

BISHOP STUART UNIVERSITY



ANALYSIS OF THE EFFECTS OF THE FORMS AND DRIVERS OF URBAN AGRICULTURE ON THE SOCIO-ECONOMIC STATUS OF FARMERS IN KAMPALA AND MBARARA CITIES, UGANDA

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DECLARATION

I, Ninsheka Leonard, do declare that this dissertation is a result of my work. However, the ideas that are not of my own have been acknowledged and credited. I further affirm that this dissertation has never been presented to any University or other tertiary institution for the award of certificate, diploma or degree.

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APPROVAL

This dissertation has been submitted to the Directorate of Graduate Studies, Research, and Innovations with the approval of the following supervisors.

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DEDICATION

To my dear wife “Nahurira Rachael”, my children, my parents, brothers, sisters and my friends

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LIST OF ACRONYMS AND ABBREVIATIONS

BSU:	Bishop Stuart University
CVI:	Content Validity Index
DV:	Dependent Variable
EU:	European Union
FAO:	Food and Agriculture Organization
FDGs:	Focus Group Discussions
IMO:	Indigenous Micro Organism
IV:	Independent Variable
LCs:	Local Councils
MV:	Moderating Variable
NGOs:	Non-Governmental organizations
PSU:	Primary Sampling Unit
REC:	Research Ethics committee
SES:	Socio Economic Status
SPSS:	Statistical Package for Social Scientists
SSU:	Secondary Sampling Unit
UA:	Urban Agriculture
UBOS:	Uganda Bureau of Standards
UFs:	Urban Farmers
UN:	United Nations
UNEP:	United Nations Environment Program

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ABSTRACT

The study analyzed the effects of the forms and drivers of urban agriculture on the socio-economic status of farmers in Kampala and Mbarara Cities, Uganda. The objectives were to; examine the influence of forms of urban agriculture on the socio-economic status of farmers, examine the influence drivers of urban agriculture on the socio-economic status of farmers, establish the influence of socio-demographic characteristics on the socio-economic status of urban farmers and establish the impact of policy directives in urban agriculture on the socio-economic status of urban farmers in Kampala and Mbarara Cities. The study adopted a cross-sectional design combined with qualitative and quantitative methods for data collection and analysis. A multistage cluster sampling technique involving both simple random and purposive approaches was employed to get the required number of respondents. Using questionnaires, focus group discussions (FGDs), key informant interviews and observations, data was gathered from a sample of 384 respondents. Microsoft EXCEL and Statistical Package for Social Science (SPSS) Version 21.0 were used to analyze the data and produce both descriptive and inferential statistics. The study found a strong association between forms of urban agriculture and socio-economic status of the urban farmers in Kampala and Mbarara Cities. Household socio-economic status was substantially correlated with subsistence farms ($\chi^2 = 15.615$, $p < 0.001$), commercial farms ($\chi^2 = 18.907$, $p < 0.001$), and tourist farms ($\chi^2 = 7.784$, $p < 0.005$). Subsistence farms (backyard, roadside and rooftop gardens), commercial farms (zero, poultry, fish farms and crop farms), and tourist farms (demonstration sites) had a significant influence on household food and income security of Urban farmers. The study also discovered a positive significant relationship between drivers of urban agriculture and socio-economic status of the urban farmers with access to market ($P < 0.002$), Access to financial grants ($p < 0.012$), Access to capital ($P < 0.029$) and value addition ($P < 0.021$). Further, the study discovered a significant relationship between farmers' socio demographic characteristics and their socio economic status where by Age ($P < 0.002$), Gender ($p < 0.038$), Religion ($P < 0.001$), source of livelihood ($p < 0.005$) and lastly group membership (0.002). The study further established appropriate policy directions for urban agriculture in Kampala and Mbarara Cities. The study confirmed a significant influence of the forms and drivers of urban agriculture on socio economic status of urban farmers. Also the study concluded that there a significant influence socio demographic characteristics on social economic status of urban farmers. The further confirms the need for harmonized and

appropriate policy framework for urban agriculture development. The study recommended promotion of cost effective technologies to solve the problem of land shortage in urban areas. Also government must invest in urban farming demonstration sites and education centres to improve knowledge on urban farming. Also city authorities also should encourage urban farmers to form groups for marketing, value addition, and organic recycling of wastes. Government should also invest in urban agriculture forms that are not widely practiced such as agritourism, fish farming, piggery, rabbits farming and also formulate urban agriculture policy that is applicable to all urban centers.

CHAPTER ONE: INTRODUCTION

1.1 Back ground

The world is driven by major developments, such as rapid urbanization (Arsiso et al., 2018), climate change (Akanwa and Joe-Ikechebelu, 2019), lifestyle changes (Hawkes, 2006), and fast technological developments (Zhang and Zhou 2022), which has a bearing on resources utilization most especially land and food security among others. World over Cities invests in Urban Agriculture (UA) initiatives (Van.Tuijl et al., 2018). This is backed by a variety of rationales and policies. On both the global and domestic fronts, UA is taking on many forms and is being driven by several motivations which include; farmer's interests, marketing systems, extension services, and policies on urban farming (Kirkpatrick and Davison, 2017). These forms and drivers have effects on the socioeconomic status (SES) of the farmers. Socio economic status is represented by the combined measurement of the economic and social position of an entity compared to others in society (Loy et al., 2013). Also, it refers to an individual's position within a hierarchical social structure (Guru Raj et al., 2015).

This influences accessibility to the resources, livelihood pattern, food & nutritional security, income, and ownership of property. A family will struggle to raise its status if it's low or fight to maintain it when it is threatened is fact apparent to all societies (UN report, 2020).

Since 3500 BC UA practice was limited to simple agricultural practices meant to produce food and income to supplement the needs of the poor (Thebo et al., 2014; Nicholls et al., 2020). As the practice increased in size and needs, the forms of UA transformed and the motivations improved (Stewart et al., 2013). The term 'urban agriculture' is spreading across developed and developing countries worldwide. In developing countries, UA is particularly used to feed the rapidly growing population (Gouldson et al., 2018), while in developed countries, UA usually is associated with lifestyle, health, community development, and innovation (Tornaghi, 2014,). According to Thebo et al., (2014) "urban agriculture" means the practice of growing crops, aromatic plants, herbs, spices, and ornamentals; and the rearing of fish, poultry, and livestock for food, income, environment management, and medicine in and around the cities, towns & urban environments; and includes the processing and marketing of such products.

This large diversity in motivations for UA is attributed to the rising interest in urbanization as a remedy to a crisis in the industrial food system (McClinton and Simpson, 2018; Van Tuijlet al., 2018; Knezevic, 2021). This has created food justice movements (Agymann and Mcentee, 2014; Koberinski 2019), leading to the new food producing technologies (Morgan and Sonnino, 2010; Eigenbrod and Gruda, 2015). In a nutshell, it is stressed that food should not be looked at as a tradable product in a system mainly based on low costs, but as a human right (FAO, 2017), cultural determinant, renewable resource, essential for humans or public good in an alternative food system (Vivero Pol, 2017).

Urban agriculture is now being recognized by city authorities in many countries due to its significant contributions to urban food systems, ecosystems, and the economy (Barthel et al., 2019; Kangogo et al., 2020). Because of this formalization, some countries in Sub-Sahara Africa (SSA) now have 'Urban Agriculture Directorates' as part of their government departments. According to Drechsel et al., (2016), UA in SSA encompasses a complex and diverse mix of production and marketing activities. The most common systems are 1) backyard gardening (mostly subsistence); 2) open space crop cultivation for irrigated vegetables, flowers and ornamentals, seedlings, and rain-fed cereals (mostly market-oriented); and 3) the rearing of dairy cattle, small ruminants, aquaculture, and poultry (both subsistence and market-oriented). Urban production systems are usually very intensive and small scale due to lack adequate land space caused by competition from other sectors, especially housing. Production is supported by a marketing network and to a lesser extent processing systems (Yuan et al., 2022)

Urban agriculture performs a lot of purposes, appears in many places, and takes many forms (Dimitri et al., 2015; Van Tuijl et al., 2018). Van Tuijl et al., further urged that there are several new types of energy-efficient cultivation concepts notably vertical farming, zero-acreage farming (Z farming), plant factories with artificial lighting (PFAL), agro-parks and agro-tourism (Despommier 2019; Engler and Krarti, 2021; Thomaier et al., 2014; Pecht et al., 2015; Pennisi et al., 2019); Yang et al., 2010). Pennisi et al., (2019) attribute these types of UA to rapid technological development. Not every type of UA fits in a single category (McClintock, 2013), and overlaps between the types that exist (Sanyé-Mengual et al, 2020). Combinations are also possible. For instance, according to Sanyé-Mengual (2015), community gardens on roof of buildings can make use of zero acreage farming (Z-Farming) technologies.

Researchers notably McClintock, (2014); Thomaier et al.,(2014, 2015); Van Tuijl et al.,(2018); Pearson et al.,(2010), Pulighe & Lupia (2016), have maintained that the management, organization and the strategic focus indicate that the various types of UA differ in terms of scale and location of production and the market dimension. Thus, UA is a multi-dimensional concept (Rogus and Dmitri, 2015) seeking to be implemented variously and in different forms for a variety of goals. They further urged that the various dimensions can be divided into two main categories, that is: the strategic focus and the 'locational dimension'. According to Van Tuijl et al., (2018), the locational dimension deals with locations of UA in cities, while the strategic focus refers to various purposes of UA such as the market orientation, and the products it generates (Rogus and Dmitri, 2015). According to Sabiiti and Katongole, (2016); Yap (2013) in the Ugandan context, urban farming emerged from the political and economic crises of the 1970s and is largely practised in Kampala and other towns in Uganda. FAO (2017), further reported that, crop production (vegetables) and livestock keeping (poultry, dairy cattle, and pigs) are the main components of UA systems, along with cassava growing and other staple crops in peri-urban areas. Relatedly, according to Lee-Smith (2008), UA households have been categorized into four types: commercial farmers, food self-sufficiency farmers, food security farmers, and Survival farmers. Lee-Smith (2008) and Sabiiti et al., (2014) further elaborated that there are very few commercial farmers that are generally well-off that produce for the urban market. The other category is food self-sufficiency farmers which are also well-off and found in other areas except for the inner urban core (Zasada et al., 2019; Sabiiti et al., 2014; Opitz et al., 2015; Pateman, 2011). They produce food primarily for household consumption (Ntakyo& Van den Berg, 2019). Food security farmers are found both in urban and peri-urban areas (Dossaet al., 2011; Korth et al., 2014). They practice UA as a secondary form of employment as well as a source of food (FAO, 2018). They have alternative income sources with farming acting as a supplement to urban lifestyles. Survival farmers include a very large number of people (Sabiiti et al., 2014). They are largely engaged in vegetable, poultry, and pig production (Baltenweck et al., 2018). Many studies indicate that UA has been done in Kampala at the expense of other urban areas (Sabiiti et al., 2014; Komakech et al., 2014; Richmond et al., 2018). Therefore, this study identified the niche and bridged the gap by looking at Kampala and Mbarara Cities. It established the forms and drivers of UA concerning the SES of the urban farmers (UFs) and investigated the types and motivations in UA engagement. The study focused on farmers

practicing UA concerning their SES and determined policy directions that influence UA practices in Uganda.

1.2 Statement of the problem

Urban agriculture is taking on many forms and is driven by several interests (Kirkpatrick & Davison, 2018). Whereas in the past UA was one of the occupations of the urban poor to supplement their incomes, the current urban expansion has increased the forms and drivers of UA (Dimitri et al., 2015). This has a bearing on the socio economic status of urban farmers in Kampala and Mbarara cities. According Islam (2023), there has been also the challenge of gentrification of the land by middle-class and wealthy people causing displacement of urban poor pushing them to marginal areas. Literature relating to the effects of forms and drivers of UA on farmers' SES in Uganda is scanty, (Hallet et al., 2016; Van. Tuijl et al., 2018). How farmers derive their social and economic status from engaging in UA, the types and motivations of farmers are not clear. Relatedly, there is limited information on the extension and research needs for urban farmers. The same applies to the marketing systems the farmers use. The policy direction to UA is not clear and the areas are grey. An understanding of the SES, the factors that are crucial for food security and the agricultural sector are essential to developing the right technologies and policies (Pawlak and Kołodziejczak, 2020). The study was segregated into intensive commercial farmers (poultry, piggery, rabbits, and green agriculture) and subsistence farmers (back yard farming) and established their impact at the household level SES of farmers in terms of food security, household income and ownership of property. The farmers' motivation, extension support, household livelihoods and food security were analyzed documented and recommendations drawn to inform policy direction.

1.3 Objective of the study.

1.3.1 The Main Objectives.

The main objective of the study was to establish the forms and drivers of urban agriculture and their effect on the socio-economic status of farmers in Kampala and Mbarara Cities.

1.3.2 Specific objectives

The specific objectives of the study were:

- 1) To assess the influence of the different forms of urban agriculture on the socio-economic status of urban farmers in the Kampala and Mbarara Cities.
- 2) To examine the influence of the drivers of urban agriculture on the socio-economic status of urban farmers in Kampala and Mbarara Cities.
- 3) To establish influence of socio demographic characteristics on the socio-economic status of urban farmers in Kampala and Mbarara Cities.
- 4) Establish the impact of policy directions in urban agriculture on the socio-economic status of urban farmers in Kampala and Mbarara Cities.

1.4 Research Questions.

- 1) What are forms of urban agriculture practiced by urban farmers in the study areas?
- 2) What are the drivers of urban agriculture in the study areas?
- 3) What are the socio-demographic characteristics of urban farmers in the study areas?
- 4) What are the different policy directions of government on urban agriculture in the study areas?

1.5 Hypotheses of the study

The following hypotheses will be tested at a 5% level of significance.

- 1) There is no relationship between the forms of urban agriculture and the socio-economic status of urban farmers.
- 2) There is no relationship between the drivers' of urban agriculture and the socio-economic status of the urban farmers.
- 3) There is no relationship between the socio demographic characteristics and socio economic status of urban farmers

1.6 Justification of the study

Urban agriculture is now being recognized by government of Uganda due to its significant contributions to urban food systems, ecosystems, and the economy. Government of Uganda has invested increasingly significant resources to ensure its growth through a number of initiatives:

NAADS through PMA and Poverty Eradication Action Plan (PEAP), Operation Wealth Creation (OWC), Parish Development Model (PDM) for household income and food security. This has the potential to impact economically the course of development in Kampala and Mbarara Cities.

There are indications that UA can reduce urban poverty and contribute in meeting the socio-economic needs of the urban populations. However, this sub sector has limited information to quantify and guide national agricultural development planning. The study has provided the information needed for the establishment of sustainable forms of urban agriculture, invest in drivers that have significant impact and contribute to regulatory policy framework that can ensure orderly, prioritized UA for national development.

This study also have provided information to guide members of public to make an informed choice on the appropriate types of urban agriculture technology to undertake to address the problem of food security and income which in line with sustainable development goals number 1 and 2, (SDG 1=No Poverty, 2= Zero Hunger).It will also contribute to existing set of knowledge on urban agriculture to be used for advancement of the knowledge for academic purposes which in line SDG 3 = Quality Education. And lastly, the study provided the needed information leading to the establishment of a regulatory policy framework to ensure orderly, prioritized, and sustainable use of urban resources which in line with SDG 11= Sustainable Cities and Communities.

1.7 Scope of the study

1.7.1 Geographical Scope

The study included the urban areas of Kampala and Mbarara Cities. These two cities have been chosen because of their ecological background with Kampala to represent Lake Victoria crescent characterized by banana, coffee, farming system accompanied with root crops, vegetables, and fruits, poultry, and piggery. Mbarara is in the cattle corridor characterized by livestock keeping (cattle keeping, goat and sheep rearing, and cereal production with banana plantations). Kampala City has 5 divisions (Rubaga, Kawempe, Nakawa, Makindye and Kampala central). For this study, only 4 divisions were considered because Kampala central is the business hub of the city with few agriculture activities taking place and agriculture is not a viable economic venture

depending on land space available and population concentration. On the other hand Mbarara City has 6 divisions (Kakoba, Nyamitanga, Kamukuzi, Kakiika, Biharwe, and Nyakayojo). Also here the researcher selected 4 divisions excluding two which are Biharwe and Nyakayojo. These two divisions have just been included in the city and are dominated by farmers using the conventional methods of agriculture mostly common with rural farmers because of big acreage of land available at their disposal for extensive farming methods, while improved urban farming methods which are intensive are not yet being practiced in these areas.

1.7.2 Content Scope

The content scope of the study is about the forms and drivers of urban agriculture and social economic status of urban farmers in Kampala and Mbarara cities in Uganda. The forms of UA were studied in terms of types of UA available which include; Subsistence farms - organic foods, Commercial farms-poultry, fish, zero-grazing, and Tourist farms. The drivers of UA were studied in terms of its motivations which include; marketing systems -formal & informal, extension services and training, and Credit/Capital. Then SES was studied in terms of expectations/outcomes got from utilizing UA innovations by a household which include ownership of property, food security, and household income.

1.7.3. Time Scope

This study covered urban farmers who have accumulated experience from one to ten years in urban farming. This time is enough for farmers to master urban farming technologies. And it's enough time for securing conducive land tenure ownership security by a farmer whether he/she is a tenant or landlord for investing in urban farming innovations/technologies.

1.8 The Theoretical Frameworks underpinning the study

This study was anchored on the Johann Heinrich von Thünen's Theory of the 19th century and the Theory of Planned Behavior by Icek Ajzen 1991.

1.8.1 Von Thünen's theory

Von Thünen's theory illuminates how farm products should be grown in concentric zones outward from the city center (Han et al., 2022) as illustrated in figure1. It goes to explain how the market distance (economic location) influences land use (type of agriculture) (Gullers 2015). Aoyama et al, (2012) urged that Von Thunen's theory explains the effects of market distance on the location and agriculture type undertaken. Anderson (2012) further explains the theory as the relationship between transport distance and production location with local land rent. It establishes location regularity on land use and comparative advantage of the location.

Anderson, (2012) further urged that Von Thünen's theory explains how urban-close production is related to transport costs and bid rents. The landlord rents out the land to the farmer who can pay the highest rent. The City is usually a market centre. Von Thünen's theory states that commercial agriculture is dependent upon urban marketing systems for the produce. However, the theory assumes the price of agricultural output and transportation rates are fixed (Anderson, 2012). This study postulate that this theory is legitimate and anchors this study due to the fact that it addressed pertinent issues about UA, since it looked at the distance to market Centres and land rent prices as the determinants to the types of UA enterprise to undertake. It also looks at the motivations of farmers with the availability of market, extension, and training, capital, or credit accessibility by the farmers to acquire improved technology. It also considers the policy framework available in terms of land, technology, environment, and urban agriculture.

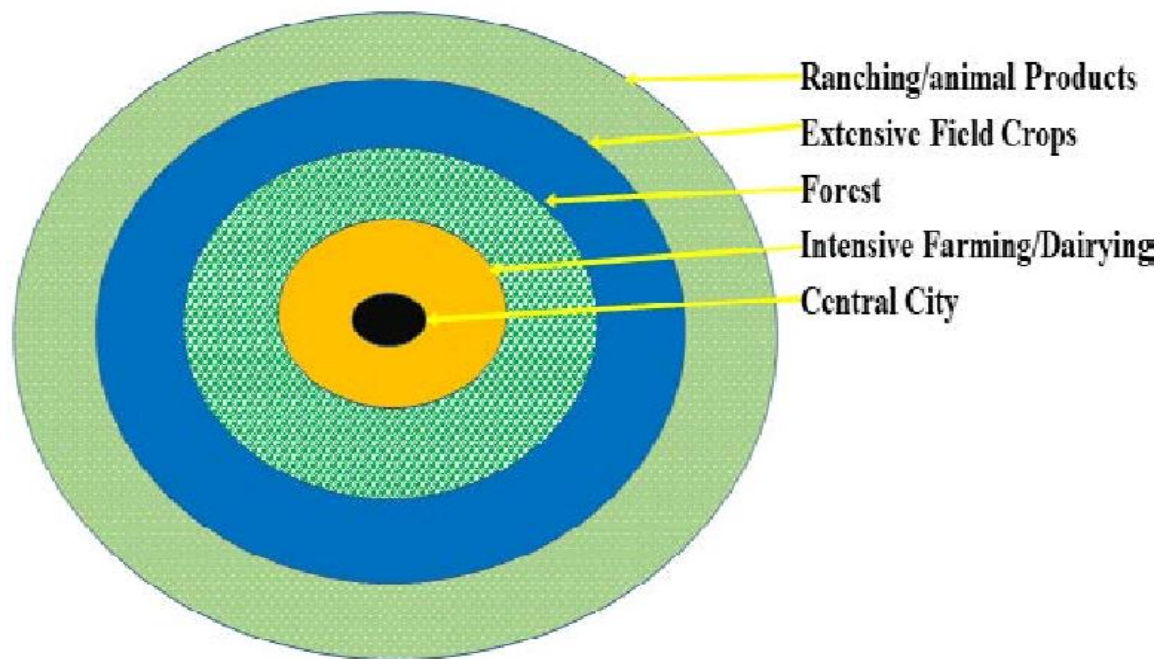


Figure 1: Thünen's Model

Source: Han et al., 2022

1.8.2 The theory of planned behavior

According to Sok et al., (2021) the theory of planned behaviour (TPB) was developed by Icek Ajzen as an attempt to predict human behavior (Ajzen, 1991). The TPB posits that attitude toward the behavior, subjective norm, and perceived behavioral control influence behavioral intention. This theory has been widely used in investigations of decisions and behaviors of farmers (Senger et al., 2017).

According to the TPB, the decision to diversify originates from the intention of the farmers, which is influenced by three constructs: attitude, subjective norm and perceived behavioral control (Figure 2). The use of these three constructs allow us to identify how farmers evaluate the possibility of adopting a particular production type/form of UA on their farms (attitude), verifying the social pressure perceived by farmers to engage in agriculture production/drivers of UA (subjective norm) and identifying the perception of farmers of their ability to use this strategy on their farms amidst the city policy regulations (perceived behavioral control). The constructs attitude, subjective norm and perceived behavioral control are originated from

behavioral, normative and control beliefs, respectively. The analysis of beliefs identifies the drivers of these constructs.

According to Ajzen and Fishbein (1980), attitude is the way in which a person feels about engaging in a particular conduct. The person's ideas about the benefits or qualities of engaging in the conduct, which are then weighed by judgments of those benefits or qualities, influence their attitude. In other words, someone who thinks acting in a certain way will result in optimistic outcomes will have a favorable attitude toward that action, whereas someone who thinks acting in that way would result in poor outcomes will have a negative attitude (Montano and Kasprzyk, 2015). A person's positive attitude toward an activity is more likely to result in the intention to engage in the behavior, that is why attitude is seen to be a key determinant in behavior prediction (Montano and Kasprzyk, 2015)

The second TPB construct, the subjective norm, describes the perceived social pressure to engage in or refrain from engaging in a behavior. Ajzen and Fishbein (1980) claim that the subjective norm is the person's perception of whether important individuals think they must carry out the behavior. The individual's normative beliefs, or whether significant referents approve or disapprove of engaging in the action, are weighted by their desire to follow those referents, and these beliefs define the person's subjective norm (Montano and Kasprzyk, 2015). In other words, people are a high probability to perform a behavior if they believe significant other approve of it and are motivated to live up to their expectations (Ejigu and Yeshitela 2024). Farmers' intentions to start urban agriculture may be greatly influenced by social expectations from influential coworkers, family, or friends, for instance (Cook et al., 2021).

The third TPB component, perceived behavioral control (PBC), describes how an individual perceives how easy or difficult an activity is to carry out (Ejigu and Yeshitela2024). PBC is believed to be founded on accessible control beliefs, which are concerned with the existence of elements that may help or obstruct the performance of the activity (Ajzen 2020). Control elements include necessary knowledge and skills, the presence or absence of time, money, and other resources, and other people's participation. PBC depicts how the conduct is perceived to be constrained both internally and externally (Ejigu and Yeshitela2024). An individual will feel themselves to have a great deal of control over a behavior if they hold strong controlling beliefs about the circumstances that facilitate that conduct. In contrast, a person with weak controlling

beliefs would feel little control over their action, which would prevent it from happening (Tavallae et al., 2017). The primary predictor of conduct is intention, which is impacted by attitude, perceived behavioral control, and subjective norm. The stronger the intention to conduct the behavior, and thus the more probable the behavior will be completed, is correlated with the individual's attitude and subjective norms toward the behavior, as well as the degree of perceived behavioral control (Ajzen, 2020)

The use of the TPB is justified first, by the growth of this kind of approach that suggests that the behavior of farmers is not only influenced by profit maximization (Gasson, 1973; van Sommeren 2019); and second, because relatively few studies focus on the social psychological factors that influence farmers' decisions on diversifying their agricultural production (Senger et al., 2017), particularly in developing countries, as Uganda.

