr
13. How long have you been in farm experience? 1) Less than 5 2) 6 to 10 years 3) 11 – 20 years 4) Over 20 years

Contributions of urban agriculture to household food security in the study areas

14. Why you are engaging on urban agriculture? 1) For household consumption 2) For marketing purpose or sale 3) both
15. If you engaging urban agriculture for home consumption; according to your own self-assessment, is your household food secure? 1) Yes 2) No
16. If your answer is “Yes” for question 15, does your urban agriculture meet variety of food needs for daily consumption; vitamin, protein and carbohydrate? 1) Yes 2) No
17. If your response is "Yes” for Question 16, do you meet all year-round food requirements of your household members from own production? 1) Yes 2) No
18. If your response is "No" for Question 17, why? 1) No place to produce more food 2) no supports from government 3) less accesses of inputs
19. Is there a time of a year when your household encounters shortage of specific foods?

1) Yes 2) No

20. 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)

21. Do you afford to buy food stuffs from market to meet food requirements for your household consumption? 1) Yes 2) No
22. Does any of your household members work in non-crop production and livestock herding activities? 1) Yes 2) No
23. If your response is "Yes" for question 22, in average how much they earn monthly?

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

24. According your perception urban agriculture can have environmental benefits?

    1) Yes 2) No

25. If your answer is “Yes” for question 24, how it contributes to environment? 1) by recycling wastes 2) by making green environment 3) by regulating environmental temperature
26. Does your urban agricultural create permanent and temporary job for other rather than household members? 1) Yes 2) No
27. If your response is “Yes’’ for question 26, do you specific in numbers? 1) 2 2) 3-5 3) 6-8 4) more than 8 people
28. Does your income increased by urban agriculture you engaged in? 1) Yes 2) No
29. If you response is “Yes” for question 28, what is your annual income from both crop production and livestock rearing?

	List of crop and livestock	**oduct amount**	**ice in birr**	**tal Annual income**
	List of crops	***kg***	***ngle 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**			
	Potato			
	Tomato			
	Cabbage			
5	**From fruit tree production**			
	Mango			
	Avocado			
	Orange			
	Papaya			
	Banana			
	Sub- total of crop income			
	List of livestock production	***no_ and Liter***		***birr***
	From cow milk production			
	From Oxen fatting			
	From sheep and goat			
	From chicken for egg and meat			
	From bee keeping (Honey in Kg)			
	Sub- total of livestock production			

	Total annual income			

HFIAS in the past four weeks in households of Urban agriculture adopters

HFIAS	Occurrence		Frequency		
	Yes	No	Rarely (1)	Some times (2)	Often (3)
1. In the past four weeks, did you worry that your household would not have enough food?					
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?					
3. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?					
4. In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?					
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?					
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?					
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?					
8. In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?					

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?					

Rarely, (once or twice in the past four weeks; **Sometimes**, three to ten times in the past four weeks; **Often**, more than ten times in the past four weeks

Evaluate the current urban agriculture practice in the study area

30. Do you engaged in urban agriculture? 1) Yes 2) No
31. Do you have natural capitals or land resource for urban agriculture? 1) Yes 2) No
32. If "yes" for question 31, how do you get natural capital or land resource for urban agriculture? 1) Through land distribution 2) Shared with relatives3) Inherited from parents 4) Purchased 5) Sharecropping
33. Where do you carry out urban agriculture? 1) Along river side 2) home garden area 3) In backyards/In open space 4) In urban fringe areas 5) Roadsides
34. What are the major types of urban agriculture practicing in your farm land by you and your household members? 1) Livestock production 2) crop production 3) poultry production 4) bee keeping 5). mixed of all
35. 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
36. If you are engaging on crop production, would you tell us specific type? 1) vegetation 2) Root and tuber crop 3) Cereal crop 4) Fruit tree
37. If you are producing **cereal crop**, on which crop you are engaging and more benefiting you? specify it. 1). wheat, 2). Barley, 3). millet, 4). teff 5). mixed of all
38. If you are producing **Root and tuber crop**, on which crop you are engaging and more benefiting? specify it. 1). beet root, 2). potato, 3). carrot
39. If you are producing **vegetation crop**, on which crop you are engaging and more benefiting? specify it. 1). Cabbages, 2). tomato
40. If you are producing **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 constraints and opportunities associated with urban agriculture in the study area.

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

1) Increased 2) Decreased 3) No change

43. If your response is ‘decreasing’, to question no. 50, what were the reasons?1) Large household size 2) Decline in quality of land3) Redistribution of land 4) Expansion of urbanization 5) others
44. How do you rate the sufficiency of your land holding for farming?

    1) Scarce 2) Sufficient 3) Others
45. What is the fertility status of your farm land? 1) Poor 2) Moderate 3) Good
46. How far is your farm land from your home in minute? 1) less than 10 minute 2) 10 to 20 minute 3) more than 30 minute
47. Do you have access to credit services form micro-institutions to supplement your urban agriculture? 1) Yes 2) No
48. If you response is “No” for question 47, what is the main problem? 1) lack of collateral 2) lack of initial deposited 3) bureaucracy of credit institution
49. Do you have good market accesses for your agricultural product? 1) Yes 2) No
50. Do you have enough storage area for your products? 1) Yes 2) No
51. Does government supports in your agricultural activities 1) Yes 2) No
52. Have you share cropped and/rented out your plot to other peasants on yeekul basis?

    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. Does you have shortage of land to livestock rising? Indicate their level of importance?

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

55. Does you have lack of additional fodder and water to livestock rising? Indicate their level of importance? 1). High 2). Moderate 3). Low
56. How does disease prevalence and veterinary service to livestock rising? Indicate their level of importance? 1). High 2). Moderate 3). Low
57. How does government and policy support for your urban agricultureP? Indicate their level of importance? 1). High 2). Moderate 3). Low

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

Appendix 2: CHECKLIST FOR FOCUS GROUP DISCUSSION

1. What is the main agricultural practice in your woreda? from crop and livestock

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

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

_____

_____

_____

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

_____

_____

_____

6. Does urban agriculture support to job creation and other social interaction in your woreda?

Appendix 3: CHECKLIST FOR KEY INFORMANT INTERVIEW

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

_____

_____

2. In which kebele urban farming most common?

_____

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

_____

_____

4. Which crops and livestock are commonly produced in your woreda? Start with the most important.

_____

_____

_____

5. What are the main uses of the crops and livestock? Start with the most important.\

_____

_____

6. According your self- assessment are urban farmer in your woreda are food secured?

_____

_____

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

_____

_____

_____

8. How do you evaluate the contribution of urban agriculturefor household livelihood in your woreda? In terms of food access and income generation

_____

_____

_____

_____

_____

9. Did UA contribute to job creation in your woreda? 1) Yes 2) No
10. According your self-assessment UA can contribute to environment in your woreda? How?
    1) By waste recycling 2) by making green environment 3) by conserving nature 4) balancing environmental temperature 5) if more explain it

_____

_____

_____