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ADDIS ABABA UNIVERSITY
COLLEGE OF DEVELOPMENT STUDIES
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FOOD SECURITY STATUS OF SMALL-SCALE PERI-URBAN FARMING
HOUSEHOLDS DURING COVID-19: A CASE STUDY FROM BOLE
BULBULA AREA, ADDIS ABABA

BY

TAMENE SHENKUT EMISHAW

AUGUST, 2022
ADDIS ABABA, ETHIOPIA



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BY

TAMENE SHENKUT EMISHAW

THESIS ADVISOR

MESSAY MULUGETA (PhD)

A MSC THESIS SUBMITTED TO CENTRE FOR FOOD SECURITY STUDIES, COLLEGE
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Declaration

I, the undersigned, hereby declare to Addis Ababa University School of Graduate Studies that this thesis was a product of my primal research work, prepared under the guidance of Messay Mulugeta (PhD). All sources of materials that have been used for the thesis were indicated and duly acknowledged with complete references. I further confirm that the thesis has not been submitted either in part or in full in this or any other higher educational institute for the purpose of earning any academic degree.

Name: Tamene Shenkut Emishaw

Signature: _____

Date of submission: August, 2022

Approval Sheet

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As supervisors/co-advisors of the thesis, we certify that we have read and evaluated the thesis prepared by **Tamene Shenkut** - Entitled ‘Food Security Status of Small-scale Peri-urban farming households during COVID-19: a case study from Bole Bulbula area, Addis Ababa’ and recommend for Open defense as fulfilling the requirement for the degree of **Master of Science in Food Security and Development Studies**.

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Table of Contents

Declaration.....	i
Acknowledgments.....	iii
List of tables.....	vi
List of figures.....	vii
Acronym and abbreviations.....	viii
<i>Abstract</i>	x
CHAPTER ONE: INTRODUCTION.....	1
1.1. Background of the study.....	1
1.2. Statement of the problem.....	3
1.3. Objectives of the study.....	6
1.3.1. General objective.....	6
1.3.2. Specific objectives.....	6
1.4. Research questions.....	6
1.5. Significance of the study.....	7
1.6. Scope and limitation of the study.....	7
1.7. Organization of the paper.....	8
CHAPTER TWO: - RELATED LITERATURE REVIEW.....	9
2.1. Theoretical foundation.....	9
2.2. Concepts and definition of food security, urban farming, and COVID-19.....	10
2.3. Urban agriculture and food security.....	12
2.4. Empirical literature review and the gap.....	13
2.4.1. Factors of food security situation of small-scale peri-urban farming households.....	13
2.4.1.1. Supply of agricultural input, labor, and extension service during COVID-19.....	13
2.4.1.2. Loss of agricultural markets, value chains and income during COVID-19.....	15
2.4.1.3. Food supply and pillars of food security- situation- during COVID-19.....	15
2.4.1.4. Space for cultivation and livestock keeping.....	17
2.4.1.5. Lack of access to credit.....	17
2.4.1.6. Decline of agricultural production during COVID-19.....	17
2.4.2. Resilience of agriculture systems to Covid-19 pandemic.....	18
2.4.3. Coping strategies of farmers' to temporarily food insecurity.....	19
2.4.4. Literature gap.....	20
2.5. Conceptual framework.....	20

CHAPTER THREE: - RESEARCH METHODS AND MATERIALS	23
3.1. Description of the study area	23
3.2. Research design and approach	24
3.3. Sample size determination and sampling techniques.....	25
3.4. Data types, source, and collection techniques	26
3.4.1. Questionnaire survey	26
3.4.2. Key informant interview (KII).....	27
3.4.3. Focus group discussions (FGDs)	27
3.4.4. Secondary data review	27
3.5. Techniques of data analysis	28
3.6. Definition of variable and working hypothesis.....	30
3.6.1. Dependent variable	31
3.6.2. Independent variables	31
3.7. Ethical consideration.....	35
CHAPTER FOUR: - RESULTS AND DISCUSSIONS	36
4.1. Demographic and socioeconomic characteristics of respondents.....	36
4.2. Result of household food insecurity access scale (HFIAS)	41
4.2.1. Food security status of the respondent.....	43
4.3. Statistical analyses	44
4.3.1. Model diagnosis test results	44
4.3.2. Factors of food security situation of the respondent.....	45
4.4. Coping strategy experience of the sample respondents	49
CHAPTER FIVE: - CONCLUSION AND RECOMMENDATIONS.....	53
5.1. Conclusion	53
5.2. Recommendations.....	54
References.....	56
Appendixes	69
Appendix 1: Variables and descriptions	69
Appendix 2: Ordered logit model test (linktest)	69
Appendix 3: Ordered logistic regression estimation result for HFIAS (marginal effect).....	70
Appendix 4: Ordered logistic regression estimation result for determinant factor for household food security situations (ologit)	72
Appendix 5: Household questionnaire.....	73

List of tables

Table 1: Summary of description of explanatory variables and its expected sign.....	34
Table 2: Demographic and socioeconomic characteristics for continuous variables	37
Table 3: Demographic and socioeconomic characteristics for dummy variables.....	37
Table 4: Demographic and socioeconomic characteristics for categorical variables	40
Table 5: Result of Household Food Insecurity Access Scale (HFIAS)	42
Table 6: Food security status of the respondent (using HFIAS).....	44
Table 7: Test estimation.....	44
Table 8: Multiple ordinal logistic regressions estimation of factors of food security situation of the respondents	47
Table 9: Coping strategies experience of the respondents during COVID-19	49
Table 10: Coping Strategy response of the respondents.....	51
Table 11: Coping Strategy Index estimation result of the respondents (CSI)	52

List of figures

Figure 1:- Conceptual framework, developed by the researcher	22
Figure 2:- Map of Bole Sub-city administration showing study area	24

Acronym and abbreviations

COVID	Corona Virus Disease
CoV-2	Corona Virus-2
CSA	Central Statistical Agency
CSI	Coping Strategy Index
DV	Dependent Variable
EPHI	Ethiopia Public Health Institute
FAO	Food and Agriculture Organization
FGD	Focus Group Discussions
FS	Food Secure
GoE	Government of Ethiopia
HFIAP	Household Food Insecurity Access Prevalence
HFIAS	Household Food Insecurity Access Scale
ILO	International Labor Organization
IV	Independent Variable
KIIs	Key Informant Interviews
MFS	Moderately Food Insecure
MiFS	Mildly Food Insecure
NGO	Non- Governmental Organization
OECD	Organisation for Economic Co-operation and Development
PICs	Pacific Island Countries
SDG	Sustainable Development Goal
SARS	Severe Acute Respiratory Syndrome
SFI	Severe Food Insecure
SSA	Sub-Saharan Africa
STATA	Software for Statistics and Data Analysis
TVET	Technical and Vocational Education Training
UA	Urban Agriculture
UN	United Nations

WFP	World Food Program
WHO	World Health Organization
ECOWAS	Economic Communities of West African States

Abstract

In Ethiopia, urban agriculture is ubiquitous as before. In a recent time there has been a sizable expansion of it both in peripheries of the cities and intra-urban and vacant space of urban dwellers. The main - objective of this study - is to - investigate the food security status of small-scale peri-urban farming households during COVID-19. To achieve this objective both quantitative and qualitative approaches were- employed -in order to collect the raw data from the sample respondents through survey based questionnaire, FGDs and KII. The statistical models namely, ordered logit model and multiple ordinals logistic regressions were conducted to analyze the determinants of food security status of the households. Furthermore, HFIAS was applied to measure the food security status of households. The study result indicated that 52.13% of the respondents were food secured, 27.54% of the respondents were mildly food insecure, and 20.33% of the respondents were moderately food insecure. The study conclude that food security status of small-scale peri-urban farming households were not free from partial effect of global COVID-19. Based on the finding of this study, the following points are recommended; Woreda farmer and agricultural development office and extension agents should be provide the appropriate extension service to the households as per the set of standard and create market linkage and adopt labor-intensive technology to the farmers.

Keywords:- COVID-19, FGDs, HFIAS, Food security, Urban farming, Woreda

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Urban agriculture acts as an overarching concept for a wide compartment of agricultural activities related to urban areas, though there is variation with respect to scale, location, activities and goals (Veen, 2015). Although it depends on the population size and the quality of the farm products, an urban and peri-urban farm product has been a great role to supply food for urban dwellers.

Beside the fast growing of urbanization seen the dramatic change globally over last century, urban agriculture has gradually gained traction, with the practice of growing plants and raising animals' inter or peri-urban increasingly recognised (Sjauw, 2015). In developed countries, the growth and radical change of urban agriculture began after the end of WWII (UN, 2010).

In Africa, the urban agricultural activities and works promotes the livelihood of many urban and peri-urban low income households. Urban agricultural activities have shown significant growth in East Africa since the 1970s as a result of factors such as rapid urbanization, inexistent agricultural policies, unproductive food-distribution systems, soaring inflation, increasing unemployment, and unwisely urban land use regulations, (Mireri et al., 2006).

Most of the products of urban and peri-urban agricultural practices in Addis Ababa are mainly used for household consumption, with some portions for sale (Degefa et al., 2006). As CSA (2007) report indicates that 30% of vegetables, 60 to 70% of milk and 40 to 60% of eggs consumed in Addis Ababa have been supplied by UA products those surrounded the city.

The urban agricultural activities in the city have a role to the all four pillars of food security. UA can arouse an additional supply of product in urban areas, raising the availability of locally produced foods, (Grewal and Grewal 2012). UA sites and markets can be practiced where and when the area is food insecure and food desert, so it enables there to augment the supply of fresh products (Mack et al. 2017). Improvements in personal nutrition, health, and wellbeing have also been documented for people involved in UA activities, (Armstrong, 2000, Twiss et al. 2003,

Wakefield et al. 2007, Kortright and Wakefield 2011). UA can also be serve as a strategy to increase the food sovereignty of a city, thereby raising resilience to breakdowns in the national food supply chain which may be heightened with extreme weather events and political crises associated with climate change (Altieri et al. 1999; Grewal and Grewal 2012; Barthel and Isendahl 2013; Hamilton et al. 2014; Barthel et al. 2015).

The novel Corona Virus Disease, which has been later named coronavirus disease “COVID-19” after World Health Organization (WHO) had categorized it as a pandemic has been created an unprecedented situation globally. It was first identified in Wuhan City, Hubei Province of China in the late December 2019 (WHO, 2019). The ‘COVID-19’ pandemic has been posed a grave menace to human health, economy and food security both in developed and developing countries (Carroll, et al, 2020, Islam, et al, 2020, and Mottaleb, et al, 2020).

The COVID-19 pandemic brings on supply and demand shocks affecting all the relevant economic sectors, particularly, agriculture. The lockdown posed due to the coronavirus outbreak has been hurting the supply of labor and disrupting supply chains in the agriculture industry (Negin, 2020).

According to (FAO, 2015), that 736 million people live in extreme poverty due to lack of access enough food for eat to live normal lives, which is a root cause of ill health, as deprivation weakens their immunity. These people unable go any further disruptions to their access to food, which COVID-19 has been triggering. Even underneath an effective COVID-19 containment scenario, 14 million to 22 million people globally could slip into extreme poverty and as COVID-19 leads to widespread income losses; increasing number of consumers may not be able to afford food, enhancing the food security crisis (IPES- 2020). The World Food Programme (WFP) has been cautioning that COVID-19 can make an additional 130 million people food-insecure because of limitation of movement that shatter the transport and processing of food (Crises and G.N, 2020, WFP, 2020).

The spread of the pandemic is disrupting food systems and undermining food and nutrition security of households, (Béné, 2020; Devereux et al., 2020). According to Kibrom et al, (2020),

there are at least three means those considered as the pandemic may affect the household food security. The short historical background indicated that majority of the members of the households may be infected with COVID-19 and this has been both affected the direct economic crisis such as loss of income and exposed the society in to the indirect effects that brought expenditure of extra cost for medical treatment. Second, almost all the government declared the limitations and ban on movement work, trade, and transportation in order to reducing the spread of COVID-19 that has been disrupted livelihood activities, thereby reducing household incomes (Abay et al., 2020; Amare et al., 2020; Arndt et al., 2020; World Bank, 2020). Third, the access to get ample food has been affected with derangement to markets and food supply chains to teach people, (e.g., Aggarwal et al., 2020; Hirvonen et al., 2020; Mahajan and Tomar, 2020).

Ethiopia, did not escape from direct and indirect effects of the pandemic and attendant global crisis. The socio-economic challenges being felt across Ethiopia already has been wide-ranging and serious, with the potential to become severe, depending on the combination of the pandemic's trajectory, the effects of counter-measures and underlying and structural factors (UN, 2020). Hence, this study aims to identify the factors of food security status of small-scale peri-urban farming households during COVID-19 in the study area.

1.2. Statement of the problem

The COVID-19 had effect on losses of farmers goods, especially fresh vegetables, fruit and milk products. These losses were related with restrictions imposed by countries for movement and interactions, labor losses as well as demand reduction due to closure of restaurants, hotels etc. (Cortignani et al., 2020; Harris et al.,2020). The COVID-19 produce many threats to sustainability of agriculture sector which is very sensitive because of food supply security needs. There are also many secondary damaging outcomes of the COVID-19 pandemic on sustainability of agricultural systems across the world. There is tremendous decrease in demand for eatery and commercial food services, labour restrains, handling and production capacity of food and other agricultural products that have influence on farmers output reduction (Brewin, 2020; Ceballos et al., 2020).

The Economic Communities of West African States (ECOWAS) estimates that COVID-19 pandemic raised the risk of food insecurity and malnutrition for 50 million people between June and August 2020. This was because the pandemic was expected to trigger financial stress, inflations and sustained disruption of the food supply system. This had not only affect food availability, but also its affordability, and thus had increase food insecurity across the globe (FAO, 2020-b).

COVID-19 has been expected to affect food security directly and indirectly. Food security had affected directly by the closure of farms and food businesses due to coronavirus (Devereux et al., 2020). Thus, the direct effects of COVID-19 can be disorder of farming when the virus infects members of farming households and agricultural workers. On the other hand, indirect effects were linked to mitigation measures that bring on the farmers were unable to access farm inputs and finance. Depending on the level of strictness, government restrictions create economic hardships through reduced earnings and economic activities, leading to food insecurity and hunger (Eileen and Cosmas, 2021).