For this study TPB is regiment theory because it looks at an urban farmer's decision to engage in UA which include the various forms i.e. substance, commercial and agritourism forms which describe the farmers attitude towards UA. This decision is influenced by the drivers which include; extension services, marketing systems, availability of credit, capital and grants, also accesses to electricity and water are strong motivators which describes the subjective norms because the farmers will be influences by others though these fore mentioned motivations. Then there a regulatory body in urban environment for farming to register success in terms urban agriculture, land use and environmental protection policies which are described as perceived behavior control. All these are geared towards improving the SES of the urban farmers as illustrated Figure 2.

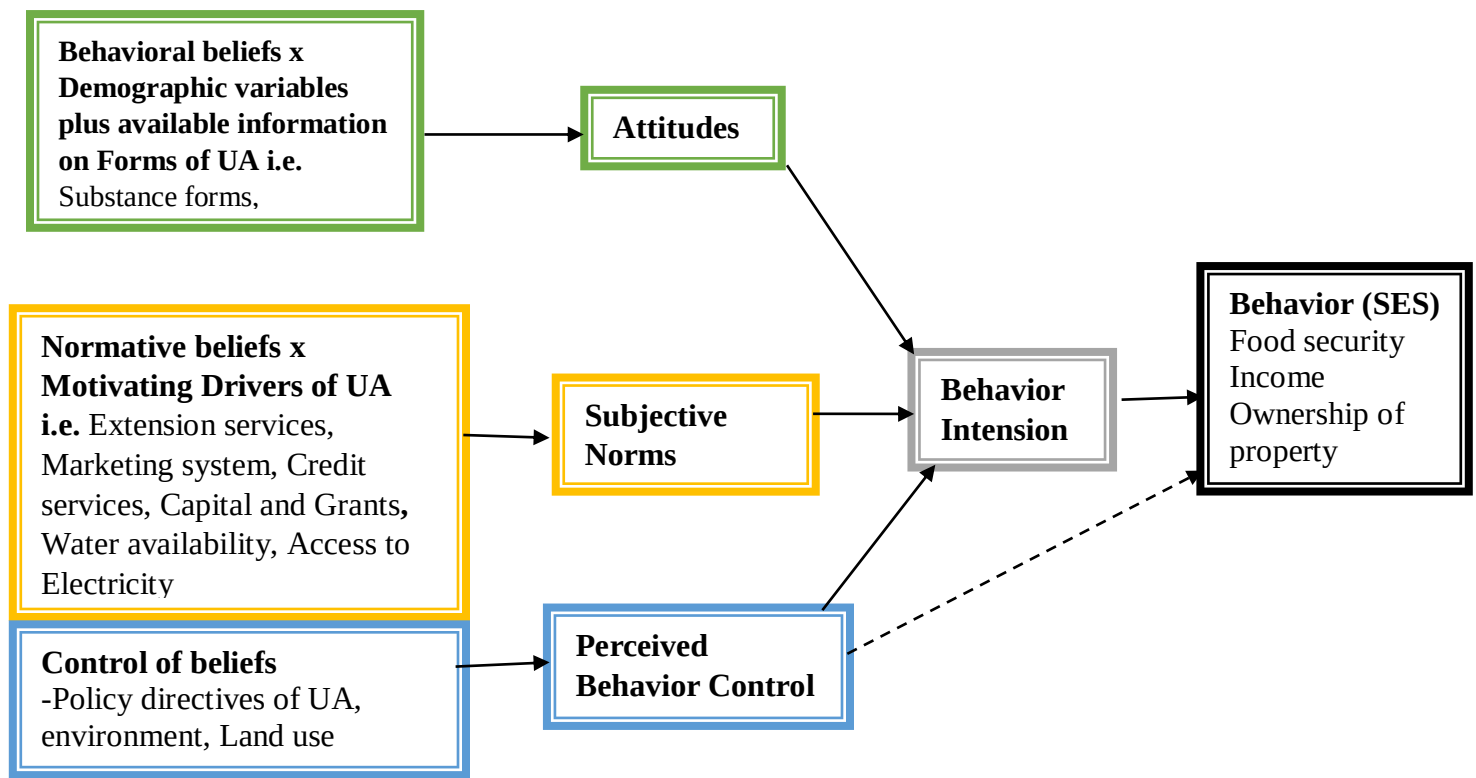


Figure 2: The Theory of Planned Behaviour

Source: (Ajzen 2006)

1.9 The Conceptual framework of the Study.

This study focused on UFs involved in UA in Kampala and Mbarara cities to evaluate the effects of forms and drivers of UA on the SES of UFs. This is because UA challenges at micro and household levels are still not attended to. This study, therefore, focused on the forms and motivating drivers of UA and their influence on SES of farmers. The study quantified and documented the extent to which these forms and drivers of UA affect urban farmers' socio-economic status. The conceptual framework was based on a three-factor systems model; the dependent variable (DV) is the socioeconomic status, which was studied in terms of expectations/outcomes got from utilizing UA innovations by a household which include ownership of property, food security, and household income. It's assumed that these outcomes cannot be realized if the farmer does not engage in urban farming. The decision to engage in urban farming is informed by farmers' motivating drivers which have an influence on the forms or types of UA undertaken and was studied as Independent Variable (IV). Forms are picked through intrinsic and extrinsic drivers of the farmers. However, this is achieved when there is a good policy framework for UA to thrive which was studied in form of Moderating Variable (MV) as policies on UA, land use, access to technology, and environment. Further MV was also

studied in form of household demographic characteristics which included; Age, sex, marital status, family size, Level of education, location of the farm, experience, land tenure religious affiliation and tribe. This can further be explained with illustration in Figure 3.

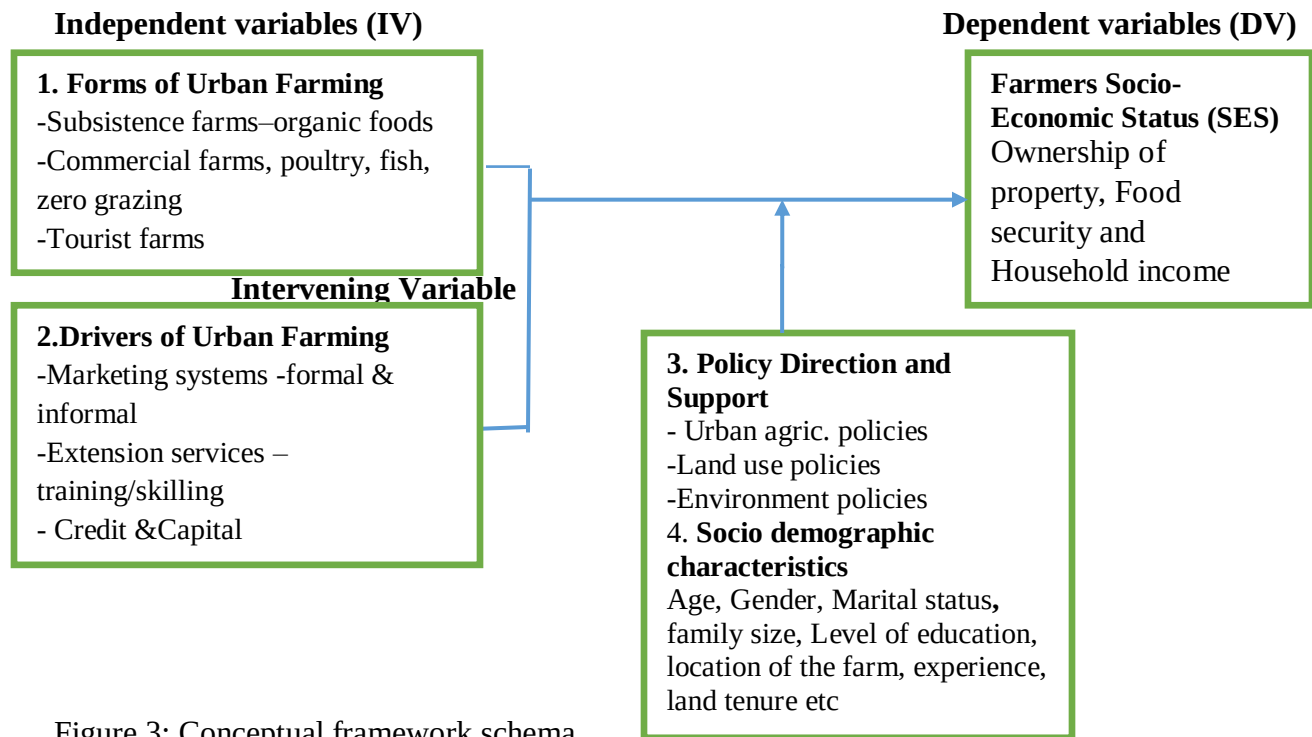


Figure 3: Conceptual framework schema

Source: Researcher 2024.

1.10: Operational Definition of Key Concepts

- **A rooftop garden** simply means a garden on top of the roof of a building, man-made green space on the topmost level of residential and commercial structures (Nur et al., 2022; Hashim et al., 2020).
- **A tourist farm** in this study was considered as any commercial enterprise that combines agriculture and tourism on a working farm, ranch, or other agribusiness operation. The Commonwealth of Kentucky (2004), defines agri-tourism as “The act of visiting a working farm or any agricultural, horticultural, or agribusiness operations for enjoyment, education or active involvement in the activities of the farm or operations that also add to the economic viability of the site”.

- **Community gardens** are plots of land, usually in urban areas, that are rented by individuals or groups for private gardens or are for the benefit of the people caring for the garden (Lovell et al., 2014)
- **Drivers /Motivation.** Shanks (2007) defined motivation as the act of providing a motive that causes someone to act. In this study, drivers/motivations were studied in the form of extrinsic and intrinsic forces like personal desire, land size and security of tenure, extension services, and prevailing policy framework.
- **Food justice** is a holistic and structural view of the food system that sees healthy food as a human right and addresses structural barriers to that right (Morgan,2009)
- **Forms /types of urban agriculture** can be very creative and exist in several forms, such as intensive gardening involving back yard gardening (using containers, sacks, tires, raised beds, rooftop, mandala garden, kitchen garden, hanging/vertical gardening, Greenhouses, use of vacant plots), mushroom cultivation, intensive dairy and poultry production (Bhattaria and Adhikari 2023; Hashim et al., 2020).
- **Green house** in this was considered as a space allotted for the cultivation of plants under controlled conditions which is covered with a transparent covering (Nemali, 2022).
- **New food equitation.** According to Morgan and Sonnino (2010), is described in terms of food price surges, food insecurity, national security, climate change, and land conflicts. For this study, new food equitation was looked at in terms of ability of people to survive amidst food price instabilities, land conflicts and weather vagaries.
- **Organic foods** in this study were considered as foods produced without chemical fertilizers and pesticides(Akter et al., 2023)
- **Sack Gardens** in this study was considered as growing crops in sacks filled with compost-rich soil (Zivkovic et al., 2022).
- **Socio-demographic characteristics** in this study referred to the characteristics of the study population in terms of age bracket, gender, level of education, family size, and location of the farm, and experience in farming and membership of the farming group (Chepkoech, 2022).
- **Socioeconomic status (SES)** is an economic and sociological combined total measure of a person's work experience and an individual's or family's economic and social position with others. Loy et al., (2013), defined SES as being represented by the combined

measurement of the economic and social position of an entity compared to others in society

- **Supportive policies:** Was looked at in this study as the requirements for urban farming to take root as in form of policies on land, extension services, and infrastructural facilities (Yuan et al., 2022).
- **Urban agricultural innovations.** This study was considered in terms of new technologies being used and ways of organizing them into use for the first time in a specific context to increase effectiveness, competitiveness, resilience to shocks or environmental sustainability in the City (Orsini, 2020)
- **Urban Agriculture:** Deals with the growing crops and raising animals in towns and cities, and other complementary activities such as processing and distributing food, collecting and reusing food waste and rainwater, and educating, organizing, and employing residents (FAO, 2001). In this study, urban agriculture operationally looked at in terms of available land/space, level of innovativeness, intensity of production, and market access.
- **Vertical gardens** in this study were considered as the use of vertical space where land available is not enough for any meaningful agriculture. It is sometimes called a hanging garden (Adegun et al., 2022).
- **Zero grazing** was considered as stall feeding where the animal in question mostly “cattle” is enclosed in a house and feeds and water are provided to this animal on daily basis instead of being taken to pasture land (Hadush, 2021)

1.11: Sequential order of the study

The following is the outlined structure of the study divided into five Chapters, namely:

- **Chapter 1** dictates the orientation of the research; it introduces the study and describes its background. It outlines the problem statement, and then states the research objectives, research questions and the hypotheses, the study significance, Justification of study, the scope of the study, theoretical and conceptual frame works and definitions of main concepts.
- **Chapter 2** is a description of the reviewed literature related to the study.
- **Chapter 3** Describes the research methodology used in the study.

- **Chapter 4** Presentation and Discussion of the research results
- **Chapter 5:** Presents the summary, conclusion, recommendations of the study and areas for further research

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Urban Agriculture is defined as growing fruits, herbs, and vegetables and raising animals in inner cities and their environs, (Mougeot, 2000) a process that is accompanied by many other complementary activities such as processing and distributing food, collecting and recycling food waste and rainwater and educating, organizing, and employing residents. Socio-economic status (SES) is a theoretical construct encompassing individual, household, and/or community access to resources (Psaki et al., 2014). It is commonly conceptualized as a combination of economic, social, and work status, measured by income or wealth, education, and occupation, respectively (Berzofsky et al., 2014, Antonoplis, 2023). According to Braveman and Gottlieb (2014), SES has been linked to a wide range of health-related exposures and outcomes, including child under nutrition, chronic disease, and infection.

Literature on SES measurement distinguishes between wealth or accumulated financial resources and income, (Currie, 2008; Psaki et al., 2014, Bricker et al., 2016), a measure of shorter-term access to capital (Pollack et al., 2007). Researchers (Psaki, 2014; Aitken, 2020; Currie, 2008), have identified challenges in collecting income data, particularly in low-income settings, due to monthly fluctuations, informal work, and reporting biases (O'Donnell et al., 2007). Bricker et al., (2016) Urged that recent empirical work has drawn attention to the approach of supplementing or replacing information on income with direct measures of wealth, such as household assets (Filmer and Pritchett, 2001). These studies provided insight in Urban Agriculture and were not evaluated through research in Ugandan context. This study is towards that.

2. 2 Evolution of urban agriculture

Research on UA in Africa originated with the idea that traditional farming methods could provide food and incomes for resource-constrained urban households (FAO, 2012). This idea gained a broad following, with numerous literature (Poulsen et al., 2015) arguing in favour of urban agriculture's economic and food security benefits. While this assumption was critiqued by some scholars (Prain and Lee Smith, 2010) and such arguments were overwhelmed by the sheer volume of material promoting UA as the solution to African food insecurity. This assumption is even adopted by the public sector and influences national and municipal policies (Pereira &

Drimie, 2016). In many cases, UA fails the urban poor (Tevera, 2022). For example, the poorer and less educated a cultivator is, the less benefit they tend to derive from cultivation, in terms of production volumes, food security, and income. Thus, UA is unlikely to benefit those who are already marginalized (Frayne et al., 2014).

However, a handful of case studies suggest the opposite. Gallaher et al., (2015), on 'sack gardeners' in the Nakuru slums, Kenya; Hovorka, (2006) on chicken farmers in Gaborone, Botswana; and Slater, (2010) on 'food gardening' in Cape Town, South Africa, all demonstrate that economically marginalized women can become financially, socially and politically empowered as a direct result of UA. The paradoxical results between some case studies finding that UA is empowering, and others arguing that it only makes the rich richer suggest an intervening variable has not been considered. NGOs as service providers appear to be one such variable (Oliver, 2015). In each of the success stories related above, NGOs were present that invested considerable time and resources into training cultivators and integrating them into supportive networks. When such support is absent, profiteers can exploit the economically vulnerable cultivators, leading to clientelism, debt traps, and usury practices (Vervisch et al., 2013). Empowering economically marginalized cultivators, therefore, requires high-quality external support that focuses on skills training, social networking, and input subsidization (Banks et al., 2015).

However, contextual and empirical gaps emerged. For instance, none of the studies was carried out in the Uganda context. Still, whereas all the other studies indicated that UA can be an indicator of SES such information is missing in the Ugandan context.

2.3. Philosophical and historical Review

2.3.1 Origin of urbanization

One of the most significant changes over the centuries has been urbanization, or the shift from rural areas to large cities. Urbanization has had important consequences for many aspects of social, political, and economic life (Kleniewski and Thomas, 2011). Throughout history, people have been attracted to cities as centers of culture, learning, and economic opportunity (McAdams, 2007).

Urbanization is one of the defining features of the modern age. According to Batzel (2021), Urbanization is the process of people moving from the countryside into denser “urban” settlements, aka towns and cities. He further urged that throughout history, cities and towns have played critical roles as centers of trade, culture, and power, but for most of this time they accounted for little of the total population, which remained overwhelmingly agrarian. It is the advent of the industrial age in the 19th Century, with highly concentrated economic growth, improved nutrition, better hygiene, and advances in healthcare that triggered a great change which has seen the proportion of the population living in cities and towns increase rapidly, both absolutely and relatively, ever since.

The earliest cities developed in ancient times after the rise of horticultural and pastoral societies made it possible for people to stay in one place instead of having to move around to find food. Because ancient cities had no sanitation facilities, people typically left their garbage and human waste in the city streets or just outside the city wall (which most cities had for protection from possible enemies). This poor sanitation led to rampant disease and high death rates. Some cities eventually developed better sanitation procedures, including, in Rome, a sewer system (Angelakis et al., 2023). Still, the world remained largely rural until the industrialization of the nineteenth century.

Satterthwaite et al., (2010) asserted that no nation has prospered without urbanization and there is no prosperous nation that is not predominantly urban. They further urged that over the past 60 years, there is a strong association between economic growth and urbanization and most of the world's poorest nations remain among the least urbanized nations. Urban areas provide many potential advantages for improving living conditions through the economies of scale and proximity they provide for most forms of infrastructure and services (Turok and McGranahan, 2013). This can be seen in the high life expectancies evident in the best governed European, Asian and North and South American cities. Urbanization over the past two centuries has also been associated with pro-poor social reforms in which collective organization by the urban poor has had important roles (Mitlin, 2008).

But there are still very serious development problems in many urban areas, including high levels of urban poverty and serious problems of food security and of high infant and child mortality. Many urban areas in sub-Saharan Africa also have very high prevalence rates for HIV/AIDs; where there are large urban populations unable to get required treatments and a lack of

programmes to protect those most at risk, these increase urban mortality rates significantly (van Donk, 2006).

2.3.2 Origin of Urban Agriculture

The history of urban agriculture dates back to about 3,500 B.C., according to the American Society of Landscape Architects' (ASLA) blog (Green, 2012). He disclosed that the semi-desert towns of Persia provided some of the earliest archaeological evidence for urban food production some 1,500 years later in the same region of the world. Two more early examples are from the Western Hemisphere and date to the 1400s A.D.(Aurora University, 2019). One famous example was the Peruvian city of Machu Picchu, which was self-sufficient in food. "Scarce water was reused time and again, step-by-step down the mountain," (Aurora University, 2019).

The rapid growth of cities in the developing world is placing enormous demands on urban food supply systems (Satterthwaite et al., 2010). According to Süß, (2018) urban agriculture has been championed in recent years as a solution to a host of issues, from food insecurity in urban communities to employment and environmental sustainability. Further, he urged that for years, farms and community gardens have continued to sprout up within major city limits throughout the World. This trend has gained traction and generated a lot of buzz among urban planners and community organizers. While urban agriculture is widespread and has become a hot topic in major cities across the world, an exact picture of urban agriculture has not yet been painted (Yuan et al., 2022). While the idea of farming within the limits of a big city may seem novel as it recently gained popularity, urban farming has been in practice since the dawn of cities and agriculture itself (Hardman et al., 2022). Before the advent of chemical fertilizers, refrigeration and mass transportation that make the current food system possible, this forced cities to produce enough food to sustain themselves, rather than, import it from rural areas (Bricas, 2019). Philpott and Bichier, (2017) also stated that one of the most effective methods of growing vegetables that involves adding compost to densely-planted raised plant beds and is still in practice in the United States today originated within the city limits of Paris in the 1800s. The knowledge has spread throughout the urban areas globally.

From the earliest records from ancient cities we know that some kind of farming activities has been an integral part of the urban life. The presence of farming in the urban areas, and in the

immediate surroundings of the cities, has been a common trait through history (Yuan et al., 2022). In the pre-industrial cities, the urbanites possessed domestic animals and managed small farm or garden lots. But this changed with industrialization in many parts of the world. With the societies developing into the industrial era well-known migration from rural areas to the fast growing cities was experienced. In Europe in the 19th Century, hordes of underemployed farm workers fled to the cities (Wallace, 2014). In many cases they brought their rural identity and lifestyle with them, and the expanding urban areas began to reflect this. In European cities, concepts such as garden cities and allotment gardens emerged, providing opportunities for the migrants to produce part of their food themselves (Philpott, 2010). These gardens, similar to the plots found around medieval cities, first appeared around the edges of towns in the 18th Century due to agricultural transformation, urbanization and industrialization in countries such as Germany, England, Sweden, and Holland. Immigrants from these countries took allotment gardens to the United States where they became important for food security in poor urban areas such as Boston and New York (Evan, 2013). This kind of farming involves availing plots of land for individual, non-commercial gardening or growing food plants. Such plots are formed by subdividing a piece of land into a few or up to several hundreds of land parcels that are assigned to individuals or families. Such parcels are cultivated individually, contrary to other community garden types where the entire area is tended collectively by a group of people (Rogge and Theesfeld, 2018).

2.3.3 Ancient Civilization and Urban Agriculture

Some of the first evidence of urban agriculture comes from Mesopotamia (McMahon, 2020). Indeed, farmers set aside small plots of land for farming within the city's walls. Further, there is a lot of historical evidence that elaborate gardens and irrigation systems were integrated into several ancient Mesopotamian citadels.

According to Tivolacci, (2019) the art of gardening and horticulture can be said to have its beginning with the first farmers, when they started to cultivate vegetables as opposed to field crops. Vegetable plots tended to be located close to the home, as these plants needed more watering and special care. More often than not the plot would have had an enclosing barrier to prevent livestock from eating the plants growing inside it. While there may initially have been a need for self-sufficiency, over time gardens have also been a way for people to enhance their

surroundings. The art of gardening can be found in the ancient literature, art and archaeology of earliest societies, from Egypt, Mesopotamia, Greece, Rome and Byzantium to the early Islamic and medieval worlds (History extra, 2016). There are even hints of the existence of Minoan and Etruscan gardens (Angelakis et al., 2013).

According to History extra, (2016) the actual evidence for horticulture and gardening, as opposed to agriculture, can be dated back to the third or fourth millennium BC at least, to the early civilizations of Mesopotamia and Egypt. It further reveals that in countries with hot summer climates, measures were necessary to ensure that the fierce sun would not scorch plants. One solution as mentioned in an early Mesopotamian myth was for the gardener to plant a wide branching tree to create vital shade, allowing more delicate plants to grow below its ample canopy. Trees became an integral part of a garden. Trees were also used in urban gardens to provide shade, and there was a conscious preference to included fruit- or nut-bearing trees (Miller et al., 2020). They further urged that the most favoured trees in Egypt were three species of palm tree (the date palm, doum palm & argun – *Phoenix dactylifera*, *Hyphaene thebaica* and *Medemia argun* respectively), the sycamore fig (*Ficus sycomorus*) and the beautiful persea (*Mimusops laurifolia*)

According to FAO, (2020) the civilization of ancient Egypt was indebted to the Nile River and its dependable seasonal flooding. The river's predictability and fertile soil allowed the Egyptians to build an empire on the basis of great agricultural wealth. Egyptians are credited as being one of the first groups of people to practice agriculture on a large scale. This was possible because of the ingenuity of the Egyptians as they developed basin irrigation. Their farming practices allowed them to grow staple food crops, especially grains such as wheat and barley, and industrial crops, such as flax and papyrus.

Relatedly, according to Vasiloudis, (2021) the Aztecs built a complex garden plot and canal system, tied to their irrigation waterways, called chinampas. The chinampas started as small-scale “floating gardens” maintained by farmers. But eventually they were implemented on a large scale and within urban areas to sustain the growth of the expanding Aztec empire. This helped the Aztecs in addressing the challenge of urban agriculture and food security in the 21st Century (Figure 4).