The functional structure of small-scale agricultural producers are influenced with COVID-19 pandemic because of the implementation of countries' mitigation measures to control the pandemic (e.g., confinement, social distancing, and closure of local and national borders) that disrupt spatial mobility, social networks, and production and marketing processes (Diosey, 2020).

Food insecurity had been enlarging during the pandemic, as food availability and accessibility are seriously affected in various ways (Almohamad et al, 2020). First, because of problems with transportation, distribution, and delivery the availability and accessibility of food have been more affected during the COVID-19 pandemic (Galanakis, 2020). Second, the chain of food availability and accessibility has been hugely disrupted, as the planting of crops has been delayed due to late harvesting caused by shortage of workers (Zurayk, 2020), while import restrictions have been decreased the availability of production inputs for instance, seeds and fertilizer.

In Ethiopia domestic food production has been challenges with COVID-19 which has been disruptions of supply of key agricultural input, scarcity of seeds, fertilizers, and labor exacerbating pre-existing economic, conflict, and weather food insecurity drivers (TWG-5, 2020).

In Ethiopia there are determinants of food security including economic, social, cultural and environmental conditions. Food security is a challenge in urban areas because of a confluence of factors including irregular income, limited attention to urban agriculture, lack of employment opportunities, lack of legal frameworks for urban land tenure security, lack of potable water, sustainable energy supply, housing, and education as well as health facilities among others (FDRE, 2016; World Bank, 2015). In Ethiopia, Production, productivity and market access were affected by shortage of availability of inputs (fertilizers, seeds, animal feed, phytos, veterinary products and services and so on. The COVID-19 pandemic as a systemic shock to the Ethiopian economy that result in income and employment losses and a likely increase in poverty, especially those that were positioned just above the income poverty line. The emergence of COVID-19 in Ethiopia and the likely drop in economic performance was likely to increase poverty levels by 2 million people, (UN, 2020). Findings in Ethiopia shows that the percentage of households reporting a food gap, a widely used measure of food insecurity in Ethiopia, increased by 11.7 percentage points and the size of the food gap by 0.47 months. In the country empirical evidence on the immensity of the effect of the pandemic on household food security remains scant, partly because the pandemic is still unfolding and detailed household survey data are not available yet Kibrom et al, (2020).

The COVID-19 pandemic disease is new for Ethiopia, thus there were few analytical research had done so far in Ethiopia amid COVID-19 but it was not enough because where the effect of COVID-19 was touch very slightly on agricultural sector as a general and the effect of COVID-19 specifically on urban and peri-urban agriculture thereby influence household food security was not touch. This research is therefore, an attempt to solve such source of reference gap by investigate the food security status of small-scale peri-urban farming households during COVID-19 in the study area.

1.3. Objectives of the study

1.3.1. General objective

The general objective of the research is investigating the food security status of small-scale peri-urban farming households during COVID-19.

1.3.2. Specific objectives

The specific objectives of the research are to:

- Analyze the food security status of small-scale peri-urban farming households.
- Identify the major factors of food security status of small-scale peri-urban farming households during COVID-19 in the study area.
- Describe the coping strategies of food insecurity situation of small-scale peri-urban farming households during COVID-19 in the study area.

1.4. Research questions

The study attempted to answer the following questions:

- What is the current food security status of small-scale peri-urban farming households in the study area?
- What is the current understanding of small-scale peri-urban farming households on food security status in the study area?
- What are the major factors of food security situation of small-scale peri-urban farming households during COVID-19 in the study area?
- What is the feature of agricultural production of small-scale peri-urban farming households during COVID-19 in the study area?
- How small-scale peri-urban farming households cope with food shortage in the study area during COVID-19?

1.5. Significance of the study

This study was conducted in Bole Sub-city Bole Bulbula Woreda, in Addis Ababa to investigate the food security status of small-scale peri-urban farming households during COVID-19. The output of this research was adding information to the limited research done so far on this topic. The result of this research was used to the government (Woreda, Sub-city, & National) and NGO to take the appropriate policy or strategy intervention measures to improve the performance of urban farming and achieve household food security. The study also used as a source for any person who wants to make detail investigation on the similar topic. Eventually, the findings were given valuable information for decision makers who could be understand the current situation of small-scale peri-urban farming household food security and redesign the existing urban farming policy & strategy.

1.6. Scope and limitation of the study

The study was primarily to investigate the food security status of small-scale peri-urban farming households during COVID-19 from Bole Sub-city Bole Bulbula Woreda, in Addis Ababa. The scope of this study was limited to the farming activities such as; crop production, dairy and/or poultry production, fattening, and mixed farming which were practiced at peri-urban level particularly in study area. The study was carried out at the household level and had addressed household producers.

Bole Sub-city administration has a total of 11 Woredas. Nonetheless, this research was covered only one Woreda because of limited budget and time constraints. In addition to this, the researcher encountered some problems during data gathering period. The problems were during visit of the respondent's home that unable to reach certain selected households timely due to engage various social problems so that the researcher and enumerators had to go their homes several times to find them and they also spend a lot of time talking about their own problems. Thus, with the aforementioned problems the data collection had trouble delaying. However, after ups & downs, the households were found and the information was collected.

1.7. Organization of the paper

This study consisted of five major chapters. The first chapter is an introductory part of the study, which deals with background of the study, statement of problem, objectives of the study, research questions, significance of the study, scope & limitations of the study, and organization of the study. The second chapter reviews the related literature. The third chapter deals with the research method. The fourth chapter presents result and discussion of the study. The final chapter gives of conclusion and recommendations.

CHAPTER TWO: - RELATED LITERATURE REVIEW

This chapter presents about conceptual framework, theoretical, and empirical literature review related to COVID-19 and food security. The empirical literature review on major factors of food security situation of small-scale peri-urban farming households - during COVID-19, and coping strategies of small-scale peri-urban farming households during the crisis of COVID-19 around the world and Ethiopia in particular. At the end of the chapter, conceptual framework was drawn by using the relationship between the household food security situation and the variables which have been selected from literature review.

2.1. Theoretical foundation

Food insecurity as a disaster - The Pressure and Release Model theory was one of the food security theories that the basis of the model was disaster which was the the intersection of two opposing forces: those processes generating vulnerability on one side, and physical exposure to a hazard on the other. The model give a number of human and natural factors in the cause and effect chain, whereby the variables to be involved alter according to type of disaster under question. The social related components of a disaster are represented by vulnerability which is, in turn, produced by interaction between three factors: ‘root causes’ of a disaster, ‘dynamic pressure’, and the resultant ‘unsafe conditions’. Dynamic pressures channel the root causes into particular forms of unsafe conditions that then have to be considered in relation to the different types of hazards facing people. These dynamic pressures include epidemic disease, rapid urbanisation, and current wars which are undermine food security, Blaikie et al. (1994).

COVID-19 can be handling as real disaster. Disaster refers to a contingent and unexpected catastrophe notwithstanding of number of people, countries or the entire world effected. The up-to-date globally occasion of COVID-19 pandemic can be handled as disaster or happening having huge potential to create many damages. This can be defined as well as a hazard or the overall cradle of danger. A risk is defined as the certain expose of specific valuable things for people to a hazard. The risk is usually being handling as the probability of loss. Therefore, the COVID-19 pandemic is a disaster and a realization of hazard (Dalia et al, 2021).

The characteristic of vulnerability is the degree to which a system or its constituent may respond harmfully in the face of hazardous event or disaster. The vulnerability concept permit estimating the risks linked to the physical, social and economic consequences resulting from disaster to the system or its components (Proag, 2014). The economic vulnerability analysis deals with the risks of destruction of physical and social infrastructures and related cost of repair, linked losses of agriculture products and income losses due to labor restrictions and shortages (Darnhofer, 2020; Pu & Zhong, 2020)

The effect of COVID-19 on agriculture stressed food insecurity issues like the main consequence of COVID-19 disaster by linking them also with negative health impact to population (Laborde et al., 2020a, 2020b).

2.2. Concepts and definition of food security, urban farming, and COVID-19

Food security:- Food security as a concept emerged in the mid-1970s in the context of several incidences, which prompted discussions on food supply and sufficiency at the aggregate level both at global and national level, however, the issue of sufficiency at the household or individual level as well as nutritional quality and environmental sustainability were neglected (Ingela and Nagothu, 2017).

It was first defined in the Proceedings of the 1974 World Food Summit as: ‘availability at all times of adequate world food supplies of basic food stuffs. . to sustain a steady expansion of food consumption...and to offset fluctuations in production and prices’ (UN 1975). In 1983, FAO enlarged its concept to enclose a third prong: ‘Ensuring that all people at all times have both physical and economic access to the basic food that they need.’ (FAO 1983). In the World Bank’s (1996) report of Poverty and Hunger, this concept of food security has been further expanded in terms of: ‘access of all people at all times to enough food for an active, healthy life.’ Definition of food security by (FAO, 1996) food security exists ‘when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’.

FAO's four dimension of food security connect with availability, accessibility, utilization, and food stability at micro and macro levels. Food availability is a measure of food supply, while access is having the ability to have food either from own production or markets. Utilization refers to the dietary quality of food. Stability is a dynamic concept that requires that availability, access, and utilization are stable or adequate over time (FAO, 2008).

Ethiopia has been one of the most food-insecure and famine affected countries. A large portion of the country's population has been affected by chronic and transitory food insecurity. The status of chronically food insecure people are becoming more and more severe. Food security status in Ethiopia is highly related to recurring food shortage and famine in the country, which are linked to recurrent drought. Accordingly, more than 30 percent of the Ethiopian population lies below the poverty line and above 31 million people are undernourished. By using the threshold of 2,550 kilocalories (Kcal) per adult equivalent per day, 40 percent of Ethiopian households of the country were food insecure and undernourished (COMPACT, 2016; UNECA and WFP, 2010).

Urban farming: It is not easily defined because of the existence of much type of urban farming systems in the world and it has different characteristics depending on local socio-economic, geographic and political conditions. The most widely used definition of UA was developed by Mougeot. According to (Mougeot, 2020: 11) urban agriculture has been defined as [“an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which cultivate or raises, processes and distributes a diversity of food and non-food products, (re)using largely human and material resources, products, and services found in and around that urban area, and in turn supplying human and material resources, products and services mainly to that urban area”.]

The FAO (2007) has defined urban agriculture as “the growing of plants and the raising of animals for food and other uses within and around cities and towns, and related activities such as the production and delivery of inputs, processing and marketing of products.”

Urban and peri-urban agriculture as defined by Baumgartner and Belevi, (2011), that comprise the production, processing and distribution of diversity of food, including vegetables and animal products within the city (urban) or at the fringe (peri-urban) of a city. Thus the main motivation is food production for consumption or sale and /or income generation.

COVID-19: COVID-19 (Corona Virus Disease of 2019)- is an infectious and a respiratory disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), Mayo, (2020). The first confirmed case of COVID-19 was discovered in Wuhan (capital of China's Hubei province) in December 2019. Because of novelty of virus strain, the disease is expanding people to - people at alarming rate. WHO has declared COVID-19 outbreak as global pandemic on March 11, 2020- (Cucinotta and Vanelli, (2020).

COVID-19 was a pandemic creating tremendous disruption to lives and livelihoods as well as social and economic systems worldwide. It was the worst global crisis since WW II. The COVID-19 pandemic disease is highly contagious and has spread with geometric progression and to every corner of the world. Young people are far more likely to be infected (as carriers) but older persons are more likely to die (UN, 2020).

2.3. Urban agriculture and food security

According to Mougeot (2005), UA is thought to improve food security through two main pathways: amend access to food, and increased income. The total amount of food available at household level increases by home-grown foodstuffs and thus can prevent hunger and malnutrition. Similarly the availability of fresh, home grown food products, specifically fruits and vegetables, improved the nutritional status of household members and thereby enhances health. Direct access to food that enables poor households to consume a more diverse diet than they would otherwise be able to afford. Especially, animal husbandry is believed to provide an important source of animal protein, which is commonly limited in poor households' diets due to income constraints. Stewart et al. (2013).

UA is also has been to create an ‘opportunity cost’ – domestic producers can either save income, with consumption of home-produced foodstuffs that are cheaper to produce than to buy from the market, and/or increase income by selling or trading their products. Addressing urban food insecurity therefore needs a balancing act between urban agriculture (the opportunity cost of producing your own food) and more efficient urban food markets (making the food you buy cheaper). Stewart et al. (2013).

According to Mougeot (2000) and (Arku et al., 2012) the first advantages of UA is related with nutritional benefits. The urban poor get a greater access of variety of affordable and nutritious food through practicing urban agriculture. The urban poor expense around 50 to 70 % of their income for purchasing food and yet cannot buy enough food for their own consumption. Therefore; practicing urban agriculture diminish this expenditure that poor households spend on food items and as a result increase the household savings which can be spent on other basic needs.

2.4. Empirical literature review and the gap

This sub-section presents empirical literature review on factors of food security and coping mechanisms that related to the study topic and the gap and conceptual framework.

2.4.1. Factors of food security situation of small-scale peri-urban farming households

2.4.1.1. Supply of agricultural input, labor, and extension service during COVID-19

According to (FAO, 2020b) findings both Ethiopia and Afghanistan are the countries heavily that depend on imports of fertilizers and pesticides.

Low supplies of insecticides and pesticides were already disrupting the efforts to protect the crops in countries affected initially. Including eastern parts of Africa transportation costs of pesticides to regions have increased almost 3 times. This has hindered the locust fighting progress and is worsening the threat to food security (FAO, 2020). Because of movement

restrictions and import delays farmers were affected as the planting season approaches (Schmidhuber et al., 2020).

The pandemic has affected the availability and use of agricultural input. Those reliant upon inputs were faced difficulty to obtain it. For some crops, such as horticulture, inputs are widely used. In Ethiopia a recent survey of farmers collected by phone found that there were shortages of inputs and their prices had increased, primarily because of COVID-19 related restrictions of imports (Tamru et al. 2020).

Unprecedented COVID-19 pandemic has been caused lockdowns/restriction of movements, closure of some input producing companies, and borders which has in turn reduced imports from countries such as China (Mahendra, 2020). Supply chains for important agricultural inputs including fertilizers, improved seeds, feeds and pesticides were affected by lockdown measures, making them both either not available or their prices were high due to shortages of it , as has already been reported in both China and West Africa (Arouna et al., 2020; Pu and Zhong, 2020, and FAO, 2020a).

The restrictions of movement as a result of the obligation of community lockdowns result in decreased the quantity of farm labor that would translate to overall reduction in agricultural output (Glenn & Rico, 2020).

Most of the farm producers were faced the manpower shortage. Travel ban have been made the shortage of seasonal and informal farm workers (Brelie ad Petit, 2020). There was rapid increase in employment losses around the world. International Labor Organization (ILO) estimated that COVID-19 has been affected the 81% (2.7 billion workers) global work force because of full or partial closure of the work place (ILO, 2020).

According to (OECD, 2020), that lockdown of movement has been reduced the availability of migrant labor, interrupting some harvesting and agricultural activities, raising levels of post-harvest losses and delaying the delivery of fresh produce to various target markets.

The pandemic effect on the livestock sector was particularly acute because of decreased access to animal feed and slaughterhouses' diminished capacity, linked to logistical constraints and labor shortages as many workers have been become ill (Miguel & Clara, 2020).

Agriculture extension and advisory services have also been faced severe disruptions since lockdown measures have been imposed (FAO, 2020).

2.4.1.2. Loss of agricultural markets, value chains and income during COVID-19

According to Viliamu et al. (2021) lockdowns have reduced access to markets and disrupted the transportation of product between rural and urban areas or between islands. Recent assessments and surveys (McGregor and Sheehy, 2020; Wairiu et al., 2020a; Wairiu et al., 2020b) reported that loss of markets and decreased purchasing power. Farmers were decreased the prices of vegetables and fruits because of lowered demand arising from most households now owning a home garden and few people being able to afford to purchase foods from markets because of loss of income.

Because of global trade disturbance, farmers were faced lack of agricultural inputs like seed, fertilizer and pesticides. China is one of the major fertilizer producing producer and exporter in the world. The lockdown in China have been severely affected the international fertilizer trade (Marlow, 2020).

FAO had mentioned that, small-scale farmer and fisher may face challenges in selling their product which in turn cause decrease in their income and purchasing capacity. The demand of food was affected because of reduction in income and purchasing capacity (FAO and A, 2020).

2.4.1.3. Food supply and pillars of food security- situation- during COVID-19

The food supply chain is a net linking the agricultural systems including farms with the consumers, covering production, packaging, supply and distribution as well food storage all being crucial for food safety and security (Chen et al., 2020). Food supply chains were disturbances with the occurrence of COVID-19 pandemic and shocks in food production as well

as a decline incomes and remittances have been created tensions and food insecurity in countries (World Bank, 2020). Shortages in labor (through travel restrictions, morbidity, rules for social distancing) affect traders, producers, processors, and logistics in the food supply chain – mainly for food products where workers must be nearby (Schmidhuber et al., 2020).

The supply of food is negatively affected with the lockdown through self-isolation, movement restrictions of rural and urban farmers leading to farm-hour loss, and eventually low productivity of essential food crops during the period. There are also challenges in terms of logistics involving the movement of food crops, leading to perishable goods grown within and around urban areas rotting away. Consequently, the prices of food items in markets skyrocketed because of limited supply, making them unaffordable for many urban dwellers. Livestock products especially the poultry business and including the supply of eggs to urban dwellers is also affected due to reduced access to animal feeds, Gbadegesin & Olajire. (2020).

The supply of milk and dairy product has been affected hugely by COVID-19. Dairy farmers are compelled to dump milk and milk product after remarkable decrease in supply of milk and closure of milk processing company. Dairy farmers in America estimate that farmers nationwide are dumping nearly four million gallons of milk each day (Forstadt, 2020).

COVID-19 has negative effects on all four dimensions of food security (i.e., availability, access, utilization, and stability). From the four pillars, in availability and access to food the profound effect is seen in short-term and the entire pillars of food security would be affected in long term. Similarly, different farming systems are also being affected differently. As the proceed lockdown started to effect food production and distribution, Government permitted people to carry out their farming activities like harvesting of wheat and planting of maize and rice, considering its COVID-19 related precautionary health guidelines. Nevertheless, the lockdown has continued to adversely affect food availability through production as well as trade/distribution as the supply chains of inputs and farm products were disrupted. COVID-19 reduced people's access to food through the loss of livelihoods and income. Effect on utilization of food; sanitation of food, and contamination and decaying of food emerged over the pandemic. For instance, people were confused about how to sanitize the food that was obtained from the market or touched by many

people. Availability and access of vegetables, fruits and other nutrient-dense foods were limited, and whatever came to the market, it was sold without cleaning following safety and sanitization standards (Jagannath, et al, 2020). Closure of informal markets may also disrupt the stability of access and utilization of food among poor consumers who may be unable to afford food from formal outlets (Eileen and Cosmas, 2021).

2.4.1.4. Space for cultivation and livestock keeping

Agriculture has been required land; but, the main institutional challenge was lack of land tenure rights for growing crops in cities (Thomas, 2013). Growing food in cities requires land; but there was an experience that the demand for urban spaces to build houses was far higher than using spaces for agricultural activities. Argenti (2000) further emphasized that “...agricultural productive lands are likely to be lost in this competition.”

2.4.1.5. Lack of access to credit

According to Mahteme & Akalewold (2020), study result showed that more than half (50.7%) of the respondents have been agreed that lack of access to credit was a great challenge. In the case of bio-intensive gardening 52.2% of the practitioners agreed that they have been faced such challenges while in the remaining two strata, an equal amount of 50% claimed to have faced the challenge. Therefore, lack of access to credit was a serious challenge that faced by poor urban agriculture producers.

2.4.1.6. Decline of agricultural production during COVID-19

More than 1 billion people across the globe their incomes obtaining from agriculture which is the backbone of many developing nations. The COVID-19 mitigation measures were disrupted the production and distribution of agricultural products. Agricultural production is a long process from planting, nurturing, harvesting to commodity shipment, which involves labor at various stages. The food and agricultural sectors are therefore considered less resilient due to their dependency on the market value chains. These activities were hampered by travel limits imposed

by governments across the globe to stem the spread of coronavirus. Agriculture is an input-intensive industry. In agricultural systems the dependence on each factor of production could differ significantly and therefore agriculturalists and planters could be exposing to surges in input costs. These were a result of various factors, including congested ports or roads, interruptions in transportation, a dearth of credit access, and increased interest rates and capital costs, which could lead to additional costs on the inputs. These additional costs make the production of agricultural products less profitable and may lead to a huge loss to the agriculturists (Endashaw et al, 2020).

Agricultural production was also reduced caused by farmers' limited access to farm inputs and markets to sell produce, which may result in profit losses and wastage of farm produce (Glenn & Rico, 2020).

According to Viliamu et al. (2021), that the effects of COVID-19 mitigation measures (border lockdowns, social distancing, and restricted movements) on agriculture and households in Pacific Island Countries (PICs) have mostly been negative. Communities have been exposed to loss of employment, markets and decreased purchasing power. When the households have been good access to land, planting materials and labor then their agricultural production was increased. In reverse, where there were unable to access land, planting materials, labor, and loss of amount of markets, the agricultural production remains the same as before COVID-19 or it has been reduced. COVID-19 mitigation measures have been therefore negatively affected agricultural production and decreased income and food. COVID-19 has been exacerbated many of the pre-existing challenges in PICs, such as decreasing agricultural production and rising hunger and malnutrition.

2.4.2. Resilience of agriculture systems to Covid-19 pandemic

The agriculture system resilience depends on three main capacities: absorptive, adaptive and restorative capacities which are inbuilt in agriculture systems (Vale & Campanella, 2005). Absorptive capacity of the systems can be defined as endogenous attribute of the system which displays the ability of the defined system or structure to absorb the disruptive effect of specific

disaster. Adaptive capacity of the system is dynamic capability of the system to change endogenously and to adapt successfully to the consequences of disaster. The restorative capability of the system is the ability of the system to recover after disaster. This capacity is linked to dynamic activities by various bodies which are exogenous to the system (Proag, 2014). Adaptive resilience capacity of agriculture systems is related to internal actions taken after the disaster, to go for recovery and to adapt to covid-16 impacts. The example can be new business models (Adnan & Nordin, 2020). Restorative resilience of agriculture system is linked to exogenous efforts like governmental or international subsidies channeled to cover losses of farmers encountered during pandemic due to reduction of food demand, fresh food loses or labor shortages (Petetin, 2020; Pu & Zhong, 2020).

2.4.3. Coping strategies of farmers' to temporarily food insecurity

Referring to the study by (Nicole et al, 2020) conducted in Southern Africa and Indonesia, across all regions, small-scale farmers rely primarily on social capital to cope with the COVID-19 crisis, i.e., their coping strategies were mostly developed within their immediate family, farming networks, or neighborhoods. The crisis also shows that small-scale farmers in Southern Africa are not yet prepared for supplementing local communities as farmers have little transformative capacity and agency to establish localized food systems that provide sufficient food for communities. The situation in Indonesia demonstrates that well-organized, small-scale farmer groups are part of the informal economy and are highly acknowledged actors within localized food systems, and that these informal local food systems are able to perform with resilience to shocks when larger food supply chains are severely disrupted or break down.

During the COVID-19 crisis dietary changes are another common feature across the five regions. Consumption of vegetables and staples (maize, rice, and bread) increased, while consumption of meat, fish, fruit, oil, and sugar reduced. Devereux et al. (2020) analyzed the World Bank price statistics of June 2020 and found that prices of staple foods, such as maize, meal, and rice, did not significantly rise because of good harvests on the global grain market (Nicole et al, 2020).

According to (GAIN, 2021) when more poor urban households extend to face crisis of outcomes and employing, they practiced coping strategies such as, purchasing food on credit, reducing the number and size of meals, and reducing healthcare expenses.

Based on local conditions, households are expected to explore for and adopt methods or strategies deemed relevant to mitigate the economic effects of the pandemic. In urban areas, main coping mechanisms include reliance on savings (33.8 percent), reduction of food (16 percent) and non-food consumption (11.5 percent) (Degye et al, 2020).

2.4.4. Literature gap

The food security status of small-scale peri-urban farming households during COVID-19 specifically in crop and livestock production field were less researched area in the world and almost null in Ethiopia. This means that the study done so far was slightly touched the effect of COVID-19 on agricultural sector as a general particularly in rural area and it was not done specifically on crop and livestock field extensively and profoundly in & peri-urban level. Therefore, this study would contribute as a basis or references for further study conducting with seem as this study topic.

2.5. Conceptual framework

This section gives emphasis to formulate the logical relationship between variables of the study. In order to determine the food security status of small-scale peri-urban farming households, the following variables were indicated at literature reviews. Vulnerability to COVID-19 pandemic disease has its own effect on demographic and socio-economic factor thereby food security situation of the households. The government imposed COVID-19 mitigation measures such as; social distancing, restricted movements, and border lockdown which are used to minimize the spreading of pandemic. Because of these mitigation measures there were low supply of agricultural inputs (fertilizer, improved seed, and feed), shortage of labor, high cost of inputs, lack of market available, and lack of extension contact which have been bring on the consequences of decreasing agricultural product, food supply chains are disrupted, decreased

income & food, and lack of amount of credit. Eventually for the cause of the aforementioned factors & its consequences, the households were exposed to temporarily food insecurity. However, to overcome the problems the households were practiced adaptations and coping strategies such as, social capital, informal economy, dietary change, reliance on savings, reduction of food, and non-food consumption, purchasing of food on credits, and absorptive, adaptive, and restorative capacities. Therefore, the following conceptual framework was used to analyze factors affecting food security of the households as indicated in the below framework.