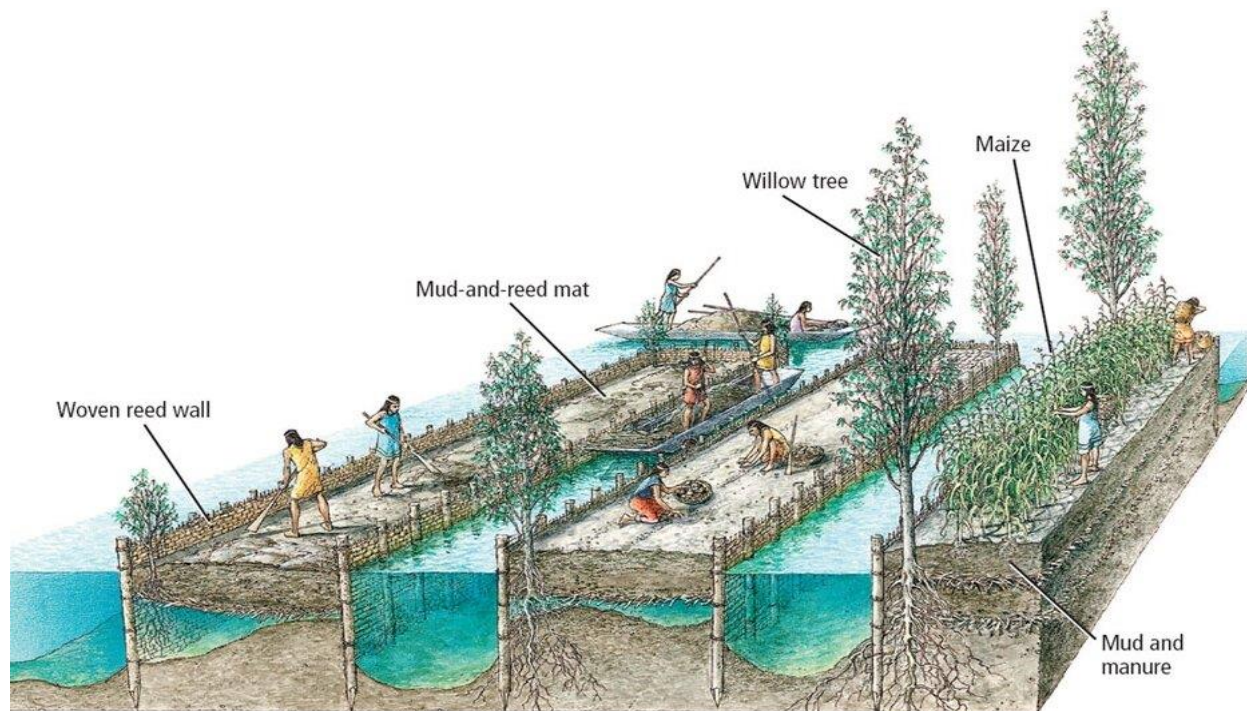


Figure 4: An illustration of functional chinampas in Mexico

Source: Vasiloudis(2021)

Figure 4 illustrates how farmers were improvising to grow crops on top of water bodies. They were using small sticks as stumps woven to form rectangular shaped basin like structure/frame. This structure would be filled with swamp bottom mud to make an island that can be used for farming leaving canals between them. The surface of this mud layer would be mixed with compost manure to make a garden where crops would be planted.

The Chinampas are a type of Mesoamerican agriculture that grows crops on the shallow lake bottoms in the Mexico Valley using rectangular pieces of lush, arable land. Their design ensures optimal moisture retention and is intended for use in agriculture on freshwater marshes or lake wetlands. Chinampas are a small area of land with lakes in Mexico City's southern valley where horticulture is performed. (Ebel, 2020). Another name for them is floating gardens (Ortiz et al., 2015). Ebel, (2020) further revealed that the chinampas proved to be highly productive and sustainable agricultural systems. Due to the nutrient-rich materials used to construct them, they provided fertile soil that could support diverse crops such as maize, beans, squash, tomatoes, chili peppers, and even flowers (Fonteyne et al., 2023). It is also a food production system that functions as a water purification system as well as a very effective climate modifier (Gomez-Zavaglia et al., 2020). Roble et al., (2018) revealed that as part of the construction process for

chinampas, a drainage system is also created with multiple functions. To facilitate the movement of water and sediments, maybe even night soil, a canal was made. The ditch would gradually fill with mud over time (Vasiloudis, 2021)

According to Orsini and D'Ostuni (2022), the growing of plants by humans, called agriculture, started at the very beginning of civilization. After agriculture took hold, the constant movement of civilizations that was necessary for hunting and gathering was no longer needed to obtain food. Therefore, humans settled in villages. The first documented examples of urban agriculture (the growing of food within cities) include the hanging gardens of Babylon and the sacred lands of Greek cities (Angelakis et al., 2020). The health benefits of gardening were studied in Chinese gardens more than 2,000 years ago. Similarly, Arabic gardens combined beauty with other sensory experiences, such as smells and odors from aromatic plants, flowers for visual attractiveness or sounds by including plants that would attract birds and other fauna. Gardens were often places people went for their spiritual and mental wellbeing (McGuire et al., 2022). In the middle ages, kitchen gardens, called hortus, appeared. In Benedictine monasteries, food was produced and processed by monks. In the Modern Age (from late 1400), the villas of wealthiest in Northern Europe had exotic plants in their tropical glass greenhouses. During the Industrial Revolution (1750 – 1850) factory workers also started gardening. These gardens both produced fresh food and provided places for workers to relax and reduce stress. Urban gardens were also promoted during war times, to provide cities with fresh vegetables. In recent years, urban agriculture has been associated with advances in society and technology (Orsini and D'Ostuni, 2022) as indicated in Figure 5. We can say that agriculture has contributed to the growth and development of urban cultures throughout human history.

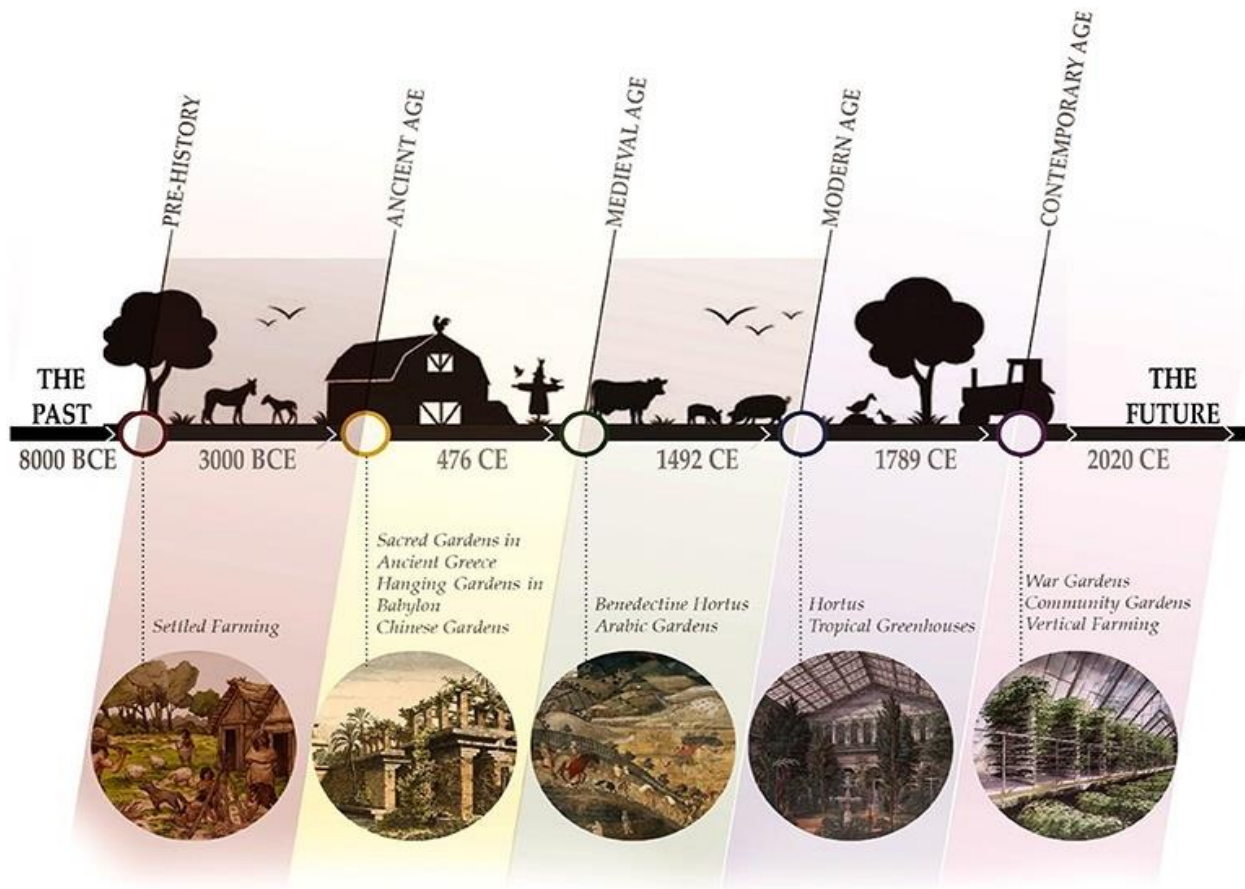


Figure 5: History of urban agriculture, from 8000 BCE (before the current era) to 2020 CE (current era).

Source: Adopted from Orsini & D'Ostuni (2022)

Figure 5 illustrates the evolution of Urban Agriculture in different periods from 8000 BCE to 2020 CE. It tries to describe what was happening in Prehistory error as indicated as "the past 8000BCE" with no information on urban agriculture recorded. It proceeded with the "ancient age 3000BCE" of settled farming. People began a gradual transition away from a hunter-gatherer lifestyle toward cultivating crops and raising animals for food. Then comes the "medieval age 476 CE" Here some form of urban farming is recorded in cities of ancient Greece as sacred gardens, Babylon with hanging gardens and some Chinese gardens. Here cities were covered with backyard vegetable beds in which people planted cabbage, carrots, peas and other products they would eat. There comes the "modern age 1492 CE" During this period the recorded urban agriculture transformed into Benedictine hortus Arabic gardens so called kitchen gardens planted with all sorts of vegetables. This was followed by the "contemporary age 2020

CE", characterized by war gardens, community gardens and vertical gardens which describe to present and the future.

2.3.4 Urban Agriculture in the modern world

According to the Green Conspiracy, (2018) urban agriculture was documented as early as 1800 – 1900s in London city. This was after a long period of industrialization. London became not only a global hub, but a hotbed of slums, poverty, and inequality. As a result, allotments and public parks were introduced in the 1920s to maintain adequate amounts of land within the city for residents to use, usually for a small fee.

Also there is the evidence in Germany in 1800s about urban agriculture. Germany started organized allotment gardening with the “Schreber Movement” in Leipzig. The goal was to save green spaces within the city for children to play in nature. This movement eventually became more oriented around growing edible gardens in urbanized areas. The importance of allotment gardens or “Kleingärten” grew during the World Wars I and II, out of necessity (Edmondson et al., 2020 and Moskalonek et al., 2020).

In addition, there is the Victory Gardens in the United States, the United Kingdom, Canada, Australia, and Germany & More in 1910s – 1940s (Gin, 2012). During World War I and World War II, most supplies and food were prioritized for the war effort, leaving many at home to deal with scarcity. In order to boost food supplies, many countries promoted “Victory Gardens” or “war gardens”, or gardens cultivated by citizens on private and public land. Besides alleviating the strain on the public food supply, it was also a way to boost morale and patriotism. In the US, Victory gardens were responsible for about 41% of all consumed vegetable produce in the year 1943 (Schumm, 2018).

The urbanization process brings indeed a wide range of unwanted consequences, which go from the reduction of fertile lands to deforestation, air and water pollution, reduced drainage of the rainfall, and the creation of peri-urban areas where socio-economic constraints are exalted and poverty is condensed (Ibrahim, 2021).

Historically, cities have served as engines of social progress and national economic growth. Over the past 60 years, there is a strong association between economic growth and urbanization, and most of the world’s poorest nations remain among the least urbanized nations (Satterthwaite et

al., 2010). Poverty was mainly found in rural areas and cities were places not of misery and despair but of opportunity for employment and improving living conditions through the economies of scale (Kadu and Kadu 2010). However, during the past two decades, urban poverty has been increasing especially in least developed countries. As reported by Piel, (1997) the world's poor once huddled largely in rural areas. In the modern world, they have gravitated to cities.

According to the United Nations (UN-HABITAT, 2010), about 12.6% of the global population (32.7 % of urban population) lives in areas classified as slums. Furthermore, more than half of the urban population lives below the Poverty line in Angola, Armenia, Azerbaijan, Bolivia, Chad, Colombia, Georgia, Guatemala, Haiti, Madagascar, Malawi, Mozambique, Niger, Sierra Leone, and Zambia. In other nations, such as for instance Burundi, El Salvador, Gambia, Kenya, Uganda, Kirghizstan, Moldavia, Peru, and Zimbabwe, the percentage range from 40 to 50 % (UNFPA, 2007). Across the world, the population living in the city "slums" is equal to about 1 billion people, out of which 220 million are in Africa, 598 million in Asia, and 134 million in Latin America (UN-HABITAT 2008).

In these agglomerates, the poor are more exposed to both work and food insecurity, and more subjected to violence and criminality. The lack of economic resources, and therein of political power, is the major cause of this vulnerability. Although food is easily found in local markets, most slum dwellers cannot afford its cost, especially for fruit and vegetables. The majority of the urban poor of Accra in Ghana and Kampala in Uganda spend most of their income to feed themselves; however, their food consumption remains insufficient in quality and quantity (Drescher, 2004). Moreover, these people are more vulnerable to the macroeconomic fluctuations such as inflation and price rises (Vilar-Compte et al., 2021).

The poor management of resources in urban areas leads to a depletion of the opportunities of living in cities (Güneralp et al., 2017). According to Ayoo, (2022) Instruments and tools that could alleviate poverty are not available and may explain the dramatic increase in poverty in urban areas. The intervention of international development agencies in this field is relatively new (UNFPA 2007). The development of urban agriculture in general and urban horticulture in particular is one of the major strategies that are being spontaneously adopted in developing countries to address urban poverty and improve well-being of city dwellers.

2.3.5. Urban Agriculture in Sub Saharan Africa

Historically and today, urban agriculture in African cities provides a small buffer to fluctuating food prices and when there is civil unrest (Hannah et al., 2022). In sub-Saharan Africa, where the potential impacts from climate change are profound, the author maintains that urban agriculture can provide benefits such as increasing water retention, reducing erosion and providing green space. It also creates employment opportunities, particularly for women and youth. Finally, in relation to the politics and policy, he says that studying urban agriculture policy in Nairobi, Kampala and Dar es Salaam reveals a lot about the evolution of urban politics more generally; city-based coalitions in African cities, which bring together citizens, civil society groups and governments, can help advance policy that is responsive to citizen needs. This is in contrast to top-down policy prescriptions from a national or international level.

In Uganda, urban farming started in early 1970's. This period was characterized by political turmoil and the associated economic crisis (Maxwell, 1995, Sabiiti et al., 2014). In 1972, Amin declared what he called 'the economic war' a phenomenon that was meant to 'Africanise' the economy. This constituted the expulsion of Asians. This group included industrialists and other commercial entrepreneurs. The immediate implication of this 'Africanisation' process was the appropriation of the previous industrial and commercial properties and establishments to indigenous Ugandans who had neither any knowledge of industrial production nor any experience in entrepreneurship (Maxwell, 1995).

The period of civil unrest (1971–1985) was followed by the implementation of an ambitious programme of macroeconomic adjustments and structural reforms, which were characterized by drastic cuts in jobs and public expenditures, trade liberalization, increased interest rates and currency devaluation. During this period, unemployment increased and real incomes fell, while at the same time prices rose and welfare services declined. The urban poor were particularly hard hit. As a result, many urban households resorted to income generating activities in the informal sector. Farming in urban areas was one such option.

Urban agriculture can be both a response to a crisis and means for opportunity. Today, beyond Uganda's crises period, urban agriculture remains vibrant and is critical to the well-being of many households in Kampala. The demand for a wide range of food products is growing in Kampala as a result of the increasing urbanization (Sabiiti and Katongore 2016). This rising

demand, combined with close proximity to markets, conversion of vacant into productive lands, income enhancement and a supportive local environment, creates a new window of opportunity for Urban Agriculture crop and livestock production. Despite the importance of Urban Agriculture to the city's food system, however, the viability of the sector is increasingly at risk from urban encroachment onto agricultural lands, declining water quality, high feed prices for urban livestock, and negative loss of productivity associated with flooding (Hemerijckx et al., 2023).

Beyond UA as a food and livelihood procurement strategy, the rapid growth in demand for food resulting from high urban population growth and inflationary pressures on food, fuel and other basic commodity prices has made access to food in Kampala a pressing concern. In 2000, the Government of Uganda launched its Plan for Modernization of Agriculture (PMA), a holistic framework with the mission of “eradicating poverty by transforming subsistence agriculture to commercial agriculture” (MAAIF and MFPED, 2000 Sabiiti et al., 2014). Through this plan the government put the focus of agricultural development on rural areas with the view that the expanding urban population would stimulate food markets, and help to eradicate poverty among the rural population who are the predominant producers of food. Most of the staple foods consumed in Kampala are brought in from rural areas, whereby the cost of fuel for transport is one of the major factors that directly and indirectly influence food prices in Kampala. The increase in food prices in Kampala, however, can be attributed to factors beyond the cost of moving food from rural to urban areas. According to Kamara and Renzaho, (2014), food prices underwent the sharpest increase compared to all the other basic items in Kampala over the period of 2007–2011. Some of the upward pressure on food prices is likely attributable to the global food price crisis. (Mittal, 2009, Gustaffson.D.J, 2013).

2.3.6. Reasons for Agriculture Becoming Urban Affair.

The benefits of urban farming improve the lives of those in the community as well as the farmer's life. According to Pendilla et al., (2018) urban farms are grown in city centers and other densely populated areas, so they're closer to their consumers than field farms. This implies that urban farms cut the cost of transporting goods down by selling to customers who live in the same area. This leads to farm-to-table produce, meaning the food didn't pass through any third

parties like supermarkets, resulting in fresher produce, thus making food access and availability reality to the urban vulnerable.

In addition, the findings by Seigner et al., (2018) revealed that urban farms can help increase food security by providing inexpensive, fresh produce to low-income communities. In 2018, 37.2 million people were food insecure in the United States, meaning they didn't have access to enough affordable, nutritious food (Coleman-Jensen et al., 2019). This is almost similar to Ugandan food security situation. According to Ssewanyana et al., (2010) the status of food security in Uganda is worrying and at an alarming rate with people with low rate of income poverty not able to readily access food confirmed by their study which revealed that average caloric intake stood at 1,970 calories per person per day, which is below the minimum caloric requirement of 2,200 calories. As such, a population of 17.5 million Ugandans in 3.1 million households was unable to meet the minimum caloric requirement in 2006. Hemerijckx et al., (2023) has also pointed that due to rapid urbanization, food systems in sub-Saharan African cities are increasingly under pressure. For instance, in urban areas of Uganda, 17 percent of urban nationals had insufficient food consumption in 2020. Being in the heart of the community means transportation doesn't have to be included in the cost of the produce, resulting in cheaper, more accessible food for the people who live near the farm (Colson-Fearon & Versey, 2022).

Nowysz et al., (2022) observed that one of the benefits of urban farming is that it's adaptable. They further urged that urban farms can be opened in spare rooms, backyards, rooftops, warehouses, shipping containers, or basically anywhere else. This cuts the need for purchasing and building on new land by repurposing indoor and outdoor spaces.

Urban farming allows you to start small by using space you already own (Chatterjee et al., 2020). They further urged that this is a huge advantage because purchasing land or buildings big enough for large-scale operations is expensive. Not having a huge financial burden on your shoulders from the start lets you work on your urban farm without the pressure of bankruptcy (Likitswat, 2021). As a result, you can experiment with systems and crops to find what works best (Despommier, 2019).

Another one of the benefits of urban farming is it helps build strong communities by stimulating the economy and providing a mutually beneficial experience (Yuan et al., 2022). They further

urged that urban farms can be multifunctional by providing a space for social gathering, which enriches the ties between members of the community. These farms, such as community gardens, have been shown to help during crises, leverage resources, and foster social interaction between diverse groups of people (Caputo et al., 2023). According to Harada et al., (2021), urban farms can also provide mental and physical benefits for farmers and visitors. Plants can lower blood pressure, increase attentiveness, increase productivity, and improve well-being of people in the same vicinity, according to Psychology Today Magazine (Lida et al., 2023). This is great news for farmers, but also for the community. Urban farms ran by a collective community can provide a healthy escape for residents from the hustle and bustle of industrial cities (Kwartnik-pric and Droj, 2023).

2.4TheoreticalReview

Two theories were used to focus this study which includes the economic location theory and the theory of planned behaviour (TPB).

2.4.1. The “Economic Location Theory.

The first theory identified for this study is the “**economic location theory**”. It was advanced by Von Thünen in the 19th century. It states that market distance has a relation with the type of agriculture practised (Anderson, 2012; Aoyama et al., 2012). The idea discusses the economic reasons for situating specific agricultural output near urban centers and focuses on urban agriculture. The theory establishes land use regularity and comparativeness advantage of location. A justification for urban agriculture is that it is in a central location close to city centres (Mougeot, 2000). Von Thünen's theory explains urban-close production as a function of transport costs and bid rents (Anderson, 2012). It is the landlord that rents out the land to the farmers who is capable of paying the highest rent. The City is the market centre. Von Thünen's model states that commercial agriculture is dependent upon urban systems, where the capital is the market centre for the produce. However, the modal assumes the price of agricultural output and transportation rates are to be fixed (Anderson, 2012). This study postulates that this theory is legitimate and anchors this study due to fact that it will address pertinent issues about UA since it is looking at the distance to market centres and land lent prices as the determinants to the types of UA enterprise to undertake. It also looks at the motivations of farmers with the availability of

market, extension, and training, capital, or credit accessibility of the farmers to acquire improved technology. It also considers the policy framework available in terms of land, technology, environment, and urban agriculture.

2.4.2 The Theory of Planned Behaviour

The second theory identified for this study is the “**theory of planned behaviour (TPB)**” advanced by Icek Ajzen in 1991. The Theory of Planned Behavior suggests people intend to take action as a function of three judgments they make about a specific behavior: their attitude toward the behavior, the perceived behavioral control over the behavior, and subjective norms surrounding the behavior (Kumudu et al., 2019). Intention, the focus of the TPB, includes “the motivational factors that influence a behavior” (Ajzen, 1991, p. 181). Attitude toward the behavior is a person’s evaluation as to whether the outcomes of engaging in the behavior will be positive or negative (Ajzen, 1991). Attitude is influenced by the expected outcomes (behavioral beliefs) of engaging in a behavior (Ajzen, 1991). Perceived behavioral control refers to an individual’s evaluation as to whether they have the ability to engage in the behavior, and this factor is influenced by the absence or presence of elements that may help or hinder engagement in the behavior (control beliefs; Ajzen, 1991). Subjective norms refer to the individual’s perceptions as to whether there is social pressure to engage in the behavior, and this factor is influenced by perceptions that there are expectations to engage in the behavior, or normative beliefs (Ajzen, 1991). Applying the TPB to this context, urban food producers would be likely to intend to continue farming in urban areas if they believe the outcomes of doing so would be positive, if they feel they have the ability (i.e., skills, knowledge, autonomy) to continue farming, and believe the people important to them expect them to do so. An understanding of these factors that influence urban food producers’ attitudes, subjective norms, and perceived behavioral control could play an important role in urban food production and contribute to food security.

The study was supported by these two theories that is; theory of market distance and land use (Han et al., 2022) and the theory of planned behaviour (TPB. Ajzen, 1991). Both theories advance the reasons for engaging in UA. The first one looks at market distance and land use to be driving force towards engaging in UA as means to save on transport and production of high value agriculture enterprises that highly perishable. And the other one looks at human behavior and decision making in the urban environment.

2.5 The forms of urban agriculture with the socio-economic status of the urban farmers

Urban agriculture has various purposes, appears in many places, and takes various types (Dimitri et al., 2015). According to Martin-Moreau (2019), there are various types of production forms of urban agriculture, which vary in scale and ownership types (Pearson et al., 2010). Pearson et al. further categorized urban agriculture basing on scale, types, and ownership. For commercial urban agriculture, there exist two scales; micro and macro-scale (Krikser et al., 2016; Artmann and Sartison, 2018). Pulighe and Lupia (2019) asserted that the micro scale commercial urban agriculture comprised of roof-top gardens, walls, and courtyards. Macro scale urban agriculture consists of commercial-scale farms, nurseries, and greenhouses (Pearson et al., 2010; Gullers, 2015). Gullers (2015) further argued that the ownership of these forms of agriculture can be private or corporate. Corporate means that several shareholders own the farms. Private refers to a single individual that owns the farms.