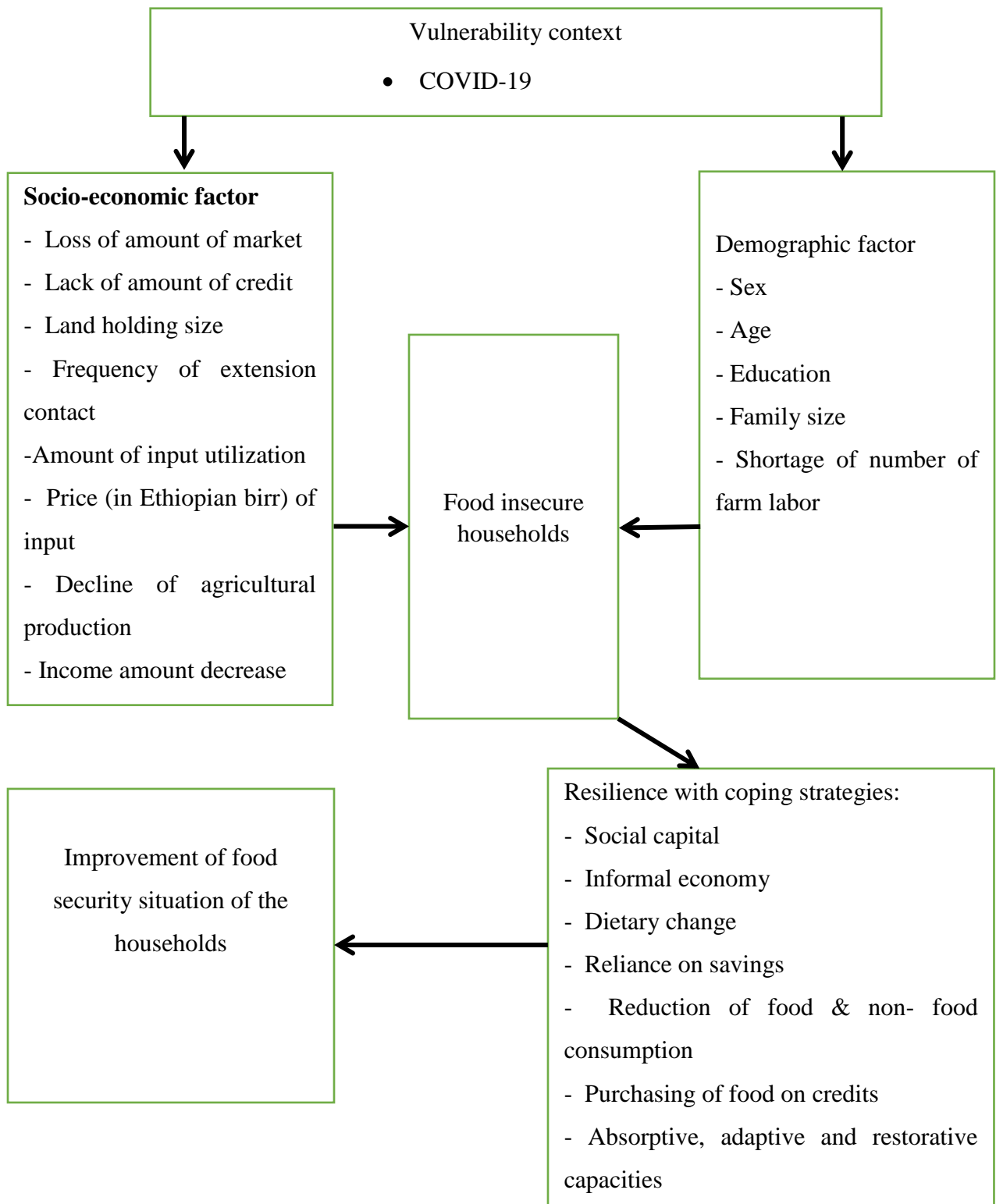


Figure 1:- Conceptual framework, developed by the researcher

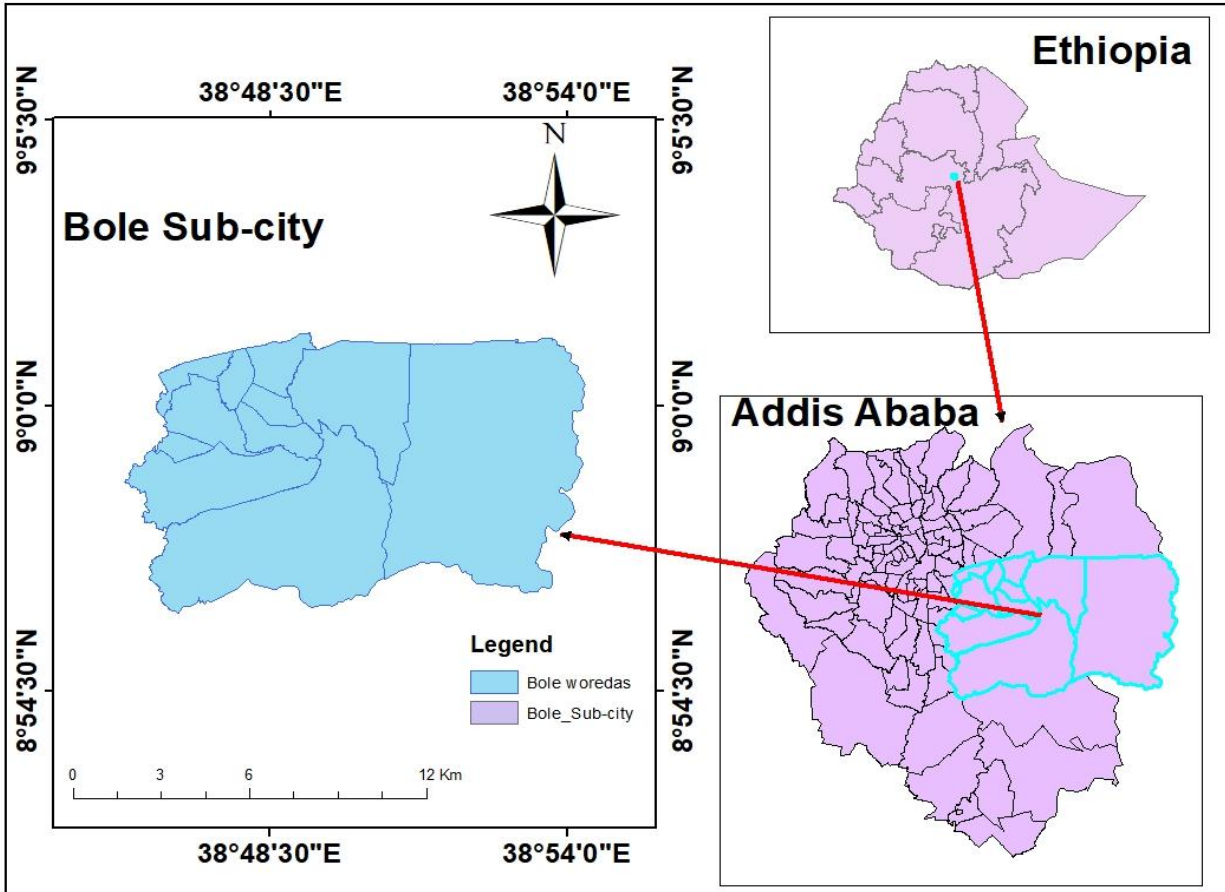
CHAPTER THREE: - RESEARCH METHODS AND MATERIALS

This chapter presents about description of the study area, Research design and approach , Sample size determination and sampling techniques, data types, source, and collection techniques, techniques of data analysis, definition of variable and working hypothesis and ethical consideration.

3.1. Description of the study area

This study was conducted in Addis Ababa at Bole Sub-city in Woreda 12 specifically an abode called Bole Bulbula. Woreda 12 (Bole Bulbula) is one of the largest and most populated Woreda in Bole Sub-city. It is situated in peripheral of Bole Sub-city and it is located at Latitude 8.98002° or $8^{\circ} 58' 48''$ north and Longitude 38.77041° or $38^{\circ} 46' 14''$ east. Available documents evidenced from Bole Bulbula vital Events Registration Branch office shows that the current total population of Bole Bulbula is 60000. It has an elevation of 2,297 meters and it is about 3 kilometers away from Addis Ababa in the north-eastern direction. According to Woreda farmer and urban agricultural development office crop production is the major agricultural activity in the study area. Growing of vegetables, cereal crops and legumes such as Carrot, Lettuce, Wheat, Teff, Lentil, and Chick Pea are some of the crop production practiced in the study area. Whereas in livestock production dairy cows, fattening, and poultry development were also exist.

Figure 2:- Map of Bole Sub-city administration showing study area



Source: Developed by the writer using Arc GIS

3.2. Research design and approach

The study used cross-sectional research design. The research design makes the research as efficient as possible by giving maximum information with minimal expenditure of effort, time and money. In a cross-sectional study, the investigator measures the outcome and the exposures in the study participants at the same time. A mixed approach was applied to triangulate the data sources and increase the validity and quality of the findings. Qualitative data was collected through in-depth Key Informant Interview (KII) guide and Focus Group Discussions (FGD). The logic to choose both approaches or mixed research approach that it would be provide idea in-

depth and valuable information/data/on both sides with the aim of triangulating and checking the reliability and validity of the information that will be gathered from different sources.

3.3. Sample size determination and sampling techniques

The study used probability and non-probability sampling technique. Non-probability sampling techniques employed to select the Sub-city's and the Woreda's population sample and probability sampling technique was used to select respondents for survey. From the 11 Sub-cities of Addis Ababa city administration, Bole Sub-city was the study site and from the 11 Woredas of the Bole Sub-city, Woreda 12 was selected for this study area purposively particularly where the researcher thinks that there were vacant space or expansion area and more urban farming households together with diversifying farming.

According to Kothari (2004), the size of sample should neither be excessively large, nor too small. It should be optimum. An optimum sample is one which fulfills the requirements of representativeness, and reliability.

There were several formulas for determining sample size; widely used are Yamane's and Cochran's formulas. Yamane's is a simplified formula for calculation of sample size from a population, which is an alternative to Cochran's formula. This study has been used Yamane's simplified formula that was developed in 1967. The mathematical formula for determining sample size is:

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

Where n is the sample size, N is the total number of urban farming households in the selected Woredas, and e the error term.

Available documents evidenced from Bole Bulbula Woreda administration farmer and urban agriculture development office shows that there were a total of 1275 peri-urban farming households in the study area. Thus, by using Confidence Level 95%, Population Size 1275,

Margin of Error 5% finally the sample size calculated by the above formula we can get 305 ideal sample sizes.

3.4. Data types, source, and collection techniques

The study used both primary and secondary data sources which were involving under overall specific objectives. Primary data were gathered through household survey, Key Informant Interview and Focus Group Discussions. Focus Group Discussions would be used to obtain qualitative aspect of the study. While secondary data would be collected from different sources which were related to food security status of small-scale urban farming households and reviewed on related literature review part of the study. Secondary data would be conducted on various associate published studies to the topic, such as research, articles, journals, reports, working paper, thesis which were online available in the internet web sites.

The research study data were collected by using household survey based questionnaire, FGDs, and Key Informant Interview. In order to collect the relevant information tools such as guidelines and checklist would be applied to guide the household survey.

3.4.1. Questionnaire survey

Questionnaire-based survey was employed in order to collect quantitative information from sample peri-urban agriculture engaged households to statistically analyze responses (Kabir, 2016). By using this data collection technique, 305 sample respondents were surveyed to collect data related to demography, socio-economic features that listed in the explanatory variables includes factors of food security situation of small-scale peri-urban farming households during COVID-19 and coping strategies of food insecurity during the occurrence of COVID-19 pandemic disease. The questionnaire was prepared with overall specific objectives and it was translated to Amharic in order to facilitate better communication between enumerators and respondent.

3.4.2. Key informant interview (KII)

Key informant interviews were carried out to collect the required primary data that led to discussion with stakeholders to obtain the appropriate information about the issue related to the study objective. The Key Informant Interviews of this particular study were Sub-city and Woreda level farmer & urban agriculture development offices experts. The Key Informant Interviews was recorded by using checklists. The in-depth interviews were conducted face to face to encouraging for open discussion. According to Guest et al. (2006), 12 interviews are sufficient to reach 92% of saturation meaning that 92% of the issues would be addressing under those 12 interviews discussion. Therefore, this study was conducted ten KII almost at 92% of saturation.

3.4.3. Focus group discussions (FGDs)

Focus Group Discussion was carried out on small-scale peri-urban farming households in order to collect opinion and qualitative description of factors of food security situation of small-scale peri-urban farming households during COVID-19 and coping strategies of food insecurity experienced during COVID-19. Focus Group Discussions guidelines were developed included all specific questions. The discussion was carried out by using Focus Group Discussions guideline. Coenen et al. (2012) defined saturation as a point and concepts; from two consecutive Focus Groups or individual interviews reveals no further second-level categories. Therefore, this study was conducted three FGDs to gather qualitative information from the respondents.

3.4.4. Secondary data review

Secondary data that are related to the topic and all specific questions were reviewed and used as related literature review. Secondary data was reviewed from different source such as; books, journal articles, reports, dissertation, thesis, reviews, working papers, and internet source.

3.5. Techniques of data analysis

After collecting the questionnaire-based survey data, the quantitative data were edited, coded and entered into a computer and analyze the data by using widely recommended statistical software called STATA Version 15.0 in order to describe key findings for the HFIAS and CSI scores. The researcher also used descriptive research technique such as, frequency, percentage, mean, and standard deviations in order to analysis quantitative data and to describe the characteristics of the respondents. Qualitative data were also generating through Focus Group Discussions, and interviews and data analyzed by narrative way and other relevant data analyses had utilized in the study. Ordered logit model was applied for HFIAS to analyses food security status and categorize small-scale peri-urban farming households. The 1st specific objective was analysis by using HFIAS and the 2nd specific objective was analysis by multiple ordinal logistic regressions. The 3rd specific objective has been analysis by using CSI.

According to Jennifer et al. (2007), at the household level the HFIAS indicator gives information on food insecurity (access). In order to understand the attributes and change of food insecurity situation of the household four types of indicators would be intended for the sample. The data would be analyzed in STATA software using ordered logit model to classify small-scale urban farming households based on their food security situation so that food security of small-scale urban farming households were categorized into food secure, mildly food insecure, moderately food insecure and severely food insecure.

Household Food Insecurity Access-related Conditions: these indicators give specific, separate information about the behaviors and insight of the surveyed households. The indicators present the percent of households that responded affirmatively to without considering frequency of the experience to measure the percent of households experiencing a particular condition at any level of severity.

$$HC = (\sum (Q7) n k=0 /n) *100 \dots\dots\dots (2)$$

Where, HC is HFIAS-related conditions, Q7 is questioning number 7 of the HFIAS questionnaire, n is number of respondents provided response to the question (Jennifer et al., 2007).

Household Food Insecurity Access-related Domains: these indicators give summary information on the prevalence of households experiencing one or more conduct per the three domains reflected in the HFIAS - - Anxiety and uncertainty, insufficient Quality, and insufficient food intake and its physical consequences.

$$HD = (\sum (Q2) n k=0 /n) *100 \dots\dots\dots (3)$$

Where, HD is HFIAS related domains; Q2 is questioning number 2 of the HFIAS questionnaire, n is number of respondents provided response to the question (Jennifer et al., 2007).

Household Food Insecurity Access Scale Score: the HFIAS score variable of the household is calculated by summing the codes for each frequency-of-occurrence question. The maximum score for a household is 27 (the household response to all nine frequency-of occurrence questions is “often”, coded with response code of 3); the minimum score is 0 (the household responded “no” to all occurrence questions, frequency-of-occurrence questions were skipped by the interviewer, and subsequently coded as 0 by the data analyst.) The higher the score, the more food insecurity (access) the household experienced. The lower the score, the less food insecurity (access) a household experienced.

$$X = (\sum (Qa) 9 Q=1 \dots\dots\dots (4)$$

Where X is the individual HFIAS score, Q is the HFIAS question as indicated on the HFIAS questionnaire, a is the frequency of the food insecurity situation reported by respondents corresponding to each HFIAS questions (Jennifer et al., 2007).

$$\text{Average HFIAS Score} = \sum X n Q=1 \dots\dots\dots (5)$$

Household Food Insecurity Access Prevalence (HFIAP): the last indicator is a categorical indicator of food insecurity status. The HFIAP Status indicator can be used to report Household Food Insecurity (Access) Prevalence. The HFIAP indicator would be used to classify households into four levels of Household Food Insecurity (Access): food secures, mild, moderately and

severely food insecure. Households are classified as rising food insecure as they respond to more severe conditions of more frequently while a food secure household experiences none of the food insecurity conditions associated to food access (Jennifer et al., 2007). The four categories would be divided according to the households' response to the nine questions designed to calculate the HFIAS score as indicated in the formula indicated below.