It's the macro and micro level urban agriculture that has the biggest potential to reach the market with its products (Pearson et al., 2010). Micro and macro level urban agriculture has the potential of leading the development of new enterprises and offers value-adding activities such as food markets, marketing, and supply chain activities. Urban agriculture can provide different kinds of values. These values can be social, aesthetic, health, and community-building, and empowerment (Kaufman and Bailkey, 2000).

According to Stewart et al., (2013), there are various examples of UA types with different benefits. Gullers (2015) identified one study that focuses on roof-top gardening, community gardening, and backyard gardens that have several advantages. Roof-top gardening, community gardening, and backyard gardens can boost tourism and lead to local economic development (Gullers, 2015). Gullers further argued that gardens attract businesses and residents, which stimulates commercial growth. Rooftops- gardens are reducing costs for heating and cooling of buildings through providing isolation. They can also prevent a building from cracking roof-tops and save repair costs for buildings.

Specht et al. (2016) chose to include all production forms that don't require much farmland and called this group of farms zero acre farms. It involves vertical farming, rooftop gardens, and green wall cultivations, and indoor greenhouses. Researchers and practitioners are searching for larger-scale urban food production in high-density areas as a result of decreasing amount of

fertile land in cities. Vertical farms are a new production form that is under development and can be described as greenhouses stacked on each other (Despommier, 2011). Together these greenhouses create skyscrapers. This is a highly intensive production form. Just like roof-tops gardens vertical farms don't require so much space and can compensate for the loss of agricultural land. Some production systems within vertical farms can reach enough intensity to be able to compete with soil-grown produce.

The biggest business opportunities in zero-acre farming are found by integrating it with the architecture, except for the value of the production itself (Specht et al., 2016). Zero-acre farms are recycling resources and link food production with buildings. Resources are specially derived from synergies between agriculture and buildings. These resources consist of human waste, wastewater, waste heating, and organic waste. The zero-acre farms are integrated with buildings and are therefore not requiring particularly much urban land. This makes them a competitive land use with soil-required urban agriculture. There are however challenges for zero-acre farms. At the moment there is a need for further development of new technology and new cultivation forms. The main problem with zero-acre farms is high investment costs and a lack of acceptance for soil-less growing techniques.

Urban agriculture projects are from crops including mushrooms and animals (dairy, piggery, and poultry), fish farming, and beekeeping (Senyonyi, 2020). These projects are both managed on a small and large scale depending on whether the farmer is interested in commercial farming or doing farming as a matter hobby but also depending on the availability of land. Commercial farmers because of profit motive they tend to employ improved techniques for improved yields to recover their capital investment in the projects.

According to Lee-Smith (2008), extensive studies have categorized Urban farming households in Uganda into four types: commercial farmers, food self-sufficiency farmers, food security farmers, and survival farmers. These groups have the following characteristics: a) Commercial farmers are very few, are generally well-off, and are found mostly at the peri-urban periphery (Sabiiti et al., 2014). They produce almost entirely for the urban market (Sabiiti et al., 2014) b) Food self-sufficiency farmers are also mostly well-off and are found in all areas except the inner urban core (Zasada et al., 2019). They produce food primarily for household consumption. c) Food security farmers are among the middle-income or well-off households in the urban areas but among the poor in peri-urban areas (Poulsen et al., 2015, Sabiiti et al., 2014). These

households practice UA as a secondary form of employment as well as a source of food. They have other sources of income with farming helping them to save or supplement urban lifestyles. d) Survival farmers include a very large number of people. The majority are female-headed households recently widowed or abandoned by their husbands with very limited economic options, few resources, and barely the ability to make ends meet. Such households are found in urban areas where people realize meagre harvests from small plots of land (Sabiiti et al., 2014).

In addition to these four categories, Sabiti et al. (2014,) reported other categories of UA practitioners in Uganda, those who belong to institutions such as schools, health centres, prisons, and police barracks. Additionally, there is also a new form of urban farming which is Agri-tourist farms evolving in urban cities of Uganda (Vermeiren et al., 2013). The agri-tourism farms involve farm stays, where farmers can promote healthy eating and showcase nutrient-rich farming to visitors, generating demand for locally-grown food.

However, the empirical gap is relating forms to the SES of the UFs. As literature explaining how a particular type of urban farming can lead to improvement of income and acquisition of property by an urban farming household is scanty on urban centres of Uganda.

2.6. The Drivers of urban agriculture with the socio-economic status of the urban farmers

Motivations to grow food in the city vary enormously (Hallet et al., 2016), and there is a variety of choices available for urban farmers (FAO 2017), say a wealthy farmer producing heirloom tomatoes under basement LED lights (Massa et al., 2008), to a subsistence farmer growing indigenous greens in balcony sacks to help feed her family (Hallet et al., 2016). They further argued that although all points on this continuum can be found anywhere in the world, there appear to be clear distinctions in the needs, opportunities, and risks of UA in the Global North compared to the Global South. Several good reviews focus on UA in the developing World (Mok et al., 2014).

Urban agriculture is carried out for subsistence, economics, recreation, and community building (Hallet et al 2016). According to Martin-Moreau, (2019), people in the developed nations tend to engage in urban agriculture for purposes of recreation and community building more than economics or subsistence meanwhile (Hallet, et al.,2016), observes that people in the poorest nations tend to grow food primarily for subsistence and sale. Historical examples show that wars

and economic depressions draw people into urban agriculture for subsistence, (Pauleit et al., 2019) whereas economic growth sees urban farms shuttered, built upon, or converted from farms to parks (Martin-Moreau, 2019).

Amare et al., (2018) argued that the decisions made by urban farm households are largely driven by household goals and or objectives. They added that although these decisions exert influence on cropping practices implemented by households, certain production decisions are mostly affected by specific factors. Crop choice decisions in particular are to some extent influenced by household demographic characteristics. On the other hand, soil fertility management decisions are mainly influenced by the agro-ecological environment in which the farms are located. Therefore, based on the location of the farms, different soil and water conservation management practices are employed (Tittonell et al., 2005). However, some of these management possibilities are not practiced by some households owing to their high labour requirements (Ruben and Pender, 2004).

The presence of markets, especially for crops like vegetables that are perishable, also plays a substantial role in land use as well as resource allocation decisions (Tittonell et al., 2005). The distance of output markets from the farm, usually accounted for in terms of transport costs, has also been found to have an impact on land use patterns, for example the amount of land allocated to individual crops. Bowman and Zilberman (2013) cite the state of input and output markets as aspects, which influence production decisions of urban farm households. The state of input markets, for example the seasonal variation in labour demand, may hinder households from producing crops that are harvested during the same period, as the demand for agricultural labour is high during peak periods like harvesting.

Another example of the drivers of production decisions is access to irrigation facilities by urban farmers during the dry season. The access to irrigation facilities made the farmers to invest in high value crops and progress from subsistence to commercial production. Although the farmers were willing to diversify their production, the high input costs restricted crop choices for some farmers (De Bont et al., 2019). In line with this, Ruben et al., (2004) also agree that high transaction costs significantly limit farmers' willingness to diversify into high value crops.

Furthermore, financial schemes that make cash accessible for the urban smallholder farmers such that they are able to invest in production do influence cropping activities. These investments could include venturing into new crops and or technologies for instance the use of chemical fertilizers (Ebanyat et al., 2010; Bowman and Zilberman., 2013).

Hallet et al. (2016) pointed out that there are many informal reports on the role of urban agriculture in the alleviation of malnutrition in Africa. Although this is surprisingly poorly documented (Hamilton et al., 2013). Urbanization is a vast human trend in Africa, but many African cities retain significant food-production capacity (Smit, 2018). According to Hallet et al. (2016), the proportion of the urban population involved in agriculture has been estimated at 50% in Accra, Ghana (Obosu-Mensah 2002; Diao et al., 2019), 80% in Brazzaville Republic of Congo (Orsini et al., 2013), 37% in Maputo, Mozambique (De Bon et al., 2010), 36% in Ouagadougou, Burkina Faso (Stenchly et al., 2018; Korbéogo. G, 2018), 35% in Yaounde, Cameroon (Bopda et al., 2011; Plain et al., 2010) and 68% in the five biggest cities in Tanzania (Worrall et al., 2017). Many urban families up to 70%, are involved in agriculture across the developing world (Zezza and Tasciotti 2010; Orsini et al., 2013)

According to FAO (2019), Sub-Saharan Africa (SSA) is the poorest and most food-insecure region of the world and so it is here that understanding the role of UA is the most important (Townsend and Gautam 2021; Sassen, 2012; Dodo, 2020). According to Amao, (2020) UA has the potential to increase access to nutrition for the urban poor (Ayerakwa et al., 2020), in particular through horticultural crops that are rich in important minerals such as zinc and iron, and vitamins, such as vitamin A, that are often deficient in African diets.

According to Ndiya (2019) African indigenous greens which are readily available at local markets and are easily grown in a relatively small space, play an important role in food security. Yeudal et al., (2007) documents significant improvements in the health of children in Kampala, Uganda, who have access to food from urban plots

No study has been done to relate these drivers/ motivations to the SES of the UFs, therefore this study sought to fill this gap and related the drivers of UA to the SES of farmers in Kampala and Mbarara cities in Uganda.

2.7 Policy Directions and Support to Urban Agriculture Concerning Socio-Economic Status of Urban Farmers

2.7.1 Urban Agriculture Policy in Cities of Uganda

The present legal framework regarding urban farming is still far from supportive (Meenar et al., 2017; Thomaier et al., 2014). The city authorities have made attempts to recognize urban farming but do not provide for the planning or zoning of such activities (Halloran and Magid, 2013; Huang and Drescher, 2015). Nuwagaba et al., (2003) argued that neither the former "harassment" approach of urban farmers nor the current "permissive" laissez-faire approach functions well. Up to now, the City Council needs to issue a permit for people to engage in urban agriculture. The urban poor are not aware of this, while the City prefers to provide licenses to agro-business entrepreneurs (such as large poultry farming). This simply means that urban agriculture is carried out without any regulation or authorization (Nuwagaba et al., 2003). Nonetheless, to make urban agriculture profitable and sustainable, a precise structure is required. That's exactly what this study investigated.

2.7.2 Land use policy on urban agriculture in Uganda

Land remains one of the controversial issues related to Urban Agriculture, but access to land is mostly more crucial than the availability of land (Drescher, 2001). According to NuiSSL and Siedentop, (2021) Urban land use relates to the way land in the urban areas is being used to meet the demand for Housing, Agriculture, Transport, and Recreation. Namara (2011) described land use as the way humans use land. Kanianska (2016) further described land use to involve the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements.

The land is a very important resource for UA and its availability, accessibility, and suitability for agriculture should be of particular concern to those who want to promote UA as a strategy for social inclusion, enhanced food security, poverty reduction, and local economic development (Namara, 2011). Nevertheless, agriculture cannot benefit the economic development of cities to the extent that industry or housing does. At household levels, urban development pressure (such as land conversion, speculation, and high land price) may lead to the loss of cultivated land (Quon, 1999; Namara 2011; Rondhi et al., 2018). These issues are imposed by urban planning

policy through a lack of formal recognition of UA (Quon, 1999; Drescher, 2000). Yuan et al., (2022) also asserts that the amount of land available for farming in urban areas remains unknown, partly due to the state-of-the-art inland description and classification (air photo interpretation), due to miscalculating the amount of land available and the extent of urban agriculture, and due to a lack of ownership records.

2.7.3 Environment policy concerning urban agriculture

Urban agriculture is a popular practice among urban dwellers worldwide, with many engaging in it in their backyards or any other space considered appropriate for farming.(Martin- Moreau and Ménascé 2019). However, UA is practiced on land that is not suitable for farming in large Ugandan cities (Sabiiti et al., 2014), particularly on all wetlands and open spaces. Playgrounds, rivers, stream banks, marshlands, and roadside areas have all been impacted by urban farming (Makaya, and Todzwo, 2019) hence potentially harming the environment by seriously interfering with the natural ecosystem.

Despite the adverse impacts on the environment, advocates of urban agriculture maintain that urban agriculture adds to the environmental sustainability of cities (Makaya and Todzwo 2019). Urban farming promotes healthier feeding (Bellows et al., 2008), the restoration of abandoned and neglected land (Makaya, &Todzwo, 2019), as well as the decrease in impermeable surfaces and the corresponding storm water discharge (Fletcher, et al., 2012,). The same authors, (2019) declared that by recycling organic wastes from various urban sources, urban farming produces nutrients while avoiding the expenditures associated with trash disposal. It has been suggested by several researchers (Drechsel and Decker, 2010; Drechsel and Keraita, 2014; Caparino, 2018) that agricultural wastes and by-products from maize stalks and chicken runs can be utilized as manure in urban fields.

According to Bonoli et al. (2019), tones of biodegradable organic wastes and wastewater produced in cities, municipalities, and town councils are capable of being turned into a productive resource such as compost or animal feed. UA, therefore, plays an important role in balancing up urban ecosystems in the urban environmental management system (Environment Alert, 2006). They further urged that Direct open spaces can be turned into green zones while buffer and reserve zones are kept free of housing, with positive impacts on the micro-climate

(shade, temperature, sequestration of carbon dioxide). Floriculture and Urban forestry play a critical role in beautifying the city and improving the general environment.

Research has mostly focused on the physical effects of urban gardening (Guitart et al., 2012; Korth et al., 2014), although with a scant evaluation of the socioeconomic effects and institutional countermeasures to lessen the effects (Makaya, and Todzwo, 2019). Examining the reasons behind urban administrative organizations' inability to manage the environment sustainably has received little attention. This study looked into it and offered sensible policy suggestions.

CHAPTER THREE: METHODOLOGY

3.1. Introduction

This chapter presents the methodology that was followed in carrying out this study. The chapter covers the research design, research philosophy, research approaches, study area, study population, sample size and selection, sampling techniques, study instruments, validity and reliability of instruments, research procedure, data analysis and ethical considerations.

3.2 Research Design

The research used a cross-sectional study design. It involved a quantitative and qualitative method of data collection. A cross-sectional design helped in obtaining useful data from a relatively large number of respondents at particular point in time as it allows the collection of data by employing a survey (Bordens and Abbott, 2011). Quantitative methods were used to collect numerical data while Qualitative methods were also used to obtain in-depth information to get a wider perspective about the phenomenon. Data were collected from primary and secondary sources. A participatory urban appraisal was used to gather the majority of the data, which included focus group discussions (FGDs), key informant interviews, personal observations, and photography and questionnaire interviews. These choices of the study methods depended on the research goal and required multifaceted approach given the problem and the topic under investigation. In this study, the survey method was found to be more appropriate, where data was collected through use of questionnaire and interview schedules. In order to gather secondary data, a thorough review of UA supported project reports, published journals, research reports, relevant government of Uganda policy documents and papers on the state of urban agriculture in Kampala and Mbarara, Cities, over the previous ten years was conducted. According to Creswell (2009), research design is conceptualized within three essential frameworks, and these were used to inform this research. These Frameworks include the intersection of philosophy, and strategies of inquiry that then inform the specific methods used. This research draws on a social constructivist worldview that primarily uses qualitative inductive inquiry strategies within a study.

3.2.1 Research Philosophy

3.2.1.1 Intersection of philosophy or ‘worldview’ of the researcher

Although not always explicit, academic research can stem from any number of philosophies or ‘worldview’s that both influence and inform the research design (Luehr, 2019). According to McElravy (2022) the term worldview is used in place of and encompasses the broad terminology around paradigms, epistemologies, and ontologies. Therefore, a worldview is seen as a “general philosophical orientation about the world and the nature of the research that a researcher brings to the study” (Creswell and Creswell, 2018), and examines how people engage in processes of constructing and reconstructing meanings through daily interactions (Leavy, 2017). Therefore, before detailing the specific methods used in this study, I will discuss the worldview that best informed this research.

Creswell and Creswell (2018) identified four unique worldviews that researchers often adopt to help frame why and how particular research methods (e.g. qualitative, quantitative, or mixed) are chosen (Table 1). Worldviews have overlapping qualities that inform the meaning for both qualitative and quantitative research designs, leading to variations in their applicability to every type of research.

Table 1: Four research paradigms

Transformative	Constructivism	Post positivism	Pragmatism
- Political -Empowerment issue-orientated -Collaborative -Change-oriented	-Understanding -Multiple participant meanings -Social and historical construction -Theory generation	-Determination -Reductionism -Empirical observation and measurement -Theory verification	-Consequences of actions -Problem –centered -Pluralistic -Real –world practice orientated
Source: Adapted from Creswell and Creswell (2018).			

This study is shaped by a constructivism paradigm (Luehr 2019) or more specifically social constructivism (Eberle 2023). Social constructivism was first coined in 1991 by Berger and Lukman (Lee & Stech, 2011) and asserts that “individuals seek an understanding of the world in

which they live and work and how these meanings are varied and multiple, which lead the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas” (Creswell, 2014). Therefore, a social constructivist believes that “social phenomena and their meanings are continually being accomplished by social actor (Luehr 2019) [and] implies that social phenomena and categories are not only produced through social interaction but that they are in a constant state of revision” (Bryman, 2012). Therefore, knowledge associated with social constructivism is shaped by experience and context (Erciyes, 2020). For this research, I spoke with urban farmers exclusively from Kampala and Mbarara with the understanding that their knowledge and experiences are situational and unique from the experiences of farmers of their counterparts in the rural areas of Uganda. The understanding of local realities is also represented in my exploration of the perception of urban agriculture from not only urban farmers, but other actors (e.g. government officials, academia) that may influence or impact urban agriculture. As Creswell (2014) notes, focusing on specific contexts in which people live and work are important as “we are all born into a world of meaning bestowed upon us by our culture”, which results in varied, multiple, and complex contextual meanings formed through interactions. Therefore, social constructivism can bring understanding of the historical and cultural settings of the participants due to its focus on participants’ views and interactions of the situation being studied (Creswell, 2014). Consequently, the researchers’ intent is to interpret meanings that inductively develop a pattern of meaning (Kivunja and Kuyini, 2017).

3.2.2 Research Approaches

This study involved the use of both the positivist and interpretive approaches carrying out numerical and interpretive analyses. The positivist or functionalist paradigm assumes that the reality is relatively independent of the context, can be abstracted from their contexts, and studied in a decomposable functional manner using objective techniques such as standardized measures. The positive approach involved collecting the data using a questionnaire survey for data that was numerically analysed with statistical procedures to generalise findings (Eyisi, 2016). The interpretive approach is loosely synonymous with qualitative research. It is a research paradigm that is based on the assumption that social reality is not singular or objective, but is rather shaped by human experiences and social contexts (ontology), and is therefore best studied within its socio-historic context by reconciling the subjective interpretations of its various participants (epistemology). Qualitative methodology allows to advance and apply interpersonal and subjectivity skills to research exploratory processes. Interpretive approach gives the best opportunity to understand the innermost deliberation of the ‘lived experiences’ of participants. As an approach that is ‘participant-oriented’, interpretative phenomenological analysis approach allows the interviewees (research participants) to express themselves and their ‘lived experience’ stories the way they see fit without any distortion and/or prosecution. Therefore, utilizing the interpretive approach in a qualitative research study reiterates the fact that its main objective and essence are to explore the ‘lived experiences’ of the research participants and allow them to narrate the research findings through their ‘lived experiences’ (Alase, 2017). In this study the interpretive approach involved the use of interviews to explore the study problem through in-depth analysis. Interpretive data presented multiple realities and descriptions enabling the generation of insight and in-depth analysis (Mjøsund et al., 2017). Positivist and interpretive approaches helped in carrying out statistical inferences for generalisation and making of explanations.

3.3 Study area

The study was carried out in the Kampala and Mbarara cities and their environs. The two areas were selected because they have two cities have different land use systems and are located in different agro-ecological zones; Kampala being in the Coffee/Banana Zone influenced by lake Victoria rainfall basin while Mbarara is located in the Cattle Corridor under tropical savanna climate which is characterized with cattle keeping, grain and banana farming. Kampala city has five divisions (Rubaga, Kawempe, Nakawa, Makindye and Kampala central). The study focused on urban areas surrounding the inner city business settings. Mbarara city covers six divisions (Kakoba, Nyamitanga, Kamukuzi, Kakiika, Biharwe, and Nyakayojo) as indicated on the figure 6 and 7 below.

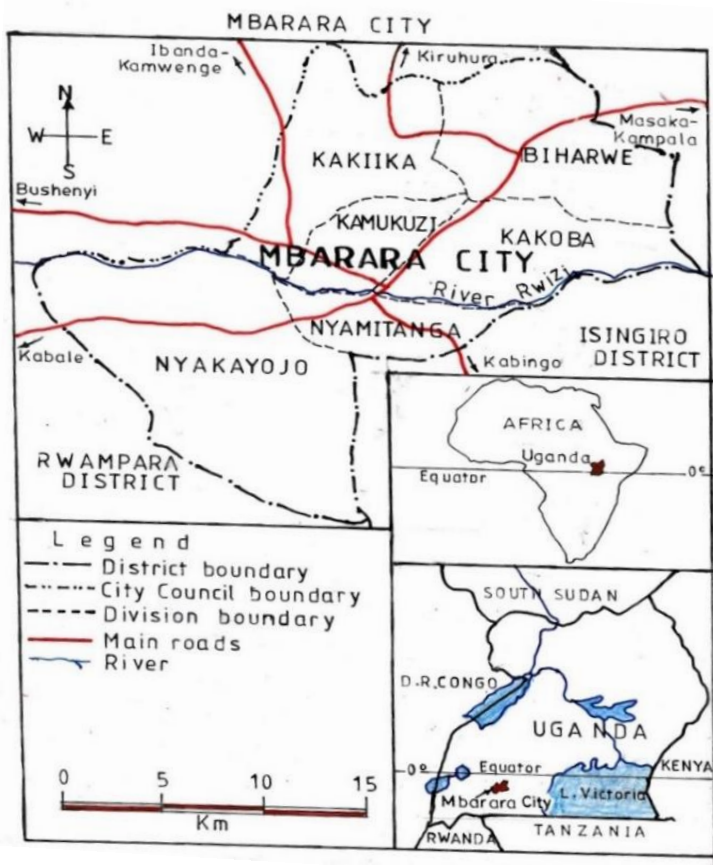


Figure 6: Map showing the six Divisions of Mbarara City

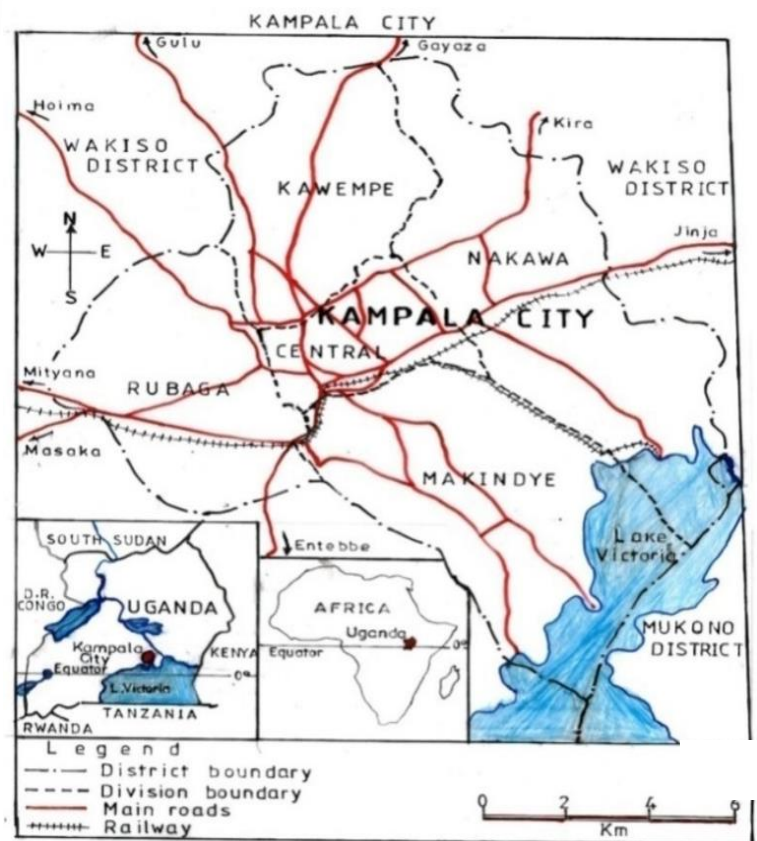


Figure 7: Map showing the Five Divisions of Kampala City

3.3.1 The background of study sites

The study focused on two urban centres' that is Kampala and Mbarara Cities. Kampala is Uganda's capital and largest city, which is situated on 0.3476° N and 32.5825° E. (Muchelo 2018). The specific area of interest for Kampala lies between Latitude 000 29' 00" N, Longitude 0320 24' 10" E and latitude 000 28' 10" N, Longitude 0320 46' 12" E, covering an area of about total area of 189 km² (73 square miles), comprising 176 km² (68 square miles) of land and 13 km² (5.0 square miles) of water. Kampala is home to almost all industries in Uganda and has the largest contribution to Uganda's gross domestic product (GDP). It occupies a series of hills at an elevation of about 3,900 feet (1,190 metres) and is situated in the southern part of the country, just north of Lake Victoria. The history of urban centres in Uganda like those of other SSA countries reveals that the major centres started during the colonial period (Thomas, 1970). For instance, Kampala started in 1902 as a small administrative centre gazetted on about 0.7 km² of land reserved exclusively for European settlement (Omolo-Okalebo et al., 2010). The city expanded in size to 12.95 km² by 1929 (UBOS, 2002) and by 1959 the city had expanded to 21.76 km² (Prabha, 1993). In addition, both cities have varying agro ecological conditions with Kampala experiencing the effect of Lake Victoria basin influencing rainfall patterns giving a tropical rainforest climate. Kampala experiences two wet seasons and the city does not experience a true dry season. The wetter season lasts 9.1 months, from August 23 to May 28, with a greater than 59% chance of a given day being a wet day. The month with the highest number of wet days is April, with an average of 25.2 days with at least 0.04 inches of precipitation. The month with the least number of wet days in Kampala is January, with an average of 11.1 days having at least 0.04 inches of precipitation. According to Bekunda et al. (2014) Kampala is situated in an undulating gradient characterized with hills and valleys and soils are Nitisols and Ferralsols that are conducive for root crops, fruits and some cereals. It falls under intensive banana- coffee lake shore farming system

The second study site is Mbarara which is a major regional urban centre, located at 0.6072° S and 30.6545° E in Western Uganda. The specific area of interest for Mbarara lies between latitude 000 33' 09" S, Longitude 0300 35' 28" E and latitude 000 33' 31" S, Longitude 0300 42' 04" E, equivalent to an area of about 246.5 km². Like Kampala, Mbarara started as a commercial centre around 1950, and is currently the fastest growing urban centre in Uganda. In 1957, it attained a township status under the British Administration and was elevated to

municipality status in 1974. It is now the second largest urban centre in Uganda and currently covers a total area of 51.47 km², with an urban population growing at 4.5% per annum (UNHABITAT, 2012). Mbarara city is found in the cattle corridor characterized by the savanna type of vegetation and falling under western banana- coffee systems, integrated with cereals and cattle. The soils are Andosols, Nitisols, Ferralsols and Acrisols; scattered Leptosols and Fluvisol soils (Bekunda et al., 2014). Mbarara experiences a tropical wet and dry or savanna climate. Mbarara city receives an average annual rainfall of 1,200mm with two rainy seasons, during the months of February-May and September-December.

As aforementioned, the observable characteristics of Kampala and Mbarara which include rapid growth rate, high unemployment rate, over-reliance on the informal sector and having urban agriculture as an important source of household income and food supply, make Kampala and Mbarara representative of rapidly growing megalopolis and regional urban centres in SSA respectively (Muchelo, 2018)

3.3.2 Justification of site selection

Urban agriculture is still considered a rural activity in many Ugandan cities as it does not fit in with the modern city model (e.g. urban rural integration policy) (Luehr, 2019). However, the current legal framework of establishing departments of production in the city ordinances has brought some hope to urban farmers (Masson-Minock and Stockmann 2010). For instance, Kampala City Council Authority (KCCA) established urban farmer's demonstration farm in Kyanja-Kisasi and recruited agriculture professionals to help farmers access improved knowledge and latest Technologies in commercial seedlings production, improved vegetable production technologies, poultry and dairy production methods in urban areas, piggery and fish farming, hydroponics and aquaponics, mushroom growing, composting and Indigenous microorganism technology(IMO). In Mbarara city the department of production is equipped with professional staff in areas of Agronomy, Agriculture extension, Veterinary doctors and Agribusiness to offer technical guidance to urban farmers and update farmers on government initiatives to improve the farming communities.

3.4 Study population

Kampala and Mbarara were selected purposely for this study mainly because they are urban cities with wide area coverage with a wide range of UFs. From the two cities, the target population comprised all households practicing UA. They included all Animal farmers, Crop farmers and other categories such as fish farming, mushroom growing among others. The sample area population and households were estimated to be 1.7million people with a total of 466, 7 41 households (UBOS, 2020). A household served as the sampling unit of the population of this study as shown in Table 2 below.

Table 2: Population distribution in Kampala and Mbarara cities

Area	Urban Population size	Total Households
Kampala Central	1,507,080	414,406
Mbarara municipality	195,318	52,335
Total	1,702,398	466741

Source: National Population and Housing Census 2014.

3.5 Sampling Procedure and Sample Size Determination

The study was conducted during the period between May 2022 and February 2023. The population of the study was urban farm households located in Kampala and Mbarara cities. The sampling frame of the study included all urban farm households in the selected villages/wards, with the farm household as the study unit. The study adopted a multistage cluster sampling technique involving five clusters.

1st stage involved Primary Sampling Unit (PSU) obtained from a sampling frame of cities in Uganda which include Kampala, Masaka, Gulu, Jinja, Arua, Lira and Mbarara. Cities were subjected to purposive sampling to come up with two cities that is Mbarara and Kampala.

The second stage involved the Secondary Sampling Unit (SSU1) where 4 divisions of Mbarara (Kakika, Nyamitanga, Kamukuzi, Kakoba) and 4 divisions of Kampala (Kawempe, Rubaga, Makidye, Nakawa) were considered giving 8 divisions.

The third stage involved SSU2 where parishes/wards were randomly selected by picking two Parishes from each division in a total of 16 parishes

The fourth stage involved SSU3 where Zones/LCs was randomly selected by picking three zones from each selected ward totaling to 24zones.

Fifth stage involved simple random sampling involving 384 households, including 16 households that practice urban agriculture, are included in the study region. This was achieved through seeking permission from City authorities and local council one (LC1) Chairpersons. To get the target respondents simple random sampling was employed. The actual population of urban farmers was unknown in both Kampala and Mbarara cities. To get sample size Cochran formula (1963) was used where an unknown population of farming households resulted in a sample of 384 respondents at a 95% confidence level.

The Cochran formula;

$$n0 = \frac{z^2 \cdot pq}{e^2}$$

$$n0 = \frac{1.96^2 \cdot .5 \cdot .5}{.5^2} = 385 \sim 384$$

$n0$ = Sample Size

z = the Z-value/critical value extracted from a z-table

p = the fraction of the population (as percentage) that displays the attribute

$q = 1 - p$

e = desired level of precision, the margin of err

Additionally, in each study area at least six key informants were selected from 8 divisions of Kampala and Mbarara Cities making a total of 48 Key informants. (They included religious leaders, local government leaders, Agriculture officers, and wealth creation representatives, from academia and business community). Also, eight FGDs composed of six participants were involved in the study totaling 48 members. This was accomplished by choosing four groups in each city according to the type of business the farmers were involved in. Table 3, below represents the study sample selection of respondents in the form of key informants and smallholder farmers.

3.6 Sampling strategy

This was achieved through employing the sampling techniques presented in table3 below;

Table 3: Sample Selection.

Category	Population	Sample Size	Sampling Technique.
Key informants (6)	48	48	Purposive
FGDs 8 groups composed of 6 members	8	8	Purposive
Respondents (small holder famers)	Unknown	384	Cluster and simple random
Total		440	

Source: Field data

3.7 Methods of data collection

Individual urban farmer household heads were interviewed to collect both quantitative and qualitative data. Quantitative data addressed patterns, relationships and effects among variables while qualitative data focused on understanding phenomena in the social world (Bryman and Cramer 2004, Haq, 2014). In this study, quantitative data was collected to analyze the role of urban agricultural income (also called farm income) in the total household income and quantify asset acquisitions and holdings in the urban farmer's households. Also, the household's food security was considered. Qualitative data was collected to find out agricultural production forms in the study site, and understand farmers' motivations about UA.

A semi-structured questionnaire was used for interviews with the household heads as they were the Unit of Analysis. Discussions with key informants were held using a prepared checklist. Field observation, discussion with urban agricultural experts and secondary data sources were used to supplement household interviews and discussions with key informants and FDGs.

3.7.1 Research Questionnaire Survey

The study employed a questionnaire Survey. This is because it is a highly suitable and effective method for measuring the perception (behavior, attitudes, preferences, opinions and intentions and motivations) of large numbers of respondents, and is cheaper than other methods in a

multicultural environment (Young, 2016). The format used was the semi-structured questions. Since many respondents had low proficiency in the language that was used that is English, the questions were translated for them into their local dialects that are “Luganda and Runyankole”. According to Luehr (2019), translation of questionnaires and interview questions from one language to another raises several challenges for cross-cultural researchers, as it is often seen as the most common difficulty encountered by the researcher or commonly referred to as the ‘outsider’ (Liamputtong, 2010). Four research assistants were hired from the local Universities in the study areas, which is two from Bishop Stuart University for Mbarara City and two from Ndejje University for Kampala city. And these assisted with the research design (e.g. neighborhood locations) and the translation of materials used during the field research (e.g. questionnaire, cover letter etc). They were also the key translator throughout the interviews. The research assistant was compensated on an agreed daily rate and signed a confidentiality statement to ensure the protection of participants’ data. For the purposes of this research, two methods were used to overcome the challenges of translation in cross-cultural research. Firstly, Liamputtong (2010) emphasizes the use of a ‘bicultural’ (or bilingual) research assistant, as “bicultural researchers share not only the language of the participants, but also many social and cultural traits, and will likely have the best knowledge of the research group. Specifically, Lee and Ellenbecker’s (1998) in China found that by utilizing a bicultural researcher, they were able to get more accurate information from participants, as experiences were told in their own language. Additionally, Shklarov (2007) noted that bicultural research assistants are able to create authentic and sound scientific results that are free of any alterations that can occur through language difficulties and increase research benefits, while also protecting participants from any possible harm in the research process. In addition, the research assistance’s role in cultural understanding is not limited to data collection, as they can play a crucial role in “data management, analysis and ultimately data interpretation” (Shimpuku & Norr, 2012).

Secondly, Brislin’s (1970) model of ‘back translation’ was used to further overcome language issues in cross-cultural research. ‘Back translation’ requires materials to be translated from their original language to the language in which they will be distributed and then back to the original language to ensure accuracy (Luehr, 2019). This model remains the most common method cited in literature. For this research, English versions of materials (e.g. cover letters, verbal consent scripts and questionnaires) were translated into Runyankole and Luganda, then back to English.

If inconsistencies were found, further discussion and an alternate translator were used to assist until accuracy was achieved by changing the original English as necessary (Köksal and Yürük 2020). Khalaila (2013) noted that when using back translation, “translators should consider issues of gender and age applicability and avoid any terms or dialects that might be considered offensive or unclear to the target population as well as pick out the proper terms according to the context and avoid the use of any jargon.

3.7.2 Focus Group Discussion

According to Kumar (1987), focus group discussion (FGD) is a rapid assessment, semi-structured data gathering method in which the selected set of participants gather to discuss issues and concerns based on a list of key themes drawn up by the researcher (Nyumba et al., (2018). This was achieved through the mobilization of target respondents into 16 groups each comprising 8 participants. That is two groups from each division. According to Gibbs, (1997) the recommended number of people per focused group is usually six to ten but some groups go as high as fifteen members. The researcher conducted an interview in 1 ½ hours with each group for two weeks. Researchers generally agree on fixing a period of 1 ½ to 2 hours (Flores and Alonso 1995, Kreuger and Casey, 2000). This time is adequate.

3.7.3 Interviewing Schedule

An interview schedule according to Taherdoost, (2022) is basically a list containing a set of structured questions that have been prepared, to serve as a guide for interviewers, researchers and investigators in collecting information or data about a specific topic or issue. In this study the interview schedule was used to collect data from the key informants to provide deeper knowledge and understanding of the study. When a particular target population is involved, one technique that is used is interviewing. The goal of conducting in-person interviews is to go further into the responses provided by the subjects in order to obtain more detailed information (Jamshed, 2014). Surveys with in-person interviews were utilized to delve deeper into the respondents' responses. This was done to get answers from important informants. The approach was selected because it increases the likelihood that individuals will respond to in-person inquiries on the topic. During interviews, open-ended standardized questions were more well-

liked since respondents felt it was more convenient to provide their lengthy responses verbally rather than in writing (Sincero, 2012).

3.7.4 Observation checklist

Mason (2002) argues that observation can be used alongside other research methods. I prepared a checklist to guide on what to observe during the survey and other visits. Since my initial visit to the sites I was prompted to observe how the gardening activities were conducted and listening to informal conversations. It was important to observe directly what the gardeners said and did because most were suspicious of any stranger around them.

I had decided on the key issues to observe at the urban farm, including the farmers' timetable, selling arrangements, gender issues in farming activities, and the farm/plots' physical characteristics. Although it was important to decide what I should observe, later I realized that flexibility was also important for a deeper understanding of gardeners' lives and included other issues that were not in my guide but were relevant to the study. This was achieved with the use of camera with farmers' permission to take photographs of different activities that were relevant to the study.

3.8 Data Collection Instruments

Individual household heads were interviewed using a structured questionnaire at the zone level. This is because individual household heads were the Unit of analysis.

3.8.1 Questionnaire

A semi-structured questionnaire was used to collect the household level data. The respondents of the questionnaire were household heads or spouses. The questionnaire covered different topics to capture relevant information about characteristics of urban farmer households, forms/types of agricultural practices, driver's/motivations for engaging in farming, sources of income, household income from annual farm and non-farm based activities, food security indicators, factors of agricultural production, and asset holdings. Detailed questions asked about types of crop cultivated and livestock reared by urban farmers, use of agricultural produces, annual

products and income from the sale of produces, market places for selling agriculture produces, and challenges in practicing urban farming. Monthly earnings from non-farm income sources were also recorded because they were important to predict overall household income and urban farmer socioeconomic status.

The questionnaire was prepared as simple as possible taking respondents' various backgrounds (such as age, education, etc.) into consideration. Later, it was translated from English into local dialects that's Luganda and Runyankole the commonly spoken dialects in the community. The use of a questionnaire enabled the collection of data from a large number of respondents. This is because the questionnaire offers greater assurance of anonymity thus enabling the respondents to give sensitive information without fear (Amin, 2005). For those who cannot read or write. They were helped in filling the questionnaire by the research assistant. A total of 216 household interviews were conducted.

3.8.2 Focus Discussion Guide

A Focus group discussion guide is a tool used to gather information informally from a small group of individuals who have a common interest in a particular subject (Dixon 2005, CRS 2018). The FGD tool is an open-ended questionnaire designed following major research themes. It gives the respondents' liberty to deliberate on the issues in the research questionnaire freely. This was achieved with a FGD checklist that was used to collect the required information. Focus group discussions were conducted to gather data on the following;

- Forms /types of urban agriculture used by the urban farmers
- Drivers/motivations of farmers to engage in urban agricultures
- Policy framework affecting farmer's operations

Additionally, information regarding decision making within the household was also elicited. Eliciting this information involved asking the participants who (men or women) generally made decisions concerning particular activities within households. This included information such as; who makes decisions on the kinds of crops to be cultivated, sold, eaten and what influences those decisions. Participants of the FGDs included both male and female participants who are involved in urban agriculture in Kampala and Mbarara cities. Participants of the FGDs were identified through key informants. They comprised of a homogenous group of farmers involved in similar enterprise even though they were able to offer variation in the data that was gathered.

3.8.3 Interview guide

The interview guide was used to collect qualitative data. This involved conducting intensive individual interviews with a small number of respondents to explore their perspectives on study variables (Boyce and Neale, 2006). The sample for the interviews consisted of 66 respondents that were 6 key informants in the different categories in the 11 divisions of Kampala and Mbarara. This sample is considered sufficient because a minimum sample of 66 is acceptable for interviews and little news comes out of the transcripts after interviewing 20 or so people. If the sample is too large, data becomes repetitive and eventually superfluous (Mason, 2010).

3.8.4 Observation Checklist and Photography

Field observations included observing the activities, which were performed by the household members/ hired labour. In addition, a checklist was used to record the urban agriculture types, physical conditions in which they live, feeding, housing conditions, means and route of transport been used and these were captured for evidence with use of a camera on ground.

3.9 Data quality control/ validity and reliability tests

3.9.1 Questionnaire Content Validity

Questionnaire validity was censured by consulting a panel of experienced researchers versed in the relevant area of research. Validity was also attained through triangulation, thus, using multiple methods of data collection and data analysis such as interviewing, observation, thematic and discursive analysis (Golafshani, 2003). In addition, content-related validity was established through consultations with a research expert. Through reading through the instruments, the research expert was able to identify relevant questions that were included and irrelevant questions that were removed. This study ensured content related to the validity of the instruments for both the self-administered questionnaire and interview guide through consultations with the study's supervisor and peers.

The test of the content validity index was established through supervisors. Each supervisor rated the items on a two-point rating scale of Relevant (R) and Irrelevant (IR). The computation of CVI (Content Validity Index) was done by summing up the judges' ratings on either side of the

scale and dividing by two to get the average. The items rated irrelevant were replaced with relevant ones. The formula used to calculate CVI;

$$CVI = n/N$$

Where: n = number of items rated as relevant

N= Total number of items in the instrument

The CVI ratio was above 0.7, a threshold considered being good recommended by Yau et al., (2015) for surveys as indicated in table 3 below.

3.9.2 Questionnaire Reliability

Reliability assesses the consistency of results over time. Reliability contains a particular embedded notion of stability of the results found, which means that they were repeatable over time (Golafshani, 2003). Kirk and Miller (1986), defined reliability as the consistency with which a research procedure evaluated a phenomenon in the same way over several attempts. This was achieved through Test-retest reliability which looks at the extent to which the instrument measures actually what it intends to measure. After a pilot study, there was a calculation of Chronbach Alpha – coefficient (α) applying the reliability Analysis Scale in SSPS (25). Table 4 indicates results content validity and reliability of the questionnaire.

Table 4: Content Validity Index and Reliability

Description of construct	No. of items	CVI	Cronbach alpha (α)
Forms of urban agriculture in relation to socio economic status of urban farmers	13	0.76	0.782
Drivers of urban agriculture in relation to socio economic status of urban farmers	10	0.80	0.959
Policy direction in relation to socio economic status of urban farmers	10	0.85	0.865
Influence of socio demographic characteristics on socio economic status of urban farmers	11	0.77	0.815

Source: Field Data

The Cronbach's Alpha coefficient is above 0.7 which is accepted as a reliability Indicator of the questionnaire because Taber, (2017) stated that any figure above 0.7 is considered reliable indicator of the questionnaire.

3.10 Data collection procedure

The University Directorate of Graduate Studies Research and Innovations at Bishop Stuart University had to grant permission for the researcher to gather field data. Following this approval, the research proposal was examined further by the Mbarara University of Science and Technology Research Ethics Committee (MUST-REC), which then forwarded my approved proposal to the Uganda National Council of Science and Technology for permission to conduct fieldwork in specific study areas in Kampala and Mbarara.

The researcher applied for research clearance from the Kampala and Mbarara city authorities. When I got clearance I proceeded to ward offices (LC1) introduced myself and ask them to help me locate urban farmers. Darwin Holmes (2020) state that identify in the person who has access to or represents the local setting in the research area is important to facilitate building rapport with the participants. Given the informal nature of urban agriculture the researcher used division agriculture officers and farmers network to locate urban farmers in various wards. In the main fieldwork it was difficult to arrange a meeting with all the urban farmers at once to introduce my study because they had different work schedules. Therefore, at the beginning the researcher used a household survey to introduce the study to the urban farmers. Since the researcher had used research assistants for the household survey, they were given identification tags for easy recognition and approval by respondents.

3.11 Data collection process

The first phase of data collection focused on individual interviews with a household member, who was either the household head or spouse. The interviews necessitated the participant to identify the forms and drivers of urban farming in relation to social economic status urban farm household. Words that explained the forms of agriculture that households engage in and the reasons behind farmers' participation in urban agriculture, and the social economic characteristics of the household in relation to socio economic status of the farm house hold were interrogated.

Photographs that also best illustrated the forms of urban agriculture undertaken by farmers were taken during the interview and through observations during field visits.

3.12 Data analysis

This involved the processing of the data which was done at three levels using Statistical Package for Social Scientists (SPSSversion25). Separate analyses depending on farmer's interest in farming i.e. "intensive commercial vs subsistence farming for Kampala & Mbarara was done and the farming type's specific data was reported at three levels. Separated analyses for farming types were done to adjust for biases associated with the farming type differences in particular the confounding bias.

Various study objectives were analyzed at various level of analysis as indicated below;

1. Objective one which examined the influence of forms of UA on the socio-economic SES of the urban farmers. The quantifiable information gathered on this particular objective was analyzed at three levels that is Univariate (using frequency counts and percentages), Bivariate (using Pearson's correlation) and Multivariate (using logistic regression analysis)
2. Objective two which examined the influence of drivers of UA on the SES of the urban farmers. The quantifiable information gathered on this particular objective was analyzed at three levels that is Univariate (using frequency counts and percentages), Bivariate (using Pearson's correlation) and Multivariate (using logistic regression analysis)
3. Objective four which examined the influence of demographic characteristics on SES of urban farmers was also analyzed at Bivariate and Multivariate levels.
4. Objective three which was the impact of policy direction on socio economic status of urban farmers was analyzed at Univariate level only.

3.12.1 Univariate Analysis

The Univariate analysis encompassed the descriptive summary for each variable. To study characteristics of farmers, techniques for summarizing data for continuous variables were used and these include: Mean, variance and standard deviation while the frequencies and percentages were used for categorical variables.

3.12.2 Bivariate Analysis

Cross tabulations were done to test any possible associations between each of the independent variables and the dependent variable. Statistical significance of the relationships was determined for the P-value ($P \leq 0.05$) and all significant variables at this level were considered at multivariate level analysis. This was done using Pearson's chi-square test.

The chi-square test statistic (χ^2) used is of the form;

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \quad [1]$$

Where $\chi^2 = \text{Chi-square}$

O_{ij} = the observed frequency in the i^{th} row and j^{th} column

E_{ij} = the expected frequency in the i^{th} row and j^{th} column

Chi-square is tested at a 0.05 level of significance

$i=1 \dots \dots \dots r$

$j=1 \dots \dots \dots c$

3.12.3 Multivariate Analysis

Multivariate analysis was performed to assess which factor is associated with Farmers Socioeconomic status (SES) more than the other. The Farmers Socio-economic status (SES) 'Better income' "Ownership of property/assets & quality of housing". "Food and nutritional status" SES is a categorical variable with more than two categories and therefore the suitable model to analyze this kind of criterion variable is the multinomial logistic. Multinomial logistic regression analysis was used because it attempts to control the possible confounding effect of independent variables on each other and thus finds the independent association for each predictor variable with the dependent variable. The model is given by;

$$\log\left(\frac{p_{ji}}{p_1}\right) = \alpha_j + \beta_j \times i \quad [2]$$

Where: α_j represent the constant

p_{ji} represent the probability of the j^{th} category

β_j s represent regression coefficients, $\times i$ s represent independent variables

p_1 is the probability of the base category

The relative risk ratios were interpreted as relative probabilities, that is; the probability of falling in the j^{th} category of social-economic status rather than the base category social-economic variable. Variables with a p-value of ≤ 0.05 were considered to be important in explaining the outcome of interest. Independent variables that were not significant at the bivariate level won't be considered at this level of analysis.

3.13 Ethical Considerations

The researcher made effort to respect the rights of others throughout the time. The material adopted from other sources such as journal articles, books and book chapters were acknowledged.

The proposal was subjected to Research Ethical Committee (REC) for scrutiny and the National Council of Science and Technology (NCST) to grant the researcher permission to proceed with data collection. Upon approval by the two research bodies, the researcher sought permission from the Bishop Stuart University Directorate of Graduate Studies, Research and Innovation to go for data collection in the field. Then the researcher proceeded to get clearance from city authorities who provided a list of farmers in each selected village/ward which was subjected to random sampling to get the respondents to involve in the study. Before reaching out to the farmers the researcher had to first seek clearance from village administration (LC1) office. After securing clearance from the LC1 the researchers preceded with the farmers got from city authorities from that particular village to involve in the study. While in the field the researcher seeks consent from the respondents before collecting data from them and consent form signed. The researcher briefed the respondents as to why they have been selected to participate in the study. The respondents were also informed of how they have been chosen and that the information they supplied was for study purposes and confidential.

CHAPTER FOUR: PRESENTATION AND INTERPRETATION OF RESULTS

4.1 Introduction

This chapter presents the presentation and interpretation of the results obtained from the field. The study was particularly interested in an analysis of the effects of forms and drivers of urban agriculture on the socio-economic status of farmers in Kampala and Mbarara Cities, Uganda. Questionnaires were administered to 384 respondents, and the process was completed by 31st August 2022. All 384 respondents answered and returned the questionnaires giving a response rate of 100%.