FS = if($X_{1a}=0|X_{1a}=1$) & $X_2=0$ & $X_3=0$ & $X_4=0$ & $X_5=0$ & $X_6=0$ & $X_7=0$ & $X_8=0$ & $X_9=0$)

MiFS = if($X_{1a}=2|X_{1a}=3|X_{2a}=1|X_{2a}=2|X_{2a}=3|X_{3a}=1|X_{4a}=1$) & $X_5=0$ & $X_6=0$ & $X_7=0$ & $X_8=0$ & $X_9=0$)

MFS = if($X_{3a}=2|X_{3a}=3|X_{4a}=2|X_{4a}=3|X_{5a}=1|X_{5a}=2|X_{6a}=1|X_{6a}=2$) & $X_7=0$ & $X_8=0$ & $X_9=0$)

SFI = if ($X_{5a}=3|X_{6a}=3|X_{7a}=1|X_{7a}=2|X_{7a}=3|X_{8a}=1|X_{8a}=2|X_{8a}=3|X_{9a}=1|X_{9a}=2| X_{9a}=3$)

Where FS represents food secure, MiFS represents mildly food insecure, MFS represents moderately food insecure, SFI represents severely food insecure, X are the HFIAS questions, 1a, 2a, 3a...represent the frequency of each HFIAS questions, X (Jennifer et al., 2007).

This research would be identifying consumption related coping strategies with a recall period of the past seven days. The CSI would be applied to know what people do when they don't have enough food or don't have enough money to buy food. The food insecure households were used four types of consumption coping strategies which are related to dietary change, short term measures to increase household food availability, short term measures to decrease numbers of people to feed and rationing or managing the shortfall by adjusting portion size or skipping the whole day without food (CARE/WFP, 2003).

The research would be consider a seven days recall period in order to collect information how often respondents experience the 12 coping strategies to achieve their food requirement for their household.

3.6. Definition of variable and working hypothesis

The data covered the necessary information such as demographic, institutional, socioeconomic factors that influence food security situation of small-scale urban farming households in the

study area. In order to answer the research questions of the study, the following variables were identified.

3.6.1. Dependent variable

A dependent variable is the variable that change as a result of the independent variable manipulation. It's the outcome and we are interested in measuring, and depends on our independent variable. Household food security is an independent variable.

Household food security: - It represents the probability of the household whether they can be benefited from peri-urban farming or not. Household food security expressed in obtaining enough food in both qualitative term in caloric sufficiency and in qualitative terms in variety, safety and culturally acceptable food from crop and livestock products. Household Food Insecurity Access Scale is the proxy to measure the household food security. Household Food Insecurity Access Scale was an indicator to- measures the accessibility of food to household in the last four weeks/one month period.

3.6.2. Independent variables

The independent variables are variables that stand in solely and not changed by other change in dependent variables. The independent variables of the study were identified by different literature review and those are affecting the food security status of small-scale peri-urban farming households. Based on this, household socioeconomic, institutional, and demographic variables are identified as independent variable. The independent variables which are clearly displayed in both empirical literature review and conceptual framework. The following independent variables are identified;

Sex of the household head (sex):- It is a dummy variable that measured as 1 if the household head is Female and 0, otherwise. Females have been many responsible that perform household domestic activities; they may not fulfill the farming activities on time and efficiently thereby their food security was influenced (Essa, 2011 and Kifleetal, 2017). Moreover, men had a chance

to participate in kebele meeting and more communicated within the community that increase the households' access to information and external service and build up more knowledge than women in terms of method of farm techniques, have greater chance to credit access and crop management practices and based on this the food security situation of men was increased (Awol, 2014).

Age of a household head (age):- It is a continuous variable that measured in years. It is a factor that determines the performance of small-scale peri-urban farming and food security. Further more, younger farmers are more innovative and willing to adopt a new and advanced technology (Diederental, 2003). According to Babatunde et al (2008), young household heads are strong and are expected to cultivate large farm size than old heads. The expect of effect of age on achievement of household food securities were positive/ negative.

Educational Level of Household Head (levedu):- It is a categorical variable which was measured with higher attending of school in years of the household head. Household who had good status of education level that enables to apply modern technology and better manage their farm activities and enhance domestic production and food security to accomplish household consumption needs (Getachew et al, 2018). In the study area, education was expected to have a positive effect on achievement of household food security status.

Family Size (Familysize):- It is a continuous variable. Farmers who had high workforce were better than household with small number of work force which enables them to perform their small-scale peri-urban farming activities. Likewise, a household who had large number of family size might be food insecure than small number (Shimelis, 2009). It was hypothesized that it had positive or negative influence on household food security

Loss of agricultural activities (daadrm):- It is measured as a dummy variable and it has a value of 1 when the household head- had lost agricultural activities during COVID-19 and 0 otherwise. During COVID-19 there was shortage of agricultural works that affects the accomplishment of agricultural activities for its given time. Therefore, it was negatively influenced the household food security.

Decline of agricultural production (papdc19):- During COVID-19 agricultural production was reduced caused by farmers' limited access to farm inputs and markets to sell produce, which may result in profit losses and wastage of farm produce (Glenn & Rico, 2020). Thereby, agricultural production negatively influences the household food security.

Farm size (landsz): It is a continuous variable that measured in hectares and the household farm size may be their owned land or rented. A large farm size enables the households obtain more production and availability of food grains. Food production can be raised extensively through expansion of area under cultivation (Haile, 2008; Babatunde et al, 2008). Further more, the total cultivated land has been a positive relationship with small-scale peri-urban farming and food security status (Kamara et al, 2001). Therefore, it was hypothesized that the larger land holding size of the household has the higher the probability to maximize their production & productivity and become food secured.

Credit amount (creditac):- It is measured as a dummy variable and it has a value of 1 when the household head take credit and 0 otherwise. It is an opportunity for development to small-scale peri-urban farming. Moreover, households who had acquired credit amount more likely to complete their agricultural inputs. During COVID-19, lack of credit amount - was a serious problem- in urban agriculture producers, (Mahteme & Akalewold (2020). Therefore, it is hypothesized that there is negative relationship between credit amount and participate in small-scale peri-urban farming and becoming to food secured.

Adequate farm labor (slaadc19):- It is measured as a dummy variable and it has a value of 1 when the household head faced shortage adequate farm labor during COVID-19 and 0 otherwise. During COVID-19 the restrictions of movement as a result of the obligation of community lockdowns result in decreased the quantity of farm labor that would translate to overall reduction in agricultural output and food security, (Glenn & Rico, 2020).

Frequency of extension contact (extagtsaaac19):- It is a continuous variable that measured in number. When the farmers are getting extension support frequently, they had got enough information which enables them to use new technology and best practice. In this regard it was

expected to affect urban farming & food security by extension service frequent contact. The household head who had got frequent extension contact, able to adopt new technology than who had no got extension contact. During COVID-19 the extension service contact was expected negatively influence to the implementation of small-scale peri-urban farming households food security.

Agricultural input amount (agriinaac19):- It is measured as a dummy variable and it has a value of 1 when there was supplying of agricultural inputs and 0 otherwise. During COVID-19 the supply of agricultural inputs were not enough even if the availability was partial. It was not available based on the household demand. So, it was negatively influence the household food security.

Price of input (priin):- It is a continuous variable that measured in Ethiopian birr. In Ethiopia during COVID-19 there were shortages of inputs and their prices had increased, primarily because of COVID-19 related restrictions of imports (Tamru et al. 2020).

Loss of amount of market (lam):- It is measured as a dummy variable and it had a value of 1 when the household head faced loss of amount of market during COVID-19 and 0 otherwise. Because of COVID-19 mitigation measures which were reduced amount of markets. Viliamu et al, 2021.

Income amount (insac19pd):- The government of Ethiopia has been imposed COVID-19 mitigation measures in order to minimize the spreading of pandemic and because of this the income generating activities of the small-scale urban farming households were disrupted. Due to this event the income amount of the households has been decreased.

Table 1: Summary of description of explanatory variables and its expected sign.

Explanatory variables	Nature of variable	Unit of Measurements	Expected sign
Sex	Dummy	1 for male and 0 for female	-ve

Age of the respondents	Continuous	Years	-/+ve
Educational level of the respondents	Category	1 for no educated, 2 for 1-8 class, 3 for 9-12 class, and 4 for diploma and above	-/+ve
Family size	Continuous	Number	-ve
Loss of agricultural activities	Dummy	Yes or No	-ve
Decline of agricultural production	Category	1 for no change, 2 for increase, and 3 for decrease	-ve
Farm size	Continuous	ha	-ve
Credit amount	Dummy	Yes or No	-ve
Adequate farm labor	Dummy	Yes or No	-ve
Frequency of extension contact	Continuous	Days	-ve
Agricultural input amount	Dummy	Yes or No	-ve
Price of agricultural input	Ccontinuous	Ethiopian birr	-ve
Loss of amount of market	Dummy	Yes or No	-ve
Income amount	Category	1 for increase, 2 for decrease, and 3 for no change	-ve

3.7. Ethical consideration

Before contacting respondent's directly and immediately going to the point, the researcher was briefly explaining the purpose of the study as much as possible. Interviews and focus group discussions were conducted to reaffirm of the consent of the respondents in order to get enough and appropriate information from them. The confidentiality of the respondents were keeping and the information was used for only study purpose. Any materials which were taken from any literature and involved to this study were citing genuinely.

CHAPTER FOUR: - RESULTS AND DISCUSSIONS

This chapter deals with the core results and discussions of the study. It divided into four sub-sections. The first sub-section explains the demographic and socioeconomic characteristics of the sample respondents with respect to identified independent variables. The second sub-section present the household food security status in terms of Household Food Insecurity Access Scale. The third sub-section present the ordered logistics regression estimation result of factors of food security and the fourth sub-section describes the coping strategy of food insecurity experience of the sample respondents. The Focus Group Discussion (FGD) and Key Informant (KII) Interview information of the respondents were involved in each of the variables of the study.

4.1. Demographic and socioeconomic characteristics of respondents

This sub-section was described the descriptive information of the household characteristics on demographic, and socio-economic characteristics of continuous, dummy, and categorical variables.

The result as indicated in the Table 2, the mean of age and family size of the respondent were 41.03 and 5.19 respectively. While, the mean of farm size was 0.48 ha suggested that the household head who had large land holding size tend to be more food secured than the household head who had small land holding size and this result was same as (Haile, 2008; Babatunde et al, 2008) that states as when there was a large land holding size which enables the households obtain more production and availability of food grains. Food production can be raised extensively through expansion of area under cultivation. Moreover, the study revealed that the mean of frequency of extension contact was .4065574. The result is harmony with (Quddus, 2012) finding, extension contact enable to the household to improve their knowledge and perception with regard to dairy production technologies and enhance their practice and also the household who had contact more with kebele extension agent that increase the opportunity to know more about the use of the service than those who cannot access (Berihun, et al., (2014). In Key Informant Interviews, Woreda agronomists said that- they had gave extension support to the farmers once or twice a month, but they did not address all farmers per month due to

overcrowding and limited experts and in Focus Group Discussion, some of the selected respondents were reported that most of the farmers were not received professional support, except for some farmers in the COVID-19. Mean of price of agricultural input was 5233.141 birr. Here at Key Informant Interviews and Focus Group Discussions the selected respondents were reported that the price of agricultural inputs had doubled during COVID-19 due to inflation, domestic insecurity, effect of COVID-19, lack of supply, rising of dollar, and rising of oil prices.

Table 2: Demographic and socioeconomic characteristics for continuous variables

Name of the variables	Mean value	Std. Dev.	Min	Max
Age (year)	41.03	7.076134	25	67
Family size (number)	5.19	2.369174	1	14
Farm size (hectare)	.48	.5604772	.02	3
Frequency of extension contact	.4065574	.8652405	0	8
Price of agricultural input	5233.141	207.8508	2679	5250

Source: Analyzed from own survey data, 2022

Table 3: Demographic and socioeconomic characteristics for dummy variables

Name of the variables	category	count	%
Sex	Male	212	69.51
	Female	93	30.49
Loss of agricultural season	Yes	130	42.62
	No	175	57.38
Credit amount	Yes	3	0.98
	No	302	99.02
Adequate farm labor	Yes	159	52.13
	No	146	47.87

Agricultural input amount	Yes	217	71.15
	No	88	28.85
Loss of amount of market	Yes	118	38.69
	No	187	61.31

Source: Analyzed from own survey data, 2022

The result as indicated in the above Table 3 dummy variables, the sex distribution of sample households, 69.51% of them were male from the total sample household, and 30.49 % of them were female headed. This research result shows that female headed respondents were exposed to food insecurity more than male headed and the reason behind it may be the same as indicated in (Essa, 2011 and Kifle et al., 2017) that females have been many responsible to perform household domestic activities; they may not fulfill the farming activities on time and efficiently. Moreover, men had a chance to participate in kebele conference and more communicated within the community that increase the households' access to information and external service and build up more knowledge than women in terms of method of farm techniques, have greater chance to credit access and crop management practices (Awol, 2014).

The study result further revealed that, 42.62% of the respondents were confront of loss of agricultural seasons whereas, the rest 57.38% of the respondents were not faced the problem. In Focus Group Discussions- the respondents were reported that, agricultural seasons such as cultivation and harvesting seasons were somewhat affected due to the government impose restriction of movement in order to minimize spreading of COVID-19 that created temporarily shortage of adequate labor.

Regarding to credit amount almost 100 % of the respondents was no obtained credit amount for their improvement of food security at household level. In FGDs of the study the respondents were reported that, the credit service was partially used before the COVID-19. We had not received credit in the last two years since COVID-19 came in. In fact, we had acquired trained to engage in animal husbandry development and so far we had not able to get a job due to the lack of credit.

From the total sample respondents, 146 (47.87%) of respondents were faced shortage of adequate labor to perform their agricultural activities on time during COVID-19 whereas 159 (52.13%) of respondents were not faced the problem. The result was harmony with (Glenn & Rico, 2020) finding, the restrictions of movement as a result of the obligation of community lockdowns result in decreased the quantity of farm labor that would translate to overall reduction in agricultural output. The participants of Focus Group Discussions of the study were reported that there were a shortage of adequate labors for almost a year since the outbreak of COVID-19, but now there were access of labor however, they have been increased their payment significantly.