4.2 Demographic Characteristics of Urban Farmers

This sub-section presents the socio-economic of 384 sampled respondents from the two cities. The key demographic characteristics captured for the study included; gender, age, marital status, education level, gender of household head, source of livelihood, religious affiliation of household size, and total farm size in acres. These features were found to be of great help in terms of clearly depicting the diverse background of the smallholder urban farmers (Table 5).

Table 5:Demographic characteristics of the respondents

Household Characteristics		Kampala (n=192)		Mbarara (n=192)		Total (n=384)	
		F	%	F	%	F	%
Gender of respondents (%)	Male	90	46.9	105	54.6	195	50.7
	Female	102	53.1	87	45.4	189	49.3
Age in years (%)	30- 60 (Lower age limit)	120	62.5	130	67.7	250	65.1
	60 and above (upper age limit)	72	37.5	62	32.3	134	34.9
Marital status (%)	Single	40	20.8	47	24.4	87	22.7
	Married	122	63.6	120	62.6	242	63
	Widow	15	7.8	15	7.8	30	7.8
	Separated	15	7.8	10	5.2	25	6.5
Education level of HH (%)	No Education	05	2.6	20	10.4	25	6.5
	Primary level	40	20.8	95	49.4	135	35.1
	Secondary level	115	59.8	70	36.4	185	48.1
	Tertiary level	35	18.2	07	3.6	42	10.9
Household head Composition (%)	Male headed	130	67.7	129	67.2	259	67.4
	Female-headed	45	23.4	50	26	95	24.7
	Others	17	8.9	13	6.8	30	7.9
Source of livelihood (%)	Agriculture	108	56.2	117	60.9	225	58.5
	Non-agricultural	84	43.8	75	39.1	159	41.5
Religion affiliation (%)	Catholic	84	43.8	77	40.1	161	41.9
	Anglican	78	40.6	88	45.8	166	43.2
	Muslim	15	7.8	17	8.9	32	8.3
	Others	15	7.8	10	5.2	25	6.5
Household size %	1-4 members	80	41.6	22	11.4	102	26.5
	5-8 members	110	57.2	120	62.5	230	59.8
	9-12 members	02	01	50	26	52	13.5
Total farm size (acres)%	Bellow 0.5	65	33.9	10	5.2	75	19.5
	0.51-2.0	110	57.2	112	58.3	222	57.8
	2.0 and above	17	8.9	70	36.5	87	22.7
Farming experience in years (%)	1-5 years	57	29.6	20	10.4	77	20
	6-10 years	105	54.6	102	53.1	207	53.9
	Above 10 years	30	15.6	70	36.4	100	26

Source: Field data

4.1.1 Gender of Respondents

Respondents' gender categorizations are recorded in Table 5. This gave a clear picture of the number of men and women directly involved in the urban agricultural sector. The study was slightly dominated by males [n=195 (50.7 %)] compared to females [n= 189 (49.3%)]. When segregated between cities, Kampala city is dominated by females at (53.1%) and males at (46.9%) where as Mbarara city is dominated by male farmers at (54.6%) and females at (45.4%).

The differences in gender for both Kampala and Mbarara is brought about the available of non agricultural jobs for men in these two cities, with Kampala being the main capital city having more opportunities in industries and construction sites for urban dwellers than Mbarara. This dominance of males (50.7%) depicts the relative importance of UA as a reliable source of livelihood for urban farming homesteads, but also the agility of men to search for every opportunity to make ends meet in effort to provide for family needs. Because traditionally males tend to dominate in activities that bring cash/income to the family as breadwinners and females dominate in non-cash family activities (Peralta, 2022). More so, the culture of Uganda takes men's sole custodians of the community and family property. As such, they are in charge of the decision-making process which includes how to utilize land and agricultural resources. Ibrahim.et al., (2020) further argued that the dominance of males in urban farming does not mean that the population of males is more than females but a reflection of typical African traditional society where the oldest male is designated as the head of household regardless of whether he is the primary source of economic support. Women are however, involved in activities like small animal (poultry and rabbit) rearing, crop planting, mushroom cultivation, weeding, and harvesting. Though the female figure in this study is at 49.3%, this finding contradicts with McKenna (2014) who established that in Uganda, women contribute immensely to agriculture production through labour in planting, weeding, harvesting and processing and at an estimated percentage population of 51.8%. However, the finding of Makaya and Todzwo (2019) gave a contradictory analogy, where their findings revealed that more females were involved in UA, and as such viewed UA as a responsibility of women as supported by Hando and Legesse (2022). This is in line with the findings of Byamugisha et al. (2008) who stated that most women especially of the low and middle-income classes remain at home and engage in urban farming to ensure the availability of food in the household, and to others to supplement household income, while their husbands go to the city to work in formal or informal jobs. Further, Hadebe and Mpofu (2013) revealed that women are mainly involved in UA activities and take the decision on the types of crop to be grown in the garden. Now that UA has been taken up as serious household livelihood venture by urban dwellers, it should be given a consideration when planning for the city in order for farmers to feel a sense of socio economic security and also benefit from government programs targeting farmers across the country.

4.1.2 Respondents by age

Analysis of the respondents' by age was done as illustrated in Table 5. Results indicated that majority of the respondents surveyed across the two cities were aged between 30 – 60 years/lower limit (65.1%) compare to (34.9%) for age black above 60 years/upper limit. When disaggregated between cities Kampala registered (62.5%) of lower age limit and Mbarara (67.7%) lower age limit. This implies that Mbarara has a high percentage of young population engaged in UA. The respondent's age was necessary because it is an influential factor in understanding ownership and access of production resources (Leibbrandt et al., 2010). This influences production decisions, agricultural information-seeking behavior and capacity to access credit services. This age category young and old above is energetic vibrant productive group with horizon to take ventures and risks in new undertakings to seek livelihood opportunities including UA. This finding is consistent with Mbade et al. (2022) who found that younger generations are more involved in farming and agricultural marketing because they are less risk-averse and more open to new ideas than older generations. Further, Makaya and Todzwo, (2019) also found out that young people are involved in farming a trend they attributed to the low employment rate that affects these age groups to rely on UA for daily survival. This study adds that, unemployment is a serious challenge that affects majority of youth in many urban areas. The youth are attracted to gambling and drug abuse due to failure to get a reliable source of livelihood. Thus UA is the best alternative source of employment to this energetic section of the population.

4.1.3. The Marital status of respondents

The study revealed that two-thirds 63% were married, 22.7% were unmarried, whereas 7.8% and 6.5% were widowed and separated, respectively as illustrated in Table 5. When desegregated Kampala registers slightly higher percentage of married couples involved in UA (63.6%) compared to Mbarara at (62.6%). The marital status of respondents was considered because it is very critical in decision-making, adoption of production technologies and other management practices in agriculture generally and in UA in particular (Atube et al., 2021). Marital status is used to understand the gendered division of labour and its impact on UA activities and decision-making on the utilization of UA income. According to Ibrahim et al. (2020) marriage implies decision to accept family responsibilities such as provision of food, shelter and clothing. The

results are similar with those of Pedzisai et al. (2014) in Chinhoyi town Zimbabwe, who established that the dominant group in UA constituted farmers who were married. The dominance of the married in UA activities is explained by the fact that they use family labour for food production among several activities undertaken for livelihoods. The Urban farmers' engage in production to generate food and income to meet their household requirements in especially in a tight economic environment. This is in tandem with Byamugisha et al. (2008) who also pointed out that a higher proportion of married couples were engaged in UA. This is an indication that UA is being practiced to provide food and income for families. This is in agreement with Mntambo (2017) who stated that households where the respondents are married and both the spouses are working are expected to be more food secure than households with single, widowed, divorced or separated individuals. This study revealed that due pressure on married couples to cater for the dependents in terms of food and other domestic household needs; they find UA being the best alternative to engage so as to cater for their household members.

4.1.4. The education level of the respondents

The study reveals that farmers undertaking UA held a range of educational qualifications from primary to master level. The majority attended secondary education at 48.1 % as illustrated in Table 5. When desegregated between cities Kampala registers high percentage in secondary education (59.8%) whereas Mbarara registered a high percentage in primary education (49.4%). The education level of the respondents was considered because it is very critical in adoption and use of UA technology, production decision making and information-seeking behaviour (Maake and Antwa 2022, Kopyawattage et al., 2018). The majority of farmers was educated and hence was capable of involving and increasing productivity through a quick understanding of training and demonstrations given to them. This is in agreement with Byamugisha et al. (2008) who found that farmers with higher levels of education may look for and apply information to increase the output of UA and food security. The projection of the results, however, showed that the UA sector has not attracted the highly educated members of the community. This study finding is in line with findings by Martiniello (2019) who claimed that extremely uneducated smallholder farmers lack the skills necessary for formal employment, effective business management, and the ability to bargain for fair selling prices. However, higher education remains very important as this is likely to better negotiation skills and better and more

appropriate use of available technology and information for improved AU production. Mntambo (2017) gave contradictory argument where he revealed that educational status of respondents could increase or decrease participation in UA. He further, argues that respondents with high level of education could be fully and gainfully employed in “white collar” jobs without participating in UA. Then they only come to engage in UA after retirement.

4.1.5. Household Head Composition

Analysis of respondents’ household head composition revealed that male-headed households were 67.4%, and female headed was at 24.7% while 7.9% households represented households headed by children, caretakers and family relatives (Table 5). The household head composition was key for this particular study to establish the income levels, form of farming decisions made, and level of participation in UA activities and household production capacity all of which had an impact on UA. These results are supported by Ibrahim et al. (2020) who established that the dominance of male head household is reflection of typical African traditional society where the oldest male is designated as the head of the household. Karanja et al. (2010) further argued that men heading households is attributable to the traditional culture that restricts women's ownership of property. Further, households headed by males tend to be more focused in economic undertaking to meet household income and subsistence needs. The study established that to be a head of the household requires one to be resilient in this economic hardship situation. One needs to be enterprising in order to sustain a family in urban areas, which calls for UA as one of the best options available for exploitation.

4.1.6. Livelihoods of the respondents

Results (Table 5), showed 58.5% depended on UA for their livelihood, 41.5% were doing non-agricultural activities like retail shops, drug shops and clinics. Livelihood sources were considered for establishing respondents household income levels, which have an impact directly on agricultural investment, adoption of agricultural extension services, production technologies and management practices. It can be inferred that respondents use UA to augment their main means of livelihood, and meet their basic needs (Mntambo, 2017). This finding concurs with Byamigisha et al. (2008) who maintained that UA is practiced to provide food and income to urban farmers. Urban farming will continue due to variety of benefits accrued to the small

urban farmers. The study thus revealed that UA should be embraced as an alternative source of livelihood, since it can provide a relief from depending on formal employment and unemployed household members.

4.1.7. Respondents' religion

The results revealed that 43.2% were Anglicans by religion, 41.9% were Catholics, 8.3% Muslims, and last but not least 6.5% were Seventh day and Pentecostal Christians (Table 5). Religion affiliation of the respondents was considered for this study because it is a critical factor in the uptake of specific urban agricultural projects, technology adoption and use, production decision making and information-seeking behaviour of the farmers. Christians were the majority of respondents. This is supported by Ryan (2016) who noted that this is a dominant trend among Christians to utilize UA and community gardening as means of feeding and supporting of the poor through charity. Urban farming will continue to dominate in traditional churches since it's a tool the church leaders use to empower their followers to fight poverty and food insecurity in their homes.

4.1.8. Household sizes of the respondents

The results in this study indicate that the majority of household size was between 5-8 members (58.9%)(Table 5). When desegregated for Kampala it gave (57.2%) and Mbarara registered a slightly higher percentage (62.5%). Household size was key for the study as it influences labour availability for production and other related activities. According to Abdoellah et al. (2023), household members are the main source of labour for different UA activities. Muchelo (2018) further reported that there is a possibility of family members offering labour, especially those who have no formal jobs. These results are in agreement with those of Yeudallet al. (2007) who established that the average house hold size in Kampala was 7 people by then. Muchelo (2018) further argued that large household sizes also means larger required quantities of foodstuff, and thus more income is required for food consumption that compels households to produce part of their food requirements to cut household expenditure. To support these findings, Mireri (2013) reported that these labour-contributing family members in UA are self-employed, though they may not be recognized or registered as such under national laws. In addition, Foeken et al. (2004) in their study in Tanzania found that usually, crop cultivation is not a full-time job for the

person involved, and the family members can allocate some of their time to cultivation. According to Power (2020), women being housewives spend a lot of time at home and devote more time to crop cultivation. Children in the household may also help out, without being classified as child labourers, as long as it doesn't affect their school attendance and education (Putnick and Bornstien, 2015). In addition, according to Frosch and Gardner (2022) labour is often provided by relatives, friends and can be in the form of working groups. This labour is usually free or operates on a mutual basis. This finding as indicated in Table 5, did not come as a surprise as it is expected that, households with more mouths to feed and care for, should find some form of income augmenting activities such as participation in UA.

4.1.9. Land ownership of the respondents

The results indicated that the majority of farmers at (57.8%) own land size in arrange of 0.51-2.0 acres Table 5. When disaggregated between cities, Kampala registered (57.2%) and Mbarara (58.3%) The results reveal the pressure on land by other competing land uses leading to slinking of land available for farming in Kampala than Mbarara cities. These results resonates well with Muchelo (2018) who established a decreasing trend on the availability of land for UA in Kampala since 2002 where on average 1.9 acres of land was available for UA to about 0.5 acres in 2015. Relatedly, according to Ramaswami et al. (2022) city-wide median area per agriculture garden size was 14.6 m² with greater size (19.8 vs. 11.6 m²) in low and high-income neighborhoods, respectively. They further, argued that across all income groups, the gardening area was a small fraction of the yard area, suggesting little land availability constraint. The probability of household participation in UA increases with households who had access to land than households that had no access to land (Ibrahim et al., 2020). According to FAO, (2011), land is an important asset for agricultural production that cannot be overstated. For farmers, farm size becomes even more of an essential physical capital endowment (Rapsomanikis, 2015). Farm size was considered because it influences a range of farm resource allocation decisions, including labour use patterns (Alum, 2021). Mayuga and Jayne (2014) observed that generally there is a downward link between population density and size of household land holding. This decline can be linked to rapid rate of urban intensification and expansion (Muchelo, 2018). He further, noted that urban intensification in areas with high housing density is affecting already small farm lands and they are disappearing completely. This has forced poor farmers to devise means of survival

by encroaching on marginal land as temporal strategy by using open public spaces like along road sides or railway lines and wetlands to carry out farming. This calls for innovative approaches to solve the problem of space by adopting better methods of farming, which include containerized farming, bag gardening, exploiting vertical space, roof gardening, hydroponics to mention but a few.

4.1.10. Farming experience in years.

The results revealed that the highest number of respondents (53.9%) have an experience in farming of between 6 -10 years. When desegregated between the two cities Kampala registered slightly high percentage (54.6%) compared to Mbarara at (53.1%). According to Zhou and Li (2022) farming experience can contribute to the entrepreneurial decision of urban residents relative to those without experience in farming. Tambol (2024) classified farm experience as low experience if it falls within 1-2 years and 3-5 years. Also, 6-10 years and 11-15 years are considered “medium experience,” and 16-20 years and over 21 years are “advanced experience” in farming.

4.2 Influence of forms of urban agriculture on the socio-economic status of the urban farmers

Sub-section 4.2 of the study addresses objective one which examines the influence of forms of urban agriculture on the socio-economic status of the urban farmers. The research question one "What are the forms of UA being practiced by urban farmers in the study area?" Results of the analysis were presented in Tables 5, 6 and 7 respectively.

4.2.1 Forms of urban agriculture

This section presents and discusses the forms of urban agriculture that were being carried out across the two cities (Kampala and Mbarara). The forms of urban agriculture considered in the study were categorized into three forms; (a) subsistence forms which include; hanging gardens, Backyard gardens, roadside gardens, rooftop gardens and vacant plots, (b) commercial forms which include; zero grazing, poultry, fish, piggery, rabbits, and crop farms and (c) tourist forms which include; demonstration and education/ training sites. The data gathered was analyzed at a

variable level. Descriptive measures like frequency counts and percentages were calculated and used to interpret single variables as in Table 6 below.

Table 6: Forms of urban agriculture

Forms of urban agriculture		Responses	Kampala (n=192)		Mbarara (n=192)		Total (n=384)	
			F	%	F	%	F	%
Subsistence forms (%)	Backyard gardens	Yes	120	62.5	128	66.7	248	64.6
		No	72	37.5	64	33.3	136	35.4
	Vacant Plot gardens	Yes	101	52.6	134	70	235	61.1
		No	91	47.4	58	30	149	38.9
	Roadside Gardens	Yes	47	24.5	62	32.3	109	28.4
		No	145	75.5	130	67.7	275	71.6
	Hanging gardens	Yes	50	26.1	22	11.5	72	18.7
		No	142	73.9	170	88.5	312	81.3
Commercial forms (%)	Crop farms	Yes	157	81.8	168	87.5	325	84.6
		No	35	18.2	24	12.5	59	15.4
	Poultry	Yes	126	65.6	122	63.5	248	64.5
		No	66	34.1	70	36.5	136	35.5
	Zero grazing	Yes	58	30.2	96	50	154	40.1
		No	134	69.8	96	50	230	59.9
	Rabbit	Yes	33	17.2	60	31.3	93	24.2
		No	159	82.8	132	68.7	291	75.9
	Piggery	Yes	47	24.5	31	16.1	78	20.3
		No	145	75.5	161	83.9	306	79.7
	Fish	Yes	18	9.4	31	16.1	49	12.7
		No	174	90.6	161	83.9	335	87.3
Tourist forms(%)	Education and training sites	Yes	81	42.2	84	43.7	165	43
		No	111	57.8	108	56.3	219	57
	Demonstration sites	Yes	15	7.8	44	22.9	59	15.3
		No	177	92.2	148	77.1	325	84.7

Source: Field data

Subsistence forms

Backyard Gardens: Results in Table 6 on backyard gardens reported fairly significant 64.6% proportion of the respondents participated in urban agriculture and when disaggregated, it represents 62.5% and 66.5 for Kampala and Mbarara city respectively. Further, results show that 35.4% of the respondents declined to practice backyard gardening. The majority (64.6%) of respondents in both cities indicated that a backyard garden is a must for all families interested in

having healthy foods on their table and to cut costs on domestic expenditure on vegetables. As one farmer from Kampala said that;

"I get fresh vegetables from my backyard garden and I had taken long not spending on green vegetables since I grow them myself" (pers.com).

Another farmer from Mbarara city went on to spell out the benefits of eating fresh foods where she said;

"I grow most of the foods eaten at my home from my backyard garden and I have managed to avoid diseases, saved on daily domestic expenditure, eaten fresh foods, and eaten a variety of vegetables from carrots to greens, tubers, fruits" (pers.com).

During the FGD and Key Informant interviews, participants' argued that backyard gardens ought to be encouraged in all urban families since they supply fresh greens and vegetables needs on daily basis, plus, mushrooms and herbs. This saves time and money for not going to the market. Backyard gardens exist in various forms including food towers, pots, sacks, polythene bags and ridges (Mugisha et al., 2016). This is further illustrated in figure 8.

The main reasons advanced by farmers for adopting these techniques are that, they are easy to establish and manage, they don't need much space, they don't require special skill, and they are affordable. Additional benefits include food security and the aesthetic value of the homestead (Mugisha et al., 2017). This study established that every urban homestead should at least have a home garden to access fresh food once in a while on their menu and to save some money on vegetables which can easily be grown at home.



Figure 8: Back yard/home garden

Source: Field data

Vacant Plots: Analysis of farming in vacant plots in the study cities was done and the results indicate that, 61.1% undertook farming in vacant plots; disaggregated as 52.6% and 70% for Kampala and Mbarara cities, respectively (Table 6). Insignificant proportion 39.8% of the total number of respondents reported not farming in vacant plots in the two study cities. A big percentage (61.1%) of respondents in both cities carrying out farming on vacant plots implies that there are many undeveloped spaces within these cities. A bigger percentage was found in Mbarara city meaning that, since it's a new city, there is some form of urban sprawl in places that are having some rural resemblance. And many people have bought plots there, and have not yet developed them as indicated in figure 9. This was confirmed with the responses from FGD and Key informants' interviews, that vacant plots are a danger to city inhabitants as they harbour vermin like rats and snakes that find their way into the homesteads. This is in agreement with Garvin et al. (2013) who argued that vacant land is a significant economic problem for many cities but also may affect the health and safety of residents. They further argued that community members should be engaged in identifying local health impacts and generating solutions to vacant spaces. The study established that utilizing these plots for agricultural productivity is the best option to put these idle spaces into production and also to lessen potential dangers they pose.



Figure 9: Vacant plots gardens

Source: Field data

Roadside Gardening: This item was analyzed to determine the level of practice among the respondents. Results indicated low proportion 28.4% of the respondents admitted to practicing roadside gardening, the proportion being 24.5% and 32.3% for Kampala and Mbarara cities respectively (Table 6). Significant 71.6% respondents do not practice roadside gardening, disaggregated as 75.5% and 67.7% for Kampala and Mbarara cities respectively. Those few respondents who grow crops on the roadside attributed it to poverty and lack access to plots of land where to grow crops as one of the farmers from Kampala said;

"I grow crops on the roadside specifically maize and eggplants because I don't have where else to cultivate, I don't have money to hire empty land for farming and on top of that I am a widow with children to feed" (pers.com).

According to the FGD and Key informants' interviews participants argued that roadsides tend to be bushy when unattended to. This can be a hiding place for vermin like snakes and rodents. Urban farmers who don't have money to rent or buy land mostly widows resort to utilizing roadside for growing vegetables, cereals and root crops as indicated in figure 10.

This is further confirmed by Karanja et al. (2010) who reported that significant proportions of farmers use roadsides to grow crops and animal farmers use the road sides to graze their animals to compensate for scarcity of grazing places in urban areas. According to Dixon and Wolf (2007), planting of tall crops/trees and landscape features within the urban right-of-way is often perceived by transportation officials as a safety risk. However, advocates of urban agriculture

encourage roadside crop plantings. They further argued that within urban environments, transport mobility and accessibility needs should be balanced with urbanites' health and welfare. One of the benefits of growing plants near roads is that they slow, absorb, and clean water runoff. Thus, plants along roadsides reduce soil erosion, control flooding, and result in cleaner water supplies (Grant, 2021). This is because plants with fibrous roots tend to hold soil particles together to form strong coherent soil mass. Similarly plants canopy protects soils against rain drop and wind impact on the soil. In addition these trees absorb dust particles and gases emitted from vehicle and motorbikes, and also provide humid environment to city dwellers to relax in during hot hours of the day. This study thus established that many farmers who use roadsides to grow crops and graze their animals are the poor, especially women, yet it is risky as it is prone to causing accidents and silting of the drainage channels.



Figure 10: Road side /canal farming

Source: Field data

Hanging Gardens: Results in Table 6 indicated an insignificant number of respondents 18.7% admitted to using hanging gardens in the two cities. When disaggregated 26.1% and 11.5% were from Kampala and Mbarara respectively. However, the numbers of farmers using hanging garden is significantly higher in Kampala 16.1% than in Mbarara 11.5%. This could be due to higher scarcity of farm land in Kampala. A significant proportion 81.3% reported not having practiced hanging gardening. When disaggregated, 73.9% and 88.5% were from Kampala and Mbarara respectively. This was confirmed by FGD and Key informants' interviews who stated

that farmers are ignorant of such innovative technologies, and they fear that such technologies may be capital intensive. However, they encourage farmers to embrace hanging gardens since most of the buildings currently are going vertical in newly built-up areas. This will exploit the vertical space hence increasing agriculture productivity in the cities as indicated in the Figure 11. According to Despommier (2019), hanging gardens so called vertical gardens don't require much space and can compensate for the loss of agricultural land, even though they are not widely practiced in the two cities. This is attributed to a lack of technical guidance and availability of vacant plots where urban farmers can carry out their farming projects.