Additionally, 71.15% of the respondents were give a response that there were availability of agricultural input during COVID-19 whereas the rest 28.85% of the respondents were give a response that there were not enough availability of agricultural input during COVID-19 specially improved seed.

The results further indicated that from the total sample respondents 118 (38.69%) respondents had faced a loss of amount of market during COVID-19 whereas 187(61.31%) respondents were did no confront loss of amount of market. The results align with the finding of Viliamu et al. (2021) lockdowns have been reduced amount of markets and disrupted the transportation of product between rural and urban areas or between islands. New surveys and assessments (McGregor and Sheehy, 2020; Wairiu et al., 2020a; Wairiu et al., 2020b) reported that there were loss of amount of markets and decreased purchasing power. Moreover, during FGDs discussion the participant households reported that they were exposed to amount of market failures during the early stages of the COVID-19 outbreak when they had sales their agricultural production. The problem was particularly acute in livestock development. That means according to Woreda agronomists, the price of livestock products had dropped in the market since after the occurrence of COVID-19 pandemic.

As it is depicted in Table 4 below, from the total sampled household, 87 (28.52%) of the households had uneducated (no education). Whereas, among the total sample respondents 129 (42.30%) respondents were primary school (1-8 class) of level of education. In other hand, 61

(20.0%) of respondents were secondary school (9-12 class). Similarly, from the total respondents 28 (9.18%) of respondents were diploma and above. This result align with (Getachew et al, 2018), household who had good status of education level that enables to practice new & modern technology and better manage their farm activities and enhance domestic production and food security to accomplish household consumption needs.

Table 4: Demographic and socioeconomic characteristics for categorical variables

Name of the variables	category	count	%
Educational level of the respondents	1 (no educated)	87	28.52
	2 (1-8 class)	129	42.30
	3 (9-12 class)	61	20.00
	4 (diploma and above)	28	9.18
Decline of agricultural production	1 (no change)	95	31.15
	2 (increase)	38	12.46
	3 (decrease)	172	56.39
Income amount	1 (increase)	17	5.57
	2 (decrease)	229	75.08
	3 (no change)	59	19.34

Source: Analyzed from own survey data, 2022

Moreover, as indicated in the above Table 4 out of the total sample respondents 31.15%, 12.46%, and 56.39%, of respondents were no change, increase, and decrease of decline of agricultural production during COVID-19 respectively. During FGDs discussion the participant households were confirm that the majority of their agricultural production had declined because of shortage of supply of improved seeds, artificial fertilizers, lack of extension contact and increasing the price of agricultural inputs with doubled. Before and after COVID-19 post crop assessment available data evidenced from Bole Bulbula Woreda administration farmer and urban agriculture development office at Woreda level shows that – before COVID-19 yield of wheat crop, teff,

lentil, and chick pea were 4326, 12000,120, and 450 respectively in quintals and total yield were 16896 quintals whereas, after COVID-19 yield of wheat crop, teff, lentil, and chick pea were 2916.8, 8335,277, and 530.6 respectively in quintals and total yield were 12059.4 quintals. As we have seen from the aforementioned information after COVID-19 Bole Bulbula Woreda administration was lost 4836.6 quintals of yield due to partial effect of COVID-19 and others reasons.

4.2. Result of household food insecurity access scale (HFIAS)

Based on the survey result and indicated below in Table 5, about mean .3540984 (35.41%) of the total respondents were worried about having no enough food and the resting 64.59% of respondents were not worried about having no enough food. Likewise, from the total respondent small-scale urban farming households have worried about having no food on average the households in the study area lacks enough food at mean 1.398148 days per a month. Thus, about mean .4721311 or (47.21%) of the total respondents were found to be worried about having not able to eat the food kinds and preferred because of a lack of resources for mean of 1.444444 days per a month. The remaining 52.79% of respondents were not worrying about having not able to eat balance food kinds.

Similarly, the survey data showed that mean of .4786885 or (47.87%) of the total respondents have been eaten limited variety of foods due to lack of resource for mean of 1.376712 days per a month and the remaining 52.13% of respondents have been not eaten limited variety of foods due to lack of resource.

Meanwhile, in the study area about mean of .4786885 or (47.87%) of the total respondents have been eaten some foods that they did not want to eat because of lack of resources to obtain other types of food for mean of 1.321918 days per a month and the remaining 52.13% of respondents have been not eaten unwanted food due to lack of resource to obtain other types of food.

Moreover the field survey showed that about mean of .1967213 or (19.67%) of the total respondents were eaten smaller meal because there were not enough food averagely for mean of

1.266667 days per a month and the rest (80.33%) of respondents have not been eaten smaller meal per days because of there were enough food in study area. Additionally, about mean of .0852459 or (8.52%) of the respondents had been to eat fewer meal per day due to lack of food averagely for one (1) days per a month and the remaining about 91.48% of respondents had not been eat fewer meal per day due to lack of food.

Table 5: Result of Household Food Insecurity Access Scale (HFIAS)

SN	Accessibility of food to household in the past 30 days	Mean	Std. Dev.
1	worry that the household would not have enough food	.3540984	.4790251
	Number of days within the month	1.398148	.5458392
2	Household member not able to eat the preferred food kinds because of a lack of resources	.4721311	.5000431
	Number of days within the month	1.444444	.5390717
3	Household member have to eat a limited variety of foods due to lack of resources	.4786885	.5003666
	Number of days within the month	1.376712	.5002125
4	Household member have to eat some foods that did not want to eat because of lack of resources to obtain other types of food	.4786885	.5003666
	Number of days within the month	1.321918	.4833066
5	Household member have to eat a smaller meal because there was not enough food	.1967213	.3981731
	If 'yes' how many days within the month?	1.266667	.4459485
6	Household member have to eat fewer meals/day because there was no food	.0852459	.2797062
	Number of days within the month	1	0
7	In household because of lack of resources to get food, there ever	0	0

	no food to eat of any kind		
	Number of days within the month	0	0
8	Household member go to sleep at night hungry because there was not enough food	0	0
	Number of days within the month	0	0
9	Household member go a whole day and night without eating anything because there was not enough food	0	0
	Number of days within the month	0	0

Source: Analyzed from own survey data, 2022

From HFIAS analysis indicated in the above table 5, there were no any responses of respondents about question 7 to 9 means there were no problem of ever no food to eat their households, household member go to sleep at night hungry, and household member go without eating anything a whole day and night.

4.2.1. Food security status of the respondent

Household Food Insecurity Access Scale data obtained from HFIAS analysis of the households and HFIA categorized in to four to determine the food security level of the households. HFIA categorized into Food Secure (1), Mildly Food Insecure (2), Moderately Food Insecure (3), and Severely Food Insecure (4).

The result indicated below in Table 6 that, from the total sampled household, 159 (52.13%) of the household food security status found to be food secure, for 84 (27.54%) of the household food security status lies in mildly food insecure and the rest of 62 (20.33%) of the households were in moderately food insecure condition. There was no any households lie in severely food insecure.

Table 6: Food security status of the respondent (using HFIAS)

HFIA category	Count	%
Food secure	159	52.13
Mildly food insecure	84	27.54
Moderately food insecure	62	20.33
Severely food insecure	0	0

4.3. Statistical analyses

4.3.1. Model diagnosis test results

This study conducted the model specification test for the overall model fit (goodness of fit) and model specification error tests (linktest) were carried out after running the ordered logistic regression (ologit).

The overall model fitness of the ordered logistic regression indicate in below Table 7 justified the fact that the models were enough to illustrate the dependent variables. This evidenced by the fact that the Prob R2 statistics of the model is 0.000 which is lies between 0 and 1. The result reinforced that the independent variables of the model could interpret the dependent variable and well fitted (see appendix 4).

Table 7: Test estimation

Tests	Test name	Factors of Adoption
Log likelihood=-190.24285	Prob>chi2	0.000
linktest	_hat	0.000
	_hatsq	0.241

As indicated in the above Table 7 the link test determine the model specification error occur when the relevant variables are omitted from the model or one or more irrelevant variables are included in the model. The null hypothesis showed that there was no model specification error. The p-value of hatsq for this specific study showed that it was not significant so that we fail to reject the null hypothesis and conclude that the model was correctly specified. In this regard, for the linkage between household food security status and factor affecting the household food security situation the p-value is 0.241 (see appendix 2). As we can see from the p-value that it was not significant so that we fail to reject the null hypothesis and conclude that there is no model specification error.

4.3.2. Factors of food security situation of the respondent

The ordered logistic regression model estimation of factors of the household food security situation were indicated in Table 8 below, that out of the fourteen variables, six variables were found to have a significant effect on the probability of household food security situation. These variables are level of education, decline of agricultural production, land holding size, shortage of number of labor, frequency of extension contact, and loss of amount of market. These variables were statistically significant at $p < 0.01$, $p < 0.01$, $p < 0.01$, $p < 0.05$, $p < 0.05$, and $p < 0.01$ significant level respectively. The remaining variables were not statistically significance association with household food security situation.

The respondents who had level of education of primary school (1-8 class), secondary school (9-12 class), diploma and above were less likely to moderately food insecure access than those of uneducated respondents with p-value 0.027, 0.000, and 0.000 respectively. It had statistically significant and positively influences household's food security at 1% significant level as Table 8 shows below. The result reveals that educated household headed had better probability to secure than uneducated household headed. Moreover, the marginal effect showed that as level of education changes from 0 to 1, assuming other factors constant, the probability to be food secure increased (more likely in food secure) by 28.12% at 1% significant level, the probability in mildly food insecure categorized less likely (decreased) by 21.18% and the probability categorized in moderately food insecure less likely (decreased) by 6.95% at 1% significant level.

Similarly, the respondents whose agricultural productions had been decreased were more likely to moderately food insecure than those of respondents that their agricultural productions had not decreased during COVID-19. Decline of agricultural production has been statistically significant and negatively influences household's food security at 1% significant level. The result revealed that the household headed who faced decline of agricultural production during COVID-19 had the probability to insecure than the household headed that their agricultural production was either increase or did not change during COVID-19. Additionally, the marginal effect showed that as decline of agricultural production changes from 0 to 1 and assuming other factors constant, the probability to be food secure decreased (less likely in food secure) by 21.07% at 1% significant level, the probability in mildly food insecure categorized (more likely (increased) by 15.86% and the probability categorized in moderately food insecure more likely (increased) by 5.2% at 1% significant level.

On the other hand the study results revealed that farm size of the household was less likely moderately food insecure access. This variable has been statistically significant at 1% significant level. The result point out that the household headed who had been large land holding size had better probability to secure than the household headed who had been small land holding size. Moreover, the marginal effect showed that as land holding size changes from 0 to 1, assuming other factors constant, the probability to be food secure increased (more likely in food secure) by 22.68% at 1% significant level whereas, the probability in mildly food insecure categorized less likely (decreased) by 17.08% and the probability categorized in moderately food insecure less likely (decreased) by 5.6% at 1% significant level.

Furthermore, those of sample respondents who had faced shortage of labor for their agricultural activities during COVID-19 were more likely to moderately food insecure access than those of respondents that they could not confront working force during COVID-19. This variable has been statistically significant and negatively influences household's food security at 5% significant level as shows table 9 below. The result indicated that the household headed who had been faced shortage of labor during COVID-19 had more probability to insecure than the household headed who had not faced shortage of labor during COVID-19. The marginal effect represent that as shortage of labor changes from 0 to 1 and assuming other factors constant, the

probability to be food secure decreased (less likely in food secure) by 21.13% at 1% significant level, the probability in mildly food insecure categorized (more likely (increased) by 15.65% and the probability categorized in moderately food insecure more likely (increased) by 5.47% at 1% significant level.

Regarding to frequency of extension contact, those of respondents who had not got extension support for their agricultural activities during COVID-19 were more likely to moderately food insecure access than those of respondents that they could be got extension support during COVID-19. Moreover, frequency of extension contact has been statistically significant and negatively influences household's food security at 5% significant level as table 9 shows below. The result declared that the household headed who did not obtain extension service during COVID-19 had more probability to insecure than the household headed who had been obtained extension contact. The marginal effect showed that as extension contact changes from 0 to 1 and assuming other factors constant, the probability to be food secure decreased (less likely in food secure) by 22.04% at 1% significant level, the probability in mildly food insecure categorized (more likely (increased) by 14.84% and the probability categorized in moderately food insecure more likely (increased) by 7.2% at 1% significant level.

Table 8: Multiple ordinal logistic regressions estimation of factors of food security situation of the respondents

Variables	Odds Ratio	Marginal effect dy/dx	Std.Err.	Z	P-value
Sex	1.469543	-.0479655	.5310613	1.07	0.287
Age	.9765038	.0065611	.022451	-1.03	0.301
Levedu		.2812681			
1-8 class	.4634647		1606933	-2.22	0.027**
9-12 class	.0618714		.0370554	-4.65	0.000*
diploma and above	.03188		.030167	-3.64	0.000*
Family Size	.9315584	.0119628	.0679526	-0.97	0.331

Daadrm	1.068013	-.0986547	.4618607	0.15	0.879
Dapdc19		-.2107442			
Increase	.7167589		.6219293	-0.38	0.701
decrease	4.483651		1.806392	3.72	0.000*
Landsz	.3985821	-.1708636	.1248318	-2.94	0.003*
Slaadc19	2.391845	-.2113848	1.020289	2.04	0.041**
Extco	2.603067	-.220464	1.116898	2.23	0.026**
Aagriina	.8932955	.0469078	.3353084	-0.30	0.764
Priain	1.391006	-.0374176	2.013146	0.23	0.820
Lam	.1137376	-.3771562	.0503957	-4.91	0.000*
Agrins		.0044391			
Decrease	5.810676		5.380871	1.90	0.057
no change	3.43184		3.243469	1.30	0.192

Note: *, **, shows P-value significant at $p < 0.01$ and $p < 0.05$

Source: Analyzed from own survey data, 2022

The result displayed in the above Table 8, that the sample respondents who had given “yes” responses for loss of amount of market at sales of their agricultural production during COVID-19 had less likely to moderately food insecure access than those of respondents who had given “no” responses for loss of amount of market. Additionally, the result declared that loss of amount of market had statistically significant and negatively influences household’s food security at 1% significant level. Therefore, the result reveals that the household headed who did not obtain amount of market during COVID-19 had more probability to insecure than the household headed who had attained more mount of market. The marginal effect of loss of amount of market showed that as loss of amount of market changes from 0 to 1, the probability to being in food security categories decreased (less likely in food secure) by 37.71%.

4.4. Coping strategy experience of the sample respondents

The CSI was developed to estimate the household food security status. A coping strategy is a response taken (strategy adopted) by households/individuals when shocks push them beyond the difficulties faced in ‘normal’ times.

In order to evaluate the current awareness and investigate the experience of small-scale peri-urban farming households about coping strategy which was included as a one part of the study in survey-based questionnaire. Based on this the result is indicated in Table 9 below, that 16 (5.25%) of the respondents were sales their assets as a coping strategy for surviving from temporarily food gap and the rest 94.75% were not sales their asset. Similarly, from the total sample of respondents 14 (4.59%), 65 (21.31%) of respondents were consumed low quality and fewer items of food respectively and the remaining 95.41% and 78.69% of the respondents were not consumed low quality and fewer items of food respectively. On the other hand 71 (23.28%) of the respondents had experience for reliance on savings to escape from temporarily problem of shortage of available enough food in the household during COVID-19 and the rest 76.72% of respondents were not reliance on savings. This research results align with the study finding by (GAIN, 2021), that more poor urban households extend to face crisis of outcomes and employing, they practiced coping strategies such as, purchasing food on credit, reducing the number and size of meals, and reducing healthcare expenses. Additionally, by (Degye et al, 2020), that based on local conditions, households are expected to explore for and adopt methods or strategies deemed relevant to mitigate the economic effects of the pandemic. In urban areas, main coping mechanisms include reliance on savings (33.8 percent), reduction of food (16 percent) and non-food consumption (11.5 percent).

Table 9: Coping strategies experience of the respondents during COVID-19

Coping strategy adapted	Frequency	Percentage
Sale of assets	16	5.25

Not sales of assets	289	94.75
Consumption of low quality food	14	4.59
Not consumed of low quality food	291	95.41
Consumption of fewer items of food	65	21.31
Not consumed of fewer items of food	240	78.69
Reliance on savings	71	23.28
Not reliance on savings	234	76.72

Source: Analyzed from own survey data, 2022

Result of Coping Strategy Index of the respondents in study area indicated in below Table 10, that shows 145 (47.54%) of the respondents were rely on less preferred and less expensive foods for 1.58 mean of days per the last seven (7) days whereas the rest 52.46% of the respondents were not rely on less preferred and less expensive foods. Similarly, there was one respondent who had borrow food, or rely on help from a friend or relative from out of the total sample respondents. Furthermore, the coping strategy result shows 112 (36.72%) of respondents were limited portion size of food had eaten at mealtimes for 1.69 mean of days per the last seven (7) days whereas the rest 63.28% of the respondents were not limited portion size of food eaten at mealtimes and one respondent who had been restrict consumption by adults in order to eat small children for 2 mean of days per the last seven (7) days from out of the total sample respondents. Further, the study revealed that 116 (38.03%) of respondents were reduced number of meals eaten in a day for 1.57 mean of days per the last seven (7) days and the remaining 61.97% of the respondents were not reduced number of meals eaten in a day. The sample respondents have not been any experience for the remaining Coping Strategy Index points in the study area.

Table 10: Coping Strategy response of the respondents

CSI	Mean of day	Frequency	Percentage
Rely on less preferred and less expensive foods	1.58	145	47.54
Not rely on less preferred and less expensive foods	0	160	52.46
Borrow food, or rely on help from a friend or relative	2	1	0.33
Not borrow food, or rely on help from a friend or relative	0	304	99.67
Limit portion size at mealtimes	1.69	112	36.72
Not limit portion size at mealtimes	0	193	63.28
Restrict consumption by adults in order for small children to eat	2	1	0.33
Not restrict consumption by adults in order for small children to eat	0	304	99.67
Reduce number of meals eaten in a day	1.57	116	38.03
Not reduce number of meals eaten in a day	0	189	61.97

Source: Analyzed from own survey data, 2022

Coping Strategy Index estimation result computed with adding the whole days that the respondents adapted coping strategy from the past seven days divided by the number of question that the households were gave responses and within this we had got the average days. Finally the average day's lie on 0 and 1 was least severe, 2 and 3 was moderately severe, 4 and 5 was severe, and 6 and 7 was very severe. Therefore, based on this structure- Coping Strategy Index estimation result of the respondents in study area indicated in below Table 11 that 177 (58.03%)

of the respondents were least severe that means those respondents were almost food secured with a little bit exposure of hardship, 120 (39.34%) of the respondents were moderately severe that is their food security status were at medium level, 6 (1.97%) of the respondents were severe food insecure, and the rest of 2 (0.66%) of the respondents were very severe coping strategy experience during COVID-19.

Table 11: Coping Strategy Index estimation result of the respondents (CSI)

CSI Categories	CSI	Frequency	%	Mean	Std. Dev.
Least severe	0 & 1	177	58.03		
Moderately severe	2 & 3	120	39.34		
Severe	4 & 5	6	1.97		
Very severe	6 & 7	2	0.66		
				1.452459	.572278

Source: Analyzed from own survey data, 2022

CHAPTER FIVE: - CONCLUSION AND RECOMMENDATIONS

This chapter presents two sub-sections. The first sub-section is conclusion part where the major findings of the study were concluded. The next sub-section forwards the recommendation point based on the results obtained from the study findings.

5.1. Conclusion

This study was conducted in Bole Bulbula Woreda, Addis Ababa Ethiopia. A multi-stage sampling procedure and cross-sectional survey design was applied. The study data were collected through Survey-based questionnaire, Focus Group Discussions and Key Informant Interviews from 305 selected respondents. From the total sampled households 69.51 % were male and 30.49 % were female respondents. In order to analyzing quantitative data of the study descriptive and econometrics data analysis model was employed using STATA version 15.0 software. Ordered logistic regression model was employed to identify the factors that influencing the small-scale peri-urban farming household food security situation. Food security status of the sample respondents at ahousehold level was compared by ordered logistic regression model with HFIAS analysis. Based on this about 52.13% of households were food secure, 27.54% of households were mildly food insecure, and the rest 20.33% of households were moderately food insecure. Out of fourteen variables of the study six variables were found to have significant effect on household food security situation.

Finally, the study concluded that nearly half of the population in the Woreda were food secure and male headed households were more food secure than those of female headed households in the study area during COVID-19. Food and agriculture are not outside of the partial effect of COVID-19. Crop and livestock production had affected by this pandemic. Food safety and security are the global concern at present scenario. The supply chain had hit hardest by COVID-19, which causes food security of most vulnerable segment of population at risk.

5.2. Recommendations

Based on the study finding, the following recommendation were suggested for taking into account that the discussion was drawn here to fore and conclude above. The recommendations are may be provide perception for future policy formulation regarding to peri-urban agriculture improvement and food security and also serve as an input for further investigation in the country. Furthermore, the possibility of this policy recommendation are to take intervention measure issues related to demographic and socioeconomic problems for those people who are living in the Bole Bulbula Woreda as well as any other area of the country which has been the same characteristics of this Woreda.

The following recommendation is forwarded based on the findings:

- The research finding indicates that if there is higher level of education resulted in increment of food security of the households. This implies that educated farming households had good adoption of new technology and able to achieve their food security situation more than uneducated farming households. Therefore, Woreda farmer and urban agriculture development office collaboratively together with stakeholders should be create more educated farming households by long term strategic plan and within short term tactical plan that it should be provide adult education to uneducated farmers. At least basic education how to write and read could be a means to resolve the indicated problem and minimize the barriers those exist.
- To increase the agricultural production of the households, Woreda farmer and urban agriculture development office and Woreda extension agents should be provide more attention to transform the perception of farmers towards adoption of new technology and to increase their agricultural production through scaling up best practices, provide frequent training and field visit.
- Moreover, the causes of shortage of farm worker were feared of the pandemic and inflation of daily payment for farm worker that is it was increased by doubled. Therefore, Woreda 12

administrative organs should address the cost of living and the inflation and adopt labor-intensive technology to the farmers at the Woreda level within the short term plan that enables the availability of labor with cost effective mechanism. This helps for the future advancement in agricultural works.

- Similarly, in order to improve food security status of small-scale peri-urban farming households, Woreda farmer and urban agriculture development office experts should be give the appropriate agricultural extension service, knowledge, training, and seminars as per standard to the farmers as well as make awareness creation and frequently follow up the performance of agricultural activities.
- Finally to overcome the loss of amount of market, Woreda 12 administration farmer and urban agriculture development office collaboratively together with the governing body should be creating market linkages especially in the livestock sector.

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Appendixes

Appendix 1: Variables and descriptions

Name of the variables	Descriptions
Sex	Sex of the respondents
Age	Age of the respondents
Levedu	Level of education of the respondents
Familysize	Family size
Daadm	Loss of agricultural activities
Dapdc19	Decline of agricultural production
Landsz	Farm size
Creditac	Credit amount
Slaadc19	Adequate farm labor
Extco	Frequency of extension contact
Agriina	Amount of input utilization
Priain	Price of agricultural input
Lam	Loss of amount of market
Agrins	Income amount

Appendix 2: Ordered logit model test (linktest)

. linktest

```
Ordered logistic regression      Number of obs   =      305
                                LR chi2(2)      =      242.30
                                Prob > chi2       =      0.0000
Log likelihood = -189.51966     Pseudo R2      =      0.3900
```

hfiacategory	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
_hat	1.070431	.1143761	9.36	0.000	.8462577	1.294604
_hatsq	-.0441971	.0376625	-1.17	0.241	-.1180143	.0296201
/cut1	-.0217511	.1932724			-.400558	.3570559
/cut2	2.487893	.2608173			1.9767	2.999085

Appendix 3: Ordered logistic regression estimation result for HFIAS (marginal effect)

```
. ologit hfiacategory sex age levedu familysize daadrm dapdc19 landsz slaadc19 extco agriina priain lam agrins sfac19
```

```
Ordered logistic regression          Number of obs      =          305
                                   LR chi2(14)           =          228.25
                                   Prob > chi2            =           0.0000
Log likelihood = -196.54407          Pseudo R2          =           0.3674
```

hfiacategory	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
sex	.1939027	.3543494	0.55	0.584	-.5006095	.8884148
age	-.0266121	.02221	-1.20	0.231	-.0701429	.0169187
levedu	-1.140834	.233461	-4.89	0.000	-1.598409	-.6832588
familysize	-.0485217	.0717484	-0.68	0.499	-.189146	.0921025
daadrm	.4001342	.420609	0.95	0.341	-.4242443	1.224513
dapdc19	.8547866	.1995402	4.28	0.000	.463695	1.245878
landsz	-.9203031	.3027569	-3.04	0.002	-1.513696	-.3269104
slaadc19	.868531	.4187259	2.07	0.038	.0478433	1.689219
extco	.8976075	.4119764	2.18	0.029	.0901487	1.705066
agriina	-.1895781	.3604038	-0.53	0.599	-.8959565	.5168003
priain	.151767	1.3993	0.11	0.914	-2.590811	2.894346
lam	-2.383907	.4269561	-5.58	0.000	-3.220725	-1.547088
agrins	-.018005	.3128383	-0.06	0.954	-.6311568	.5951469
sfac19	1.163429	.3297127	3.53	0.000	.5172036	1.809654
/cut1	-1.885959	2.121038			-6.043118	2.271199
/cut2	.5419311	2.113563			-3.600576	4.684438

```
. mfx, predict (p outcome(1))
```

Marginal effects after ologit

```
y = Pr(hfiacategory==1) (predict, p outcome(1))
= .55877046
```

variable	dy/dx	Std. Err.	z	P>|z|	[ 95% C.I.]		X
sex*	-.0479655	.08785	-0.55	0.585	-.220157	.124226	.304918
age	.0065611	.00549	1.20	0.232	-.004191	.017313	41.0262
levedu	.2812681	.05732	4.91	0.000	.168925	.393611	2.09836
family~e	.0119628	.01768	0.68	0.499	-.022696	.046622	5.18689
daadrm*	-.0986547	.10321	-0.96	0.339	-.300934	.103624	.42623
dapdc19	-.2107442	.04885	-4.31	0.000	-.306482	-.115006	2.25246
landsz	.2268971	.07473	3.04	0.002	.080433	.373362	.485475
slaadc19*	-.2113848	.09927	-2.13	0.033	-.405948	-.016821	.478689
extco*	-.220464	.09703	-2.27	0.023	-.410648	-.03028	.160656
agriina*	.0469078	.08934	0.53	0.600	-.128187	.222003	.711475
priain	-.0374176	.34496	-0.11	0.914	-.713517	.638682	1.00656
lam*	.5103491	.07084	7.20	0.000	.371499	.6492	.386885
agrins	.0044391	.07713	0.06	0.954	-.146739	.155617	2.1377
sfac19*	-.2827222	.07512	-3.76	0.000	-.429963	-.135482	.24918

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. mfx, predict (p outcome(2))

Marginal effects after ologit

y = Pr(hfiacategory==2) (predict, p outcome(2))
 = .37610207

variable	dy/dx	Std. Err.	z	P>|z|	[ 95% C.I.]	X
sex*	.0357539	.06485	0.55	0.581	-.091351 .162859	.304918
age	-.0049408	.00415	-1.19	0.234	-.013076 .003195	41.0262
levedu	-.2118074	.04909	-4.31	0.000	-.308028 -.115587	2.09836
family~e	-.0090086	.01335	-0.67	0.500	-.035181 .017164	5.18689
daadrm*	.0735558	.07658	0.96	0.337	-.07654 .223651	.42623
dapdc19	.1586998	.04087	3.88	0.000	.07859 .23881	2.25246
landsz	-.1708636	.0593	-2.88	0.004	-.287092 -.054635	.485475
slaadc19*	.1565908	.07336	2.13	0.033	.012816 .300365	.478689
extco*	.1484364	.05885	2.52	0.012	.033089 .263784	.160656
agriina*	-.0349456	.06594	-0.53	0.596	-.164187 .094296	.711475
priain	.0281771	.25981	0.11	0.914	-.481048 .537402	1.00656
lam*	-.3771562	.05934	-6.36	0.000	-.493456 -.260856	.386885
agrins	-.0033428	.05808	-0.06	0.954	-.117176 .110491	2.1377
sfac19*	.1892649	.04695	4.03	0.000	.097236 .281294	.24918