Figure 11: Hanging Garden

Source: Field data

Rooftop Gardens: Rooftop gardens as a form of urban agriculture was assessed. Results indicated that 14.3% of the total respondents practiced rooftop gardens as a form of urban agriculture across the two cities, which disaggregated to 14.1 and 14.5% for Kampala and Mbarara cities respectively (Table 6). However, 85.7% of the participants did not practice rooftop gardening. The few respondents engaged in rooftop gardening attributed it to having no space on the ground where to carry out farming. Those involved were using roof tops for leafy vegetable production, tomatoes and eggplants. Also, information from FGD and Key informants'

interviews revealed that rooftop gardening is still not yet embraced, and this was attributed to lack of knowledge, training and skills on designing rooftop gardens, relative to roofs design and if positioned in a slanting elevation creating small space for agriculture, and poor access to technical advice. These are the challenges farmers interested in rooftop farming face. These findings are in agreement with the findings of Thapa et al. (2020) who indicated that many farmers were interested in rooftop gardening, but were constrained by lack of knowledge to establish rooftops and others by small space on their roofs. This finding contradicts with that of Wang & Pryor (2019), who reported that rooftop gardens were highly cherished in the country's urban areas because the products of rooftop farming were considered as being social values, rather than food production. They further, argued that social values are based on social capital theory which focuses on balancing different social groups by creating a sense of fairness from collaboration.

Commercial farms

Crop Farms: Results on crop farms were analyzed and they indicated that 84.6% undertook crop farming; representing 81.8% and 87.5% respondents for Kampala and Mbarara respectively when disaggregated (Table 6). A small proportion (15.4%) did not undertake crop farming. This item registered a high response rate because crops are easy to raise and manage by majority of urban farmers. The crops grown are starchy staples (cassava, sweet potatoes, Cocoyam and Bananas), fruits, vegetables; maize and beans with a limited number of farmers growing Coffee. FGDs and Key informants' interviews revealed that these crops can easily be grown in small spaces, using different garden technologies. The crops engaged in are either for cash or food. For example, bananas are common in both cities since it is a stable food crop for both western and central Uganda, and at the same time a reliable source of income for families. Besides, it can be grown in compounds for aesthetic value, while contributing to food security in the household. These findings concur with those of Mugisha et al. (2017) who revealed that vegetables generally ranked high due to the relatively small spaces required to cultivate them. This study adds that the starchy staples have high demand among the urban poor and make food and nutrition security at household level. Again vegetables are also capable of being cultivated throughout the year, providing regular income to the households that grow them. Technologies in irrigation, mulching and soil and water conservation can enhance vegetables growing sustainability (El-Beltagi et al., 2022). The study established that urban crop farmers supplement

rural farmers in availing fresh nutritious food stuffs mostly vegetables to the market and need to be assisted with access to improved technologies in terms of inputs to realize their full potential.

Poultry Rearing: Poultry rearing as one of the urban agricultural practices was assessed. Results revealed that a large proportion (64.5%) of the respondents reported poultry farming as a form of agriculture practiced in the two cities; disaggregated as 65.6% and 63.5% for Kampala and Mbarara respectively (Table 6). The study found out that small proportions 35.5% of the respondents were not rearing poultry. This is in tandem with Katongole et al. (2011) findings who stated that poultry rearing was the most widespread livestock rearing activity in urban areas, followed by cattle, pigs, goats, sheep and rabbits in that order. The results from the study indicated that poultry keeping is advantageous comparatively because it does not require large space to keep them as indicated in Figure12. Some farmers reported even keeping birds in their garages, others in temporal structures and in permanent poultry structures. Conversely, some respondents reported that poultry farming is no longer a lucrative business because of the very expensive inputs in terms of feeds and unrealistic poultry breeders (Katongole et al., 2012). They reported that highly expensive feeds and high mortality rates of chicks are things attributed to hatchery operators. One of the farmers in Mbarara City said;

“I get chicks supplies from Kampala from mother hatchery but we poultry farmers don’t know the conditions of mother hatchery because specifically I register like 10% mortality rate in the brooder which cannot be explained since I observe all the sanitary requirements; but I am not certain if the chicks get infected from the hatchery or tiredness due transportation (Pers.com).

These findings are supported by the FGD and Key informants' interviews who argued that poultry production is high in urban centres due to the readily available market for poultry products in terms of eggs and chicken meat, quick investment returns. Also, there are fewer social tensions associated with keeping poultry in urban centres compared to other livestock. They further argued that urban dwellers are high consumers of these products in restaurants, bars, hotels and market outlets both informal and formal markets. Urban consumers buy poultry products in large amounts during festive seasons, parties and other public and private functions. This argument is supported by Attai et al. (2022) who revealed that poultry production provides high-quality, affordable animal protein, a high chance for investment, job opportunities and a source of income for smallholders worldwide. This study, established that chickens in many

households were kept by women and youth in Kampala more than Mbarara under gender demography's in Table 5. This provides employment and a means of increasing family economic gains. The study further revealed that chicken production contributed socially and economically through meat, manure, offerings, source of income, aesthetic value (beauty), and provision of school fees, household income and as source of employment. Besides, with modest capital investments in poultry, it can even be managed by the urban poor.



Figure 12: A local poultry unit with pullets in Mbarara city.

Source: Field data

Zero Grazing: Zero grazing as a form of urban agriculture was evaluated in this study. The results in Table 6 indicate that a small proportion (40.1%) of the respondents practiced zero grazing. When disaggregated, 30.2% and 50 % for Kampala and Mbarara cities respectively (Table 6). A large proportion (59.9%) of the respondents did not practice zero grazing, citing reasons like a heavy capital requirement to invest in the animals' shade, and high costs of feeds. Those involved keep cows and goats in the shade as indicated in figure 13. But due to the costs of construction of the shade and the expenses involved in stall feeding, some farmers opt for both free range and zero grazing at the same time. They keep animals in the shade at night, and during the day they are left to roam around on the roadsides and vacant plots grazing. These farmers end up in collision path with city authorities as roaming livestock appear as public nuisance and

destructive to city aesthetic projects by grazing up plants grown for other purposes. However, the few who keep dairy cows indicated that they are happy with the project because they get milk for consumption and sale. As one farmer from Mbarara puts it;

"I keep cows at home because my family in the village is a cattle keeping family and we like fresh milk and I sell the excess" (pers.com).

Another farmer from Kampala said;

"I keep cows and the milk from them is consumed at home, and excess is sold to neighbours and restaurants"(Pers.com).

Goat farmers said they keep goats because they are small animals which can survive in all conditions, and they are easy to feed since goats can feed on any vegetation around. One farmer from Mbarara said;

"I keep goats in my homestead because a goat is a poor man's cow, and it is easy to sell because of its size and availability of market in restaurants, and roasting around bars"(pers.com).

This was supported by the FGD and key informants who argued that the diminishing availability of open spaces for urban livestock grazing due to rapid development and infilling has increased the use of zero grazing by most farmers. Even though not fully embraced by most farmers in the study areas, don't have many options due to increased urban sprawl. This finding is in agreement with that of Klass (2018) who found that many urban farmers struggle with some challenges, which include feed scarcity, herdsmen, veterinary, and inseminator unreliability, and lack of capital.



(a)

(b)

Figure 13: Zero grazing units for (a) cows and (b) goats

Source: Field data

Rabbit farming: This study analyzed rabbit farming across the two cities. The study revealed that 24.2% of the respondents undertook rabbit farming, representing 17.2 and 31.3 % for Kampala and Mbarara cities respectively (Table 6). The study further revealed that a big proportion (75.9%) of the respondents do not practice rabbit farming. Those raising rabbits are a minority and are happy with the projects, and they said rabbit meat is in high demand mostly from foreigners whose demand can't be satisfied by the few farmers in the business. Rabbit farming is very lucrative because it is like every part of a rabbit is useful (Tembachako and Mrema 2016). Mutsami and Karl (2020) revealed that rabbit's urine is used as fertilizers, the skin is converted into leather which in turn is used by factories to make both shoes and bags, the meat is delicious when properly cooked, live rabbits are used as specimens in labs, the bones are used to make animal feeds, and the fur is used in making clothes. Rosemary and Julius (2023) further confirmed this argument, and revealed that of recent rabbit farming has become increasingly common among Ugandan communities as a source of animal protein and a possible source of increased income. This was confirmed by one farmer from Kampala who said that;

"I keep my rabbits here in a cage and feed them indoors. They are quick maturing and produce many young ones, and in a year, they produce twice unlike other animals. I have a huge market for rabbit meat, most especially from the Chinese, and I can't satisfy their

demand. I sell dressed rabbits at home and in a supermarket nearby because that is where the majority of my customers find them. I am calling upon all farmers in urban centres to embrace rabbit farming since it does not require big space to have critical mass and be able to export this rabbit meat to foreign countries where it is in high demand"(Pers.com).

Findings from FGD and Key informants revealed that rabbit farming is a new trend in urban centres of Uganda. They further revealed that the market for rabbit meat has not been fully exploited. Because rabbit meat marketing calls for farmers to produce on contract since it is consumed by foreigners and in big hotels. This is in tandem with Ndyomugenyi and Otiengino (2013) who found out that there is a low demand for rabbit meat in the local markets, leading to low prices, and this makes rabbit meat a risky venture to undertake. This study adds that low prices discourage rabbit farmers to rear many rabbits. Therefore, rabbit keeping was left to school children, who did not have the capacity in terms of land, capital and time to invest in rabbit production. Skilling in rabbit rearing is essential to enable urban farmers increase income streams to improve livelihoods. This further confirmed by Mutsami and Karl (2020) who observed that rabbit commercialization, is associated with a decrease in multidimensional poverty among urban farmers. They further encouraged urban dwellers with large households to be empowered should ensure that all household members participate in income generating activities such as rabbit farming and commercialization.

Piggery Production: Respondents mentioned piggery farms as the form of agriculture practiced across the two cities. Piggery farms were not so common among farmers in both cities, as only 20.3% admitted to having piggery farms. Among them, 24.5% and 16.1% were from Kampala and Mbarara, respectively. The majority 79.7% declined practicing piggery across the two cities. This high percentage of not practicing piggery is partly attributed to hygiene as pigs tend to be associated with a high foul smell which disturbs neighbors. However, regardless of management complications in congested urban environment pig meat (pork) remain a delicacy to urban dwellers. This is supported by Roesel et al. (2019) who established that pork is highly consumed in urban centres of Uganda since it is associated with the level of income of consumers. This is consumed on the roadside butcheries and pork eateries / the so-called pork joints and around bars (Atherstone et al., 2019). Regardless of this huge market potential, however, the few urban

farmers who keep pigs are happy with the project because of the availability of ready market in pork joints and bars. This was further confirmed by one respondent who said;

“I am happy with my piggery project because pigs give me quick money since they grow fast and reach the slaughter stage at six months. In addition, pigs produce many piglets which I sell to other farmers compared to other domestic animals like cows, goats and sheep. I even operate a pork joint where I sell most of slaughtered pigs’ meat (pork) and sell excess pork to other pork joints (Pers.com).”

This trend was also put across by FGD and Key informants’ interviews where they revealed that most urban farmers are not engaged in piggery production because of lack of knowledge in stench management as pigs are associated with a foul smell which may affect the neighbors in the congested city environment. They also revealed that in urban areas, there is lack of veterinary support, lack of proper infrastructure and licensing from city authorities which affect piggery farmers negatively. That’s why regardless of the ready market for pork in urban areas pork outlets source for most of their supplies from the peri urban areas where farmers have big stocks of pigs. However, piggery production can flourish in urban areas with the use of improved husbandry practices like use of indigenous micro-organism (IMO) in the pig sty with sawdust / husks or straw to serve as beddings to maintain the stench and flies’ free environment as indicated in the Figure14.



Figure 14: Pig sty managed under IMO

Source: Field data

Fish Farming: Fish farming as an urban agricultural practice was analyzed. The study found out that 12.7% of the total respondents practiced fish farming, and comprised of 9.4% and 16.1% for Kampala and Mbarara, respectively when disaggregated (Table 6). A big proportion (87.3 %) did not practice fish farming across the two cities. FGD and Key informants' interviews revealed that fish is highly consumed in the cities of Mbarara and Kampala, because of its nutritional benefits compared to other protein sources. According to Safina et al. (2018), fish farming if well embraced, has the potential to boost foreign exchange, household nutritional security and income levels in the country because of the high demand for fish within and outside the market. They further argued that Uganda currently supplies fish and fish products to the neighboring countries particularly Congo, Rwanda, Kenya and South Sudan in the form of technical expertise, feeds, fingerlings and other aquaculture inputs which call for increased investment in the sector. Regardless of these benefits, however, as referenced in Table 6 under commercial forms, fish farming is not embraced by the majority of farmers in Kampala than Mbarara due to insufficient knowledge on water quality and the management of fish ponds or tanks, and water contamination from residential areas and factories. This is in agreement with the finding by Ssekyanzi et al. (2022) who found out that the majority of fish farmers in the Rwenzori region had poor knowledge and practices concerning water quality in aquaculture. Another study by Namatovu et al. (2018) in central Uganda established that an increase in urbanization rate has led to the destruction of water supply sources which is limiting aquaculture expansion in urban areas. What is required though is that deliberate skilling and seed capital (the original investment capital) be provided to enthusiastic urban agricultural farmers and linked to urban markets. The proceeds will address urban households' poverty and make the government achieve the Vision 2040 to make Uganda attain economic development from a backward peasantry to middle income status.

Tourist farms

Analysis of tourist farms was assessed in the study area.

Education and training sites: These were not common in Kampala and Mbarara. However they registered slightly higher proportion (43%) of respondents who admitted the presence education and training sites in cities. When disaggregated, 42.2 and 43.7% from Kampala and Mbarara respectively (Table 6). However, 57% did not have any knowledge about education and training sites across the two cities. FGD and Key informants' interviews emphasized the need for training young farmers. They revealed that Uganda's population is young, but a high unemployment rate

means many young people struggle to build a life for themselves. This is attributed to what is being taught in school which does not match the skill required in the labour market. To solve these knowledge gaps city authorities in Kampala city established a demonstration site where farmers can access for training in latest technologies in Kyanja. Farmers are mobilized in groups and taken to demonstration sites like KCCA- Urban Agriculture demonstration site (Kyanja) and Seed multiplication organizations for examples East- West Seed Foundation (Kisasi) and taken through practical experience of various enterprises to improve their farms. The Urban Farm Demonstration and Training Center will empower both urban and rural farmers to learn new and innovative best practices and skills in urban farming methodologies as noted by Karubanga et al. (2017). These include aquaponics, hydroponics, an increase in cow and goat milk production using barley and maize fodder mixture, composting, biogas harnessing/usage and organic pesticide and permaculture. By demonstrating systems and providing the requisite training, skills and support, this activity will enable farmers to generate income while producing quality products for sustainable livelihoods.

Demonstration Farms: The results show that a small (15.3%) proportion of urban farmers were engaged in the demonstration farms. Further analyses by aggregation represent low proportions (7.8 and 22.9%) were engaged in the activity for Kampala and Mbarara, respectively (Table 6). However, a large proportion (84.7%) did not have any knowledge of demonstration sites across the two cities. The results from FGD and Key informants' interviews revealed that this is a new trend in agriculture where private individuals establish centres for demonstrating important innovations and inventions. An example is Kyanja Kampala City Council Authority (KCCA) urban farming demonstration centre, a public demonstration centre for urban farming's latest technologies across Kampala city. A similar venture is undertaken by private organizations across two cities where farmers can access knowledge of dealing with new innovations and this mostly done by seed breeding companies across Uganda. The study also revealed that these facilities, besides spreading the word about technologies fit for small spaces and urban farming, they also empower model farmers to sensitize their communities about the importance of adding vegetables to their plates, especially vegetables that are grown following health and safety standards. This finding is in line with Ohe (2022), who stated that tourism farms can act as school farms to demonstrate to other farmers to learn. He further, revealed that although farm visiting is gaining popularity as a type of experience-oriented tourism, the economic viability of this emerging service has not been fully established. In the Netherlands, for example, agriculture

is sometimes combined with various forms of recreational activities like camping on the farm (Yang et al., 2010), as a therapeutic retreat for people suffering from burnout or other disorders or as a location for environmental training and education (Grech, 2021), giving new meaning to the term mixed-farming (Greibitus et al., 2020). Similar initiatives are found elsewhere, in western Uganda in Fort Portal where tourists go to the Crater lodge where they are taken for the waterfalls and vanilla/green tourism (Banura, 2023). Holland et al. (2003) revealed that agro tourism in Uganda is often driven by a need to diversify farm and tourism income, as such also as livelihood strategy. Such multi-functional approaches to urban agriculture have been emerging and just need remodeling in terms of improvement in technology and marketing to prepare quality products in terms of tourism farm and service delivery for the economic, social and environmental space within the peri-urban areas and improved household livelihoods (Yuan et al., 2022). Makita et al., (2010) further, revealed that the development of multi-functional forms of UA may be an avenue to reconsolidate urban–rural relationships by improving the competitiveness of agriculture with urban functions in the peri-urban areas of Ugandan cities. If successful, such approaches may be able to create jobs and improve the living standards of peri-urban communities, and simultaneously provide high-quality open spaces and recreation opportunities for urban people not only in Kampala and Mbarara, but also in other cities.

4.2.2 Bivariate analysis between forms of urban agriculture on the socio-economic status of the urban farmers

At bivariate level, significant associations between independent and dependent variables were assessed and analyzed using Pearson Chi-squared (X^2) correlation at 5% level of probability (Table 7)

Table 7: Chi-square Results of forms of urban agriculture on the socio-economic status of the urban farmers

Forms of urban agriculture	Socio-economic status of the urban farmers	
	Chi-Square	Sig.
Subsistence farms	15.615	.001
Commercial farms	18.907	.0001
Tourist farms	7.784	.005

Source: Field data

As shown in Table 7, socio-economic status of farmers was used in the relationship as the dependent variable whereas forms of urban agriculture, namely subsistence, commercial and tourist farms were used as independent variables. Therefore, socio-economic status of the urban farmers (in terms of income, food security and ownership of property) were found to have a significant ($p < 0.05$) relationship with forms of urban agriculture namely subsistence farms, commercial farms and tourist farms. This means that the various forms of urban agriculture have a positive influence on the social economic status of farmers, since they are cost effective and easy to use by the farmers as indicated in Table 6 with the highest participation being 64.6% of urban farmers undertaking backyard garden under substance forms. Also these enterprises don't require extensive landholdings and some can survive with limited inputs as indicated in Table 6 with the highest participation being 84.6% of urban farmers undertaking crop farming for commercial purposes. Therefore, there is likely hood that farmers who practice these forms are more likely to register success in terms of their household food and nutritional security and income as well as ownership of property.

Table 8: Parametric estimates for influence of forms of urban agriculture on the socio-economic status of the urban farmers

Farmers Socio-Economic Status (SES)^a						95% Confidence Interval for Exp(B)	
Household food security and income ^b		B	Std. Error	Sig.	Exp(B)	Lower Bound	Upper Bound
Subsistence farms	Intercept	.496	1.508	.742			
	Hanging gardens	.065	.045	.155	1.067	.976	1.166
	Backyard gardens	2.174	.765	.002	1.929	.817	2.055
	Roadside gardens	1.885	.749	.012	.152	.035	.659
	Rooftop gardens	2.277	.704	.001	.103	.026	.407
	Vacant plots	0 ^c					
Commercial farms	Zero grazing	2.165	.973	.026	8.712	1.294	58.658
	Poultry farms	1.547	.558	.006	4.699	1.574	14.027
	Fish farms	1.378	.723	.047	3.967	.961	16.379
	Crop farms	1.346	.581	.021	3.842	1.230	11.997
	Piggery farms	.017	.015	.247	1.017	.988	1.046
	Rabbit farms	0 ^c	.	.	.	.	.
Tourist farms	Demonstration sites	-1.203	.573	.036	1.300	.098	1.924
	Education and training sites	0 ^c					

Source: Field data

a. Dependent variable is: Farmers Socio-Economic Status (SES)

b. The reference category is: Household food security and income

c. This parameter is set to zero because it is redundant.

Table 8 show logistic regression model results for the influence of forms of urban agriculture on the socio-economic status of the urban farmers. The pseudo adjusted coefficient of determination showed that the model explained 80.66% of the variations in the probability. The coefficients explained the changes in the probabilities of the outcome as a result of a unit change in the explanatory variables. Farmers Socio-Economic Status (SES) was used as the outcome category in the equation. For subsistence farms, five variables were hypothesized and three remained statistically significant ($p < 0.005$) at multivariate level including that is backyard gardens, roadside gardens and rooftop gardens. In addition, six types of commercial farms were hypothesized and four were found statistically significant ($p < 0.05$) at multivariate level and these were zero grazing, poultry farming, fish farming and crop farming. Lastly, two types of tourist

farms were hypothesized and only one “demonstration sites) ($p < 0.036$) was statistically significant at multivariate level.

Subsistence farms

Backyard gardens increased the log of the probability of farmer's SES by 1.929. Farmers with backyard gardens were 1.9 times more likely to have food and income security compared to those that carried out farming in vacant plots (Table 8). However, there was no significant difference ($p > 0.05$) in food and income security chances for farmers with hanging gardens and those doing vacant plot farming. In this case the earlier stated null hypothesis that backyard gardens had no effect on farmer's socio-economic status was rejected. This can be attributed to security of land tenure and security of the enterprises because under backyard gardening majority of farmers were having full control over the land where they were carrying out farming, and since it was near their homes they could also offer protection of their enterprises against pests, diseases, vermin, wondering animals and thieves. The results resonate well with the findings by Kirungi et al. (2020) who observed a significant effect of backyard farming and household food and income security. They observed that households practicing backyard farming found it easier to meet their household food needs compared to non-practicing households, meaning that excess foodstuffs can be taken to the market for income, and the money spent on foodstuffs saved for other domestic expenses. This implies that backyard farming if supported in urban areas can maintain food production and safeguard interference in food supply (Zezza and Tasciotti, 2010). These findings strengthen the argument for promoting urban agriculture as a tool to enhance food security and ameliorate poverty.

Unlike backyard gardens, roadside gardens decreased the log of the probability of urban farmer's SES by 0.152 and was significant at $p < 0.05$. Farmers who carried out roadside gardening were 152 times less likely to become food and income secure compared to those that practiced vacant plot farming (Table 8). This can be attributed to security of land and security of enterprises both on the road side and vacant plots. For hanging gardens, farmers have not yet fully ventured in this technology due to knowledge gap of adopting it. The study found out that many poor farmers who don't have land resort to road side or along the canal for farming because here land is free and can only be used for a short period of time with annual crops and vegetables as well as livestock grazing. Ogendi et al. (2022) argued that, for example in Nairobi, Kenya, many of the roads between the centre and the outskirts of the city have crops along their edges. They

further argued that if you were to drive or walk along these roads, you would also see cattle grazing. They further reported that farming along the roads can easily be accessed by the farmers making it easier to carry out agronomic practices and marketing of the farm produce. Sager (2020) argued that road side farming keeps the environment clean as plants growing in these gardens help to trap dust and absorb some exhaust gases from passing vehicles. However, farmers expressed worry on safety of their gardens since they are exposed to stray or scavenging animals and people passing by their side. Also, the city authorities sometimes uproot and sweep their crops away with bulldozers when making road repairs and maintenance without their notice, a thing they said is making them to lose a lot from their investments.

More so, the coefficient for rooftop gardens was positive and statistically significant ($p < 0.05$), indicating that farmers who carried out rooftop gardening were 0.103 times less likely to become food and income secure compared to those that practiced vacant plot farming. This implies that any additional rooftop garden by a unit decreases the probability of household food and income security by 0.103 times (Table 8). This is attributed to security of enterprises as farmers who practice rooftop gardening technology are more confident of harvesting their crops a part from pest and disease interference.

Commercial farms

The coefficient for zero grazing was positive and statistically significant ($p < 0.05$) indicating that farmers who carried out zero grazing had 8.7 chances of being food and income secure compared to those with rabbit farms. This was an indication in a unit increment in zero grazing farms increased the probability of the log of household food and income security by 8.7 times (Table 8). This is because rabbit farming is still struggling with market for rabbit meat from the local consumers. Many of the rabbit farmers are finding it hard to market their rabbits since they are demanded by foreigners who want a reliable and steady supply for a long time. The results imply that farmers involved in zero grazing tend to be closer to their animals giving them maximum attention leading to high productive capacity from the animals. This is in agreement with the research findings of Gerald (2000) who observed a positive relationship between zero grazing and farmers' income since it increased farmers' profit margins.

Poultry farming as a form of urban agriculture increased the log of the probability of farmer's SES by 4.7 and was significant ($p < 0.05$). Farmers who carried out poultry farming had 4.7 chances of becoming food and income secure compared to those who practiced rabbit farming

(Table 8). However, there was no observed significant difference in food and income security chances for farmers that practiced piggery and rabbit farming. The earlier stated null hypothesis of no relationship between poultry farming and farmer's SES was rejected. This was attributed to the availability of market for poultry products (chicken meat and eggs) among the urban population. The markets of poultry products in urban areas is found in restaurants, road side chicken roasters, chapatti makers "rollex" and homes around the town. This argument is supported by Mulegeta et al. (2021) who noted that the production of poultry is essential to household nutrition and food security. Ngongolo et al. (2021) in their study in Tanzania, found out that chicken production contributed socially and economically through meat, manure, gifts, source of income, aesthetic value (beauty), provision of school fees, and source of employment. They further argued that, chicken keeping is a very important sector in resource-constrained families as it provides for family proteins and income, which support family health care, education, and other social needs.