(*) dy/dx is for discrete change of dummy variable from 0 to 1

. mfx, predict (p outcome(3))

Marginal effects after ologit

y = Pr(hfiacategory==3) (predict, p outcome(3))
 = .06512747

variable	dy/dx	Std. Err.	z	P>|z|	[ 95% C.I.]	X
sex*	.0122116	.02319	0.53	0.598	-.033238 .057661	.304918
age	-.0016203	.00139	-1.17	0.244	-.004343 .001103	41.0262
levedu	-.0694607	.01716	-4.05	0.000	-.103101 -.03582	2.09836
family~e	-.0029543	.00439	-0.67	0.501	-.011552 .005643	5.18689
daadrm*	.0250989	.02729	0.92	0.358	-.028381 .078579	.42623
dapdc19	.0520444	.01395	3.73	0.000	.024702 .079387	2.25246
landsz	-.0560335	.02009	-2.79	0.005	-.095415 -.016652	.485475
slaadc19*	.0547939	.02897	1.89	0.059	-.001987 .111575	.478689
extco*	.0720276	.0424	1.70	0.089	-.011067 .155123	.160656
agriina*	-.0119621	.02357	-0.51	0.612	-.058158 .034233	.711475
priain	.0092405	.08517	0.11	0.914	-.157684 .176165	1.00656
lam*	-.133193	.0298	-4.47	0.000	-.191592 -.074794	.386885
agrins	-.0010962	.01906	-0.06	0.954	-.038444 .036252	2.1377
sfac19*	.0934574	.03688	2.53	0.011	.021183 .165732	.24918

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Appendix 4: Ordered logistic regression estimation result for determinant factor for household food security situations (ologit)

```
. ologit hfiacategory sex age i.levedu familysize daadrm i.dapdc19 landsz slaadc19 extco agriina priain lam i.agrins sfac
> 19,or
```

```
Ordered logistic regression          Number of obs   =       305
                                     LR chi2(18)      =       240.85
                                     Prob > chi2      =       0.0000
Log likelihood = -190.24285          Pseudo R2       =       0.3876
```

hfiacategory	Odds Ratio	Std. Err.	z	P>|z|	[95% Conf. Interval]
sex	1.469543	.5310613	1.07	0.287	.72373 2.983928
age	.9765038	.022451	-1.03	0.301	.9334775 1.021513
levedu					
primary school	.4634647	.1606933	-2.22	0.027	.2349018 .9144223
secondary school	.0618714	.0370554	-4.65	0.000	.0191292 .2001169
diploma & above	.03188	.030167	-3.64	0.000	.0049895 .2036957
familysize	.9315584	.0679526	-0.97	0.331	.8074564 1.074734
daadrm	1.068013	.4618607	0.15	0.879	.4575892 2.492743
dapdc19					
increased	.7167589	.6219293	-0.38	0.701	.1308544 3.926068
decreased	4.483651	1.806392	3.72	0.000	2.035617 9.875691
landsz	.3985821	.1248318	-2.94	0.003	.2157398 .7363857
slaadc19	2.391845	1.020289	2.04	0.041	1.03666 5.518612
extco	2.603067	1.116898	2.23	0.026	1.122691 6.035462
agriina	.8932955	.3353084	-0.30	0.764	.4280427 1.864246
priain	1.391006	2.013146	0.23	0.820	.0815492 23.72674
lam	.1137376	.0503957	-4.91	0.000	.0477252 .2710568
agrins					
Decreased	5.810676	5.380871	1.90	0.057	.946209 35.68341
No change	3.43184	3.243469	1.30	0.192	.5383282 21.87796
sfac19	3.19219	1.096868	3.38	0.001	1.627824 6.259938
/cut1	.0869739	2.132863			-4.093362 4.267309
/cut2	2.615657	2.13837			-1.575471 6.806785

Appendix 5: Household questionnaire

Addis Ababa University
College of development studies
Department of center for food security studies

Dear respondents;

My name is Tamene Shenkut, MSC candidate in Food security and development studies at Addis Ababa University. As part of my MSC study, I am conducting a research on food security status of small-scale urban farming households amid COVID-19 pandemic at Bole sub-city in Bole bulbula district.

The purpose of this survey questionnaire is to gather primary data concerned about food security status of small-scale urban farming households amid COVID-19 pandemic for MSC study and understand the current food security situation of the households. Based on this, I am going to ask you few questions regarding you and your family. You are kindly requested to provide genuine, accurate, and reliable information which are highly valued for this research exercise. Your answers are completely confidential and will not be shared to third person and you will not be identified by name in any way. If you do not have to answer any questions that you do not want to answer, and you may end this interview at any time you want to, you are free to do so. Your answer will only be used for academic purpose. The survey will take about 20 to 30 minutes. Eventually, I would like to thank you in advance for your cooperation and time to give information on this survey.

Interview No: _____
Date of the interview ----- (DD/MM/YYYY)
Interviewer name -----
District /Woreda-----Cluster-----

Part 1: Demographic and socio-economic information of the respondents

General Instruction: Please give your response with in circle or tick the selected number.

1. Demographic and socio-economic questions for the objective of factors of food security situation of small-scale peri-urban farming households during COVID-19:

No.	Questions	Coding categories	Skip Options (Skip to)
1	Gender of the respondent	Male 0 Female 1	
2	Age of the respondent	[_____]	
3	Marital Status of the respondent	Single 1 Married 2 Divorced/separated 3 Widow/widower 4	
4	What is the highest level of school you completed?	No Education 1 Primary (1-8 class) 2 Secondary(9-12class) 3 Diploma & above 4	
5	Household family size by gender	Male..... Female.....	
6	How many members of the family are participating in urban farming activities?	.....no.	
7	How many members of the family are not active in urban farming activities?	.....no.	
8	What are the causes for those who are	Sick 1	

	economically dependent?	Age	2	
		Disabled	3	
		others specify	4	
9	Did you miss/delay any of the routine agricultural activities due to the curfew and restrictions of movement?	Yes	1	
		No	0	
10	What kind of crop did you cultivate?	Cereal crop	1	
		Cereal & legume crop	2	
		Vegetable crop	3	
11	How many quintals per year did you get from your total crop cultivated?	.....quintal		
12	During the occurrence of COVID-19 what is your situation of agricultural production?	No change	1	
		Increased	2	
		Decreased	3	
13	If you are answer the above question is decreasing what is the magnitude of it?	Very high	1	
		High	2	
		Medium	3	
		Low	4	
14	What is your total farm size for crop or livestock production in (ha).....			
15	Did you get any credit access either GoE or NGO amid COVID-19?	Yes	1	
		No	0	
16	Did you save money?	Yes	1	
		No	0	
17	If yes, question 16 how much money did you save each month?	.....birr		
18	How much fertilizer did you use?	Dap+ Urea.....quintal		
19	How much improved seed did you use?	.....quintal		
20	How much improve fodder have you used for poultry/fattening/dairy products per	.....quintal		

	month?		
21	Do you have school drop-out children?	Yes No	1 0
22	If yes, what are the reasons for drop-out?	Lack of food Lack of school material Lack of school uniform Infected with COVID -19 Pandemic Other (specify)	1 2 3 4 5
23	Did you have been faced the shortage of labor in your agricultural activities due to COVID-19?	Yes No	1 0
24	Does an extension agent visit you to give technical support for agricultural activities amid COVID-19?	Yes No	1 0
25	If you are answer the above question is yes, how often the extension worker visits you in one month?	-----times	
26	Are agricultural inputs still available for your agriculture activities amid COVID-19?	Yes, partially available No available	1 0
27	Is the price of agricultural inputs are increased amid COVID-19?	Yes No	1 0
28	What is the current price of agricultural inputs?	.....Birr	
29	Did you have faced loss of access of market in order to sell your agricultural production or buy cereal for food amid COVID-19?	Yes No	1 0
30	Is the COVID-19 pandemic disease having any effect on your agriculture and	Yes No	1 0

	food security situation?		
31	Almost in the past 2 years did you or any member of the household infected with COVID-19?	Yes No	1 0
32	If you are answer the above question yes how many members of the household infected with COVID-19?	.....no.	
33	If you are answer the question 21 yes what is the effect of it in your food security situation?	Negative There is no effect	1 0
34	What about your agricultural income situation amid COVID-19 pandemic disease?	Increased Decreased No change	1 2 3
35	Are you engaged in off-farm activity during COVID-19?	Yes No	1 0
36	If you are answer the above question yes, how much birr did you get from off-farm activity (income amount in month)	.....Birr	
37	What are your income sources during COVID-19?	Crop production Fattening Dairy production Poultry production Mixed farming	1 2 3 4 5
38	What is your total agricultural average monthly income amid COVID-19?	.....Birr	
39	What is your total monthly expenditure in birr?	.....Birr	

2. Questions for the objective of analyze the food security status of small-scale peri-urban farming households:

No	Questions	Coding categories	Skip Options (Skip to)
40	Did you have face shortage of food amid COVID-19?	Yes 1 No 0	
41	What is your food security status?	Food secure 1 Mildly food insecure 2 Moderately food insecure 3 Severely food insecure 4	

3. Questions for the objective of coping strategy experience of small-scale peri-urban farming households during COVID-19:

No	Questions	Coding categories	Skip Options (Skip to)
42	What type of coping strategies did you used often for food security adaptation during COVID-19 pandemic?	sale of assets 1 consumption of low-quality food 2 consumption of fewer items of food 3 borrowing food 4 borrowing money 5 Reliance on savings 6 social capital 7 purchasing food on credits 8 Other specify []	

Part 2: HFIAS questionnaire for analyze the food security status of small-scale peri-urban farming households.

Availability and accessibility of food to household in the last four weeks/one month (HFIAS)

No.	Question	Response Options	Cod e
1	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1 =Yes	|__|
1a	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)	|__|
2	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1 = Yes	|__|
2a	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)	|__|
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?	0 = No (skip to Q4) 1=Yes	|__|
3a	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)	|__|

		past four weeks) 3 = Often (more than ten times in the past four weeks)	
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?	0 = No (skip to Q5) 1=Yes	|__|
4a	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)	|__|
5	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1=Yes	|__|
5a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|__|
6	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1=Yes	|__|
6a		1 = Rarely (once or twice in the past four weeks)	

	How often did this happen?	2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|__|
7	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q8) 1=Yes	|__|
7a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|__|
8	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1=Yes	|__|
8a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	|__|
9	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished) 1=Yes	|__|
9a	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)	|__|

		past four weeks) 3 = Often (more than ten times in the past four weeks)	
--	--	--	--

Part 3: Coping Strategy Index used to analyze the food shortage adaptation of small-scale peri-urban farming households during the crisis of COVID-19.

S/ N.	Coping Strategies (In the past 7 days, if there have been times when you did not have enough food and don't have enough money to buy food, how often has your household had to	Frequency (no. of days a household experienced the following coping strategies in the past 7 days)	Univ ers al Sever ity Weigh t	Weighted Score = Weight x Frequency
A	Dietary Change Strategy			
1	Rely on less preferred and less expensive foods?		1	
B	Increase Short-Term Household Food Availability			
2	Borrow food, or rely on help from a friend or relative?		2	
3	Purchase food on credit?		2	
4	Gather food from garbage or collect leftovers from hotels or somewhere		4	
5	Do labor work for friends, relatives, neighbors etc. in exchange of food		3	
C	Decrease Numbers of People			
6	Send household members to eat elsewhere?		2	
7	Send household members to beg?		4	

D	Rationing Strategies			
8	Limit portion size at mealtimes?		1	
9	Restrict consumption by adults in order for small children to eat?		2	
10	Feed working members at the expense of non-working members?		2	
11	Reduce number of meals eaten in a day?		2	
12	Skip entire days without eating?		4	
	Total			

Part 4: Key Informant Interview checklists for Sub-city & Woreda administrations farmer & urban agriculture development office experts.

Date of interview conducted: _____

Interview no. _____

Name of Interviewer: _____

Name of interviewee: _____

Woreda _____

Objective	S.n	Questions	Remark
Factors of food security situation of small-scale peri-urban farming households during COVID-19	1	Are the agricultural inputs and extension services still available for small-scale urban farming households?	
	2	What is the price of agricultural input at the time of COVID-19 crisis? Decreased / the same / increased/ why? What is the current price of it?	
	3	In your belief what are the factors that affect the small-scale peri-urban farming activities during COVID-19 pandemic? How to affect it?	
	4	What is the effect of COVID-19 on the performance of small-scale peri-urban farming activities?	
	5	Can you describe any type of agricultural activities which are more affected by COVID-19?	

	6	What is the situation of agricultural production amid COVID-19 pandemic?	
Analyze the food security status of small-scale peri-urban farming households	1	What is the food security situation of small-scale peri-urban farming households during COVID-19?	

Part 5: Guide for Focus Group Discussions (FGDs)

For sample households Respondents

Date of discussion _____

Woreda _____

Focus group no. _____

No. of participant in the group: Male _____ Female _____ Total _____

Objective	S.n	Questions	Remark
Factors of food security situation of small-scale peri-urban farming households during COVID-19	1	Does agricultural inputs still available during the COVID-19 pandemic disease?	
	2	What is the current price of agricultural inputs?	
	3	Did you have access any agricultural extension service from the responsible institutions during the crisis COVID-19?	
	4	What is the status of your income during COVID-19?	
	5	Did you face shortage of food due to effect of COVID-19?	
	6	What is the consumption pattern of the household during COVID-19?	
	7	In your belief what are the core problems that are faced you for your farming activities during COVID-19?	
	8	What is the situation of market access during COVID-	

		19?	
	9	Did you face shortage of labor to perform your agricultural activities?	
	10	What is the stage of your current food security status?	
	11	How your current agriculture activities affected by the curfew/movement restrictions?	
	12	What is the effect of COVID-19 on your agricultural activities?	
	13	Which agricultural activities are more affected with COVID-19?	
	14	Do you explain briefly your agricultural production situation during the COVID-19?	
Coping strategies of small-scale peri-urban farming households during the crisis of COVID-19	1	What types of coping strategies practiced you during the crisis of COVID-19?	

THANK YOU!!!