Both piggery and rabbit farming were not highly embraced by urban farmers. This is partly attributed to their unique nature of management and marketing. Pork is a highly lucrative business in urban areas, since its consumption is associated with stable income. But its rearing is not common in urban areas due to sanitary conditions in the sty.

The coefficient for fish farming was positive and statistically significant ($P < 0.05$), indicating that farmers who carried out fish farming had 3.9 chances of becoming food and income secure compared to those doing rabbit farming. An increment in fish farms by a unit was found to increase household food and income security by 3.9 (Table 8). This was attributed to the market for fish in urban areas compared to rabbit meat. Farmers in urban areas consume a lot fish due to the nutritional benefits consumers got from eating them.

Crop farming increased the probability of farmer's SES by 3.8 and was significant at ($p < 0.05$). Farmers who carried out crop farming had 3.8 chances of becoming food and income secure compared to those who practiced rabbit farming (Table 8). Crop farming is easy to manage and manipulate, since they can grow anywhere with modifications. Also, crops can grow in small confinement like buckets, tins, polythene, sacs, hanging gardens and rooftops.

Tourist farms

The coefficient for demonstration sites was negative but statistically significant ($p < 0.05$), indicating that farmers training through demonstration sites had 1.3 less chances of becoming food and income secure compared to those that trained through education and training sites. A unit change in the number of demonstration sites was found to negatively affect household food and income security by 1.3 (Table 8). Farmers study better when studying from their own environments than in education training institutes. This is partly because, farmers learn practically through experience.

4.3 Influence drivers of urban agriculture on the socio-economic status of the urban farmers in Kampala and Mbarara Cities

This section presents and discusses objective two which is the influence of the drivers of urban agriculture on farmer's SES, and addresses research question two: What are the drivers of urban agriculture in the study area?. The drivers of urban agriculture considered in the study were categorized under the following variables; access to market, access to agriculture extension services, access to credit services, access to capital, access to financial grants, a reliable source of water on the farm, access to electricity on the farm and value addition. The data gathered was analyzed at various levels. Descriptive measures like frequency counts and percentages were calculated and used to interpret single variables as in Table 9;

Table 9: Percentage of farmers motivated by various drivers of urban agriculture

Drivers of urban agriculture	Response	Kampala (n=192)		Mbarara (n=192)		Total (n=384)	
		F	%	F	%	F	%
A reliable source of water on your farm	Yes	188	97.9	190	98.9	378	98.4
	No	4	2.1	2	1.1	6	1.6
Access to electricity on your farm	Yes	17	90.1	163	84.9	336	87.5
	No	19	9.9	29	15.1	48	12.5
Getting into markets	Formal	169	88	125	65.1	294	76.6
	Informal	67	34.9	23	12	90	23.4
Availability of funds/capital	Yes	177	92.2	117	60.9	294	76.6
	No	15	7.8	75	39.1	90	23.4
Obtaining credit services	Yes	104	54.2	98	51	202	52.6
	No	88	45.8	94	49	182	47.4
Access to financial grants	Yes	83	43.2	68	35.4	151	39.3
	No	109	56.8	124	64.6	233	60.7
Value addition	Yes	48	25	68	35.4	116	30.2
	No	144	75	124	64.6	268	69.8
Obtaining agricultural extension services	Yes	36	18.8	40	20.8	76	19.8
	No	156	81.2	152	79.2	308	80.2

Source: Field data

A reliable Source of Water: As shown in Table 9, large proportion of respondent (98.4%) acknowledged that having a reliable source of water on the farm was among the key factors that prompted urban agriculture; effectively when disaggregated, represented by 97.9 and 98.9% for Kampala and Mbarara, respectively. A small proportion (1.6%) did not cite availability of having a source of water on the farm as an incentive for UA. This finding agrees with that of Turffour et al. (2023) who underscored importance of water as an essential feature for agriculture activities on the farm as it is used for irrigation of crops in the dry seasons (Tuffour et al., 2023), mixing agrochemicals and for animals to quench their thirst. This was supported by Dhakal et al. (2015) who indicated that alternative irrigation systems using groundwater and recycled wastewater are widely accepted for urban and regional agriculture, forestry and recreational landscaping. Presence of water can make the urban farmer invest in new agronomies and take on new crops that have short gestation periods and production of odd season crops. Government should invest in provision of water targeting urban farmers as the right direction worth undertaking.

Access to Electricity: Analysis of access to electricity by the respondents revealed that, a big proportion (87.5%) of the respondents stated that access to electricity on the farm initiated urban agriculture for some households; represented by 90.1 and 84.9% for Kampala and Mbarara

respectively. Only a small proportion (12.5%) disagreed that having electricity on farm did not motivate farmers to take up UA. Most urban farms need access to electricity mostly in livestock and poultry projects to feed livestock and poultry at night to maintain their production capacity. Even further, electricity is needed for agro processing and value addition (Shirley et al., 2021). According to Sackey and Nock (2022), an electrified agriculture sector would not only lead to drastic reduction in economic and food poverty, but it would also boost economic growth in Sub-Saharan Africa. Electrifying the agricultural sector could include provision of such services as pumped irrigation water, electrifying the grain processing, feed processing, and other activities. Presence of electricity would enable farmers to venture into more undertakings in agro-processing and new inventions and supply of fresh products. With farmers well connected, it's possible to do online marketing and supply.

Access to Formal Markets: Also a relatively good proportion (76.6%) of the respondents reported access to formal markets was a strong driver to urban agriculture; disaggregated as, (88 %) and for (65.1%) Kampala and Mbarara Cities respectively. Conversely, small proportion (23.4 %) of the respondents reported access to informal markets and disaggregated as 34.9% and 12% for Kampala and Mbarara cities respectively. Majority of farmers attributed availability of ready market as a strong motivating factor to start engaging in crop, livestock and poultry farming. Farmers from both cities indicated that urban consumers can access fresh foodstuffs in terms of vegetables, fruits, and animal products.

One vegetable farmer from Mbarara said;

“I grow vegetables to sale in my stall in Mbarara Central Market since most of my customers like fresh vegetables which I grow organically (pers.com) as indicated in figure 15.



Figure 15: Vegetable Stalls in Mbarara

Source: Field data

Formal markets in urban centres are associated with purchasing power of urban consumers mostly those with stable sources of income, especially those in the middle class. They are likely to purchase from organized markets like supermarkets, shopping malls and groceries. Urban consumers are classified as 'established high income', 'established low income', 'newcomers middle income' and 'newcomers' low income (Hemerijckx et.al., 2023). They further revealed that middle to high income urban dwellers have a more local food shed in form of supermarkets due to their broad participation in urban agriculture. While low-income newcomers rely heavily on retailers, market vendors and fixed street fruits and vegetable vendors, other consumers grow their own food at home because they have access to productive land. They revealed that apart from retailers and supermarkets, also they reported the existence of middle men in the marketing of agricultural products helping producers in locating potential consumers, that is, farm- to-market strategies.

Access to Financial Capital: In the analysis of access to financial capital to influence urban agriculture, a large proportion (76.6%) of the respondents indicated liking access to financial capital which when disaggregated was 92.2% and 60.9% for Kampala and Mbarara respectively. Nevertheless, a small proportion (23.4%) of the respondents revealed that access to financial

capital did not trigger urban agriculture. Urban farmers indicated that they get this capital from their savings obtained from other businesses. This was further reaffirmed by Wieliczko et al.(2020) who revealed that savings are a catalyst for capital creation, and are the driving force behind economic growth. Rapsomanikis (2015) also stated that farmers are having off-farm employment to complement farm income and contribute towards food security and poverty alleviation by combining their labour, land and capital assets such as irrigation structures, tractors, and other machines, livestock as productive assets. The same author further revealed that, human capital is another important source of capital because it exploits farmers' knowledge, skills, health or values to directly influence the choice of agricultural productivity. Knowledge and skills help in handling input combinations by farmers, and also in acquisition and assimilation of information and technology use, all of which if combined, will lead to successful urban agriculture projects. Furthermore, lack of access to (affordable) capital to the poorer population involved in UA hinders or shuts off urban producers' ability to acquire materials, implements and equipment which may increase their returns on labour and investment, or to add value through better processing, storage and packaging (Cabannes, 2012). The study suggests that capital intensive facilities to use in UA should be subsidized by government such that they are affordable by urban farmers. Even the government should try to give out handouts in terms in puts to urban farmers as it done to their rural counterparts through government poverty alleviation programs like operation wealth creation (OWC) and parish development model (PDM).

Access to Credit services: More so, a fairly large proportion (52.6%) of respondents revealed that the availability and access to credit services triggered urban farming. When disaggregated, 54.2% and (51%) were from Kampala and Mbarara, respectively. However, (47.4%) reported not accessing credit services. They argued that accessing credit facilities triggers urban farming. Farming is capital intensive, and the availability of funds to farmers is the big motivation to engage in urban farming. The majority of farmers (52.6%) indicated that the availability of agriculture loans from financial institution is a big motivator for urban agricultural engagement. However, this contradicts with reality on ground that the majority of farmers fear loans because of the unfriendly nature of loan terms, where the repay back period like most agriculture projects are faced with many risks and instabilities, high interest rates and the seasonality nature of agricultural products. This was further confirmed by one of the respondent from Kampala who said that.

“I fear loans because money lending institutions can put you on pressure and confiscate your property” (Pers.com).

However, the government of Uganda through Central Bank in October 2009 rolled out agriculture credit financing scheme (ACF) in partnership with commercial banks, Uganda Development Banks Limited (UDBL), Micro Deposit Taking Institutions (MDIs) and Credit institutions all referred to as participating financial institutions (PFIs) (Bamwine, 2019). Further, the scheme aims to facilitate provision of medium and long term financing to projects engaged in Agriculture and Agro processing, focusing mainly on commercialization and value addition. Bank of Uganda revealed that loans under the ACF are disbursed to farmers and agro-processors through the PFIs at more favorable terms than are usually available under conventional loans schemes. The main aim of the scheme is to increase production and productivity of agriculture at farm level. The funding is intended to enable farmers both in rural and urban areas access needed inputs such as seeds, fertilizers, agrochemicals and acquisition of appropriate inputs that aid production, post-harvest handling, processing and storage facilities targeting both domestic and foreign markets (UDB Handbook, 2020). However, the majority of the respondents seemed to be either not aware of this scheme or feared to apply for the loans because they were not sensitized about the availability of the scheme and target people. This was confirmed from the interviews session with the urban farmers as one of the farmers in Kampala reported;

“I have heard about Uganda Development Bank limited agriculture loan facility, but the conditions they put for one to qualify for it are out of reach to me a small and ordinary farmer. Because to qualify I hear your farming enterprise must be registered under company act, you must have stable and sufficient financial resources, your equity should be 25% of the total cost and must have land title to prove ownership of the farm. All these requirements are out of reach by most ordinary urban farmers, the majority don’t own land where they are carrying out agricultural activities”.

According to Cabannes (2012), for most small urban farmers, the lack of access to financing is a major bottleneck in their capacity to maintain and expand their activities, and more generally in the potential for scaling up affordable food production in cities. He further revealed that most credit institutions are reluctant to give loans to urban farmers for a long list of (good and bad) reasons and perceptions which include, lack of awareness of urban agriculture (or limited awareness), a perception that financing agriculture, especially small scale, is “risky”, concerns

about farmers' behaviour regarding repayments, perception that urban agriculture is small and unprofitable or does not match the current strategic objectives of the institution, lack of potential entities to partner with, the inflexibility of rules and regulations around standard financial products, a tendency to target only large-scale commercial enterprises, mainly those in the processing sector, a limitation of agricultural loans to rural areas, concerns about independence and administrative costs, and economic recession or financial crises creating a risk-averse attitude. This further confirmed by Cabannes (2012) who revealed that the reluctance by institutions to provide loans to urban farmers co-exists with a "...positive attitude and sympathy towards agricultural communities and activities". An interesting finding is the perception of risk by financial institutions as the main argument to justify why they are disinclined to offer financial products to urban farmers. This might be linked to fears of crop failure for climatic reasons (drought in arid zones or floods that wash away fish culture ponds, as happened in Porto Novo for instance). The expectation of climate change effects does not help change this perception. According to Ruete (2015), access to financial services such as savings and loans are of fundamental importance to start an agriculture activity. They further revealed that finances are needed to cover the cost of planting and harvesting for crop farmers, as well as investments in improved productive capacities. While financial services have become increasingly available to poor farmers, there is still much to be achieved to improve the availability of such services to young people in agriculture (Njeru, 2017). From all these arguments, the researcher established that the government should consider urban farmers in their disbursement of financial services, and mostly to the vulnerable groups such as the youth, women and persons with disabilities to realize development, since financial institutions are reluctant to extend loans to urban farmers.

Access to financial grants, as key driver to UA was assessed. Result revealed that a small proportion (38.3%) of the respondents reported access to financial grants was among the key drivers to urban agriculture; when disaggregated it is (42.3%) and (35.4%) for Kampala and Mbarara cities respectively. Conversely, many (60.7%) of the respondents declined saying that access to grants did not influence UA. Grants from government do not benefit urban farmers because they are targeting other economic activities where majority of the youth are employed. Like Operation Wealth Creation (OWC) and Parish Development Model (PDM) facilities target organized members who are in SACCOS, yet urban farmers are operating as individuals. They are benefiting members who are able to organize themselves into a group depending on their

economic activity and money is given to their SACCO to borrow at less interest rates. According to the Ministry of Local Government, the PDM is a development approach conceived under the third National Development Plan (NDP III), which was prescribed in NRM manifesto 2021-2026. The model was developed with the hope of creating wealth, employment, and to increase household income. It is hinged on six pillars: (1) Production, Storage, Processing and Marketing; (2) Infrastructure and Economic Services; (3) Financial Inclusion ;(4) Social Services;(5) Mind set change; (6) Parish Based Management Information System (7) Governance and Administration. However, majority of urban farmers have already lost hope since they are not organized into groups. Urban farmers live in enclosed structures with perimeter wall fences, and extremely limited association and information sharing. This factor affects SACCO formation and operationalization. Therefore, the study suggests an all-inclusive approach with government grants because among the urban farmers, there are those who are worse than their village counterparts since in urban areas, land is the determinant factor and is not available to everybody due to market value. That's we have farmers using marginal areas like road side, railways, along channels, vacant plots illegally and temporally since they can't afford to acquire land were to do farming.

Value Addition: A moderate proportion (30.2%) admitted that value addition triggered urban agriculture, represented by (25%) and (35.4%) for urban farmers of Kampala and Mbarara respectively. However, majority (69.8%) disagreed citing that value addition has nothing to do with urban agriculture. Dos-Santos (2020) argued that value addition is influenced by a number of factors, such as market characteristics, institutional, social, and environmental conditions; and the technological capacities of the actors involved in that process. He further revealed that the value added may be related to quality, costs, delivery times, delivery flexibility, and innovativeness of agricultural products, among other characteristics. The size of value added is decided by the end user customer's willingness to pay (Stobierski, 2020). Farmers have to identify the nature and class of target urban consumers to satisfy their market needs. If the farmer is targeting the middle income/ corporate class who purchase from supermarkets, value addition is a must if the farmer is to satisfy his /her customers.

Access to Agriculture Extension: Lastly but not least, a small proportion (19.8%) of the respondents reported that access to agriculture extension services was one of the drivers to urban agriculture, standing at (18.8%) and (20.8%) for Kampala and Mbarara respectively.

Nevertheless, a big proportion (80.2%) of the respondents disclosed that access to agriculture extension services was not among the drivers of urban agriculture. It's not easy to locate urban farmers for extension guidance. Majority of the farmers interviewed indicated that they got limited guidance from the extension officers, yet cities have production and marketing docket with agriculture extension staff employed to help urban farmers like their rural counter parts. The scatted nature of farmers in cities and living in gated environments have forced Kampala city authority to come up with a workable extension strategy, where a demonstration centre has been put in a place around Kyanja-Kisasi so that interested farmers can come to get specialized training in various urban farming technologies and improved farm inputs at subsidized prices. In an interview with one farmer from Kampala, he said that;

“I got all the knowledge to grow the improved vegetables in my farm from KCCA demonstration farm and I am very happy and satisfied with what they are doing for farmers in Kampala. They reserved a Wednesday and a Saturday as days for farmers to visit the facility to learn new urban farming technologies. They have good hospitable and cooperative staffs who take farmers through various sections of the demonstration for free and then the choice of the enterprise is left on the farmers to decide which technology and enterprise to choose according to his/ her capacity and level of comprehension of technology (pers.com).

According to Byamugisha et al. (2008) insufficient information about cutting-edge agriculture technologies, inputs, and strategies for striking a balance between environmental requirements and productivity is unavailable to urban farmers. Yet, you cannot do meaningful agriculture when you don't have access to technical guidance. This has been overcome with use of digital platforms to convey technical guidance to farmers of which majority are literate and technology compliant. However, views from the FDG indicated that the most reliable source of information for most people was fellow farmers, friends, relatives, neighbors, and opinion leaders, an indication of quick ways of obtaining oral information. The key –informants complemented these responses and in addition mentioned on-farm demonstration, agriculture exhibitions, written materials (magazines, newspapers, pamphlets, and posters) and the Internet as the other sources of information. Apparently, most responses appeared to imply that informal sources of information were predominant. The results imply that traditional extension approaches have not been successful in urban communities. There is need to incorporate digital platforms in urban

extension systems, since the majority of farmers are already exploiting them without proper guidance from technical personnel.

4.3.1 Correlation analysis between urban agriculture drivers and socio-economic status of the urban farmers

The association between urban agriculture drivers and socio-economic status of the urban farmers was achieved through a Pearson correlation at 5% level of probability (Table 10).

Table 10: Chi-square results of drivers of urban agriculture and socio-economic status of the urban farmers

Drivers of urban agriculture	Socio-economic status	
	Chi-Square	Sig.
Access to capital	1.175	0.047
Access to agriculture extension services	3.634	0.026
Access to credit services	.233	0.629
Access to financial grants	5.190	0.001
A reliable source of water on your farm	.018	0.892
Access to electricity on your farm	1.395	0.238
Access to markets	6.993	0.0001
Value addition	3.718	0.014

Source: Field data

Results of the relationship between urban agriculture drivers and socio-economic status of the urban farmers are presented in Table 10. At the bivariate level, the SES of the urban farmers (in terms of access to capital, access to agriculture extension services, financial grants, access to markets, and value addition had significant values ($p < 0.05$). Whereas, factors such as, access to credit, a reliable source of water on the farm, and access to electricity on the farm were not significant ($p > 0.05$). This implies that since UA undertakings are serious economic ventures, urban farmers need to access these services which include; capital, agriculture extension, financial grants, market and value addition to boost their UA businesses.

4.3.2 Multivariate analysis for drivers of urban agriculture and socio-economic status of the urban farmers

Significant associations between independent variables (drivers of urban agriculture) and dependent variable (socio-economic status of the urban farmers) were calculated and determined using logistic regression at 95% confidence interval (Table 11).

Table 11: Parameter estimates for urban agriculture drivers and socio-economic status of the urban farmers

Socio-economic status of the farmers ^a						95% Confidence Interval for Exp (B)	
Household food and income security ^b		B	Std. Error	Sig.	Exp (B)	Lower Bound	Upper Bound
	Intercept	.236	1.435	.869			
Access to capital	Yes	-1.230	.412	.029	.795	.524	2.205
	No						
Access to agriculture extension services	Yes	-.289	.361	.423	.749	.370	1.519
	No	0 ^c	.	.	.	.	.
Access to credit services	Yes	.143	.296	.629	1.153	.646	2.059
	No	0 ^c	.	.	.	.	.
Access to financial grants	Yes	2.041	.702	.012	1.960	.531	2.734
	No	0 ^c	.	.	.	.	.
A reliable source of water on your farm	Yes	.011	1.265	.993	1.011	.085	12.054
	No	0 ^c	.	.	.	.	.
Access to electricity on your farm	Yes	.704	.425	.097	2.022	.879	4.650
	No	0 ^c	.	.	.	.	.
Market system	Formal	3.845	.694	.002	1.413	.794	4.511
	Informal	0 ^c	.	.	.	.	.
Value addition	Yes	1.346	.581	.021	3.842	1.230	11.997
	No	0 ^c					

Source: Field Data

a. Dependent variable is: Farmers Socio-Economic Status (SES)

b. The reference category is: Household food and income security

c. This parameter is set to zero because it is redundant.

Results of the logistic regression model for urban agriculture drivers and SES of the farmers was analyzed. The coefficients explained the changes in the probabilities of the outcome as a result of a unit change in the explanatory variables. Farmers SES were used as the outcome category in the equation. Eight variables were hypothesized as “there is no significant relationship between the drivers’ urban agriculture and the socio-economic status of the urban farmer” and only four

remained statistically significant ($p < 0.05$) at multivariate level including access to capital, access to financial grants, market system and value addition (Table 11).

The coefficient of access to capital was found to have a positive association with farmer's SES ($p < 0.05$). Access to capital increased the log of the probability of farmer's improving on their household food and income security by 0.795 (Table 11). Farmers with access to capital had 0.795 chances of improving food and income security compared to those with no access to capital. The stated null hypothesis that there was no significant association between access to capital and farmer's socio-economic status is rejected.

Similarly, access to financial grants presented showed positive correlation and increased the probability of farmer's improving on household food and income security by 1.960. Farmers with access to financial grants had 1.9 chances of improving food and income security compared to those with no access to financial grants (Table 11). The stated null hypothesis that 'there was no significant association between access to capital and farmer's socio-economic status' was also rejected.

In addition, the coefficient for market system or nature of market was positive and statistically significant, indicating farmers who accessed formal markets had 1.4 more chances of increasing food and income security compared to those that accessed informal markets (Table 11). The stated null hypothesis that there was no significant association between marketing system and farmer's socio-economic status is thus rejected.

Lastly, value addition was a positive and increased the log of the probability of household food and income security by 3.8. Farmers who value addition opportunities were 3.8 times more likely to have food and income security compared to those that never added value (Table 11). The findings were statistically significant ($p < 0.05$). Therefore, the stated null hypothesis, there was no significant association between value addition and farmer's socio-economic status was rejected.

4.4 Influence of socio-demographic characteristics on the socio-economic status of urban farmers

Sub-section 4.4 addresses research objective four which sought 'to establish the influence of socio-demographic characteristics on the socio-economic status of urban farmers in Kampala and Mbarara Cities'. To addresses research question four which is "What is the influence of socio-

demographic characteristics on the socioeconomic status of urban farmers in Kampala and Mbarara Cities?” Information gathered was analyzed using bivariate and multivariate levels of analysis as presented in Tables 12 and 13;

4.4.1 Bivariate analysis between socio-demographic characteristics and socio-economic status of urban farmers

At bivariate level of analysis, significant associations between independent and dependent variable were assessed and analyzed using Pearson correlation at 5% level of probability as in (Table 12);

Table 12: Chi-Square results of socio-demographic characteristics and socio-economic status of urban farmers

Socio-demographic characteristics/Variables	Socio-economic status	
	Chi-Square	Sig.
Age	5.567	.018
Level of education	.044	.833
Family size	.057	.812
Experience in farming	2.766	.096
Total land owned	.887	.346
Gender	4.446	.035
Marital status	3.790	.285
Religion affiliation	16.624	.001
Tribe	3.493	.174
Source of livelihood	7.032	.004
Membership to farmer group	10.073	.002

Source: Field data

Results of the association between socio-demographic characteristics and socio-economic status of urban farmers were presented in Table 12. Socio-demographic characteristics were used as the dependent variable and SES of farmers as the dependent variable. At bivariate level, age, gender religion affiliation, livelihood source and membership to farmer group were significantly ($p < 0.05$) associated with SES of the urban farmers (that is income, food security and ownership of property).

4.4.2 Multivariate analysis for the influence of socio-demographic characteristics on the socio-economic status of urban farmers

Significant associations between independent variables (socio-demographic characteristics) and dependent variable (SEs of the urban farmers) were determined using logistic regression at 95% confidence interval.

Table13: Logistic regression results for the influence of socio-demographic characteristics on the socio-economic status of urban farmers

		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
						Lower Bound	Upper Bound
Socio-economic status ^a							
Household food and income security ^b	Intercept	-17.252	1.791	.000			
Age	In years	-.035	.015	.022	.966	.937	.995
Education	In years	-.009	.045	.833	.991	.908	1.081
Family size	Members	-.018	.075	.812	.982	.849	1.137
Experience in farming	In years	-.069	.042	.099	.934	.860	1.013
Size of land	Acres	-.148	.158	.347	.862	.633	1.175
Gender	Male	.770	.372	.038	2.159	1.042	4.474
	Female	0 ^c	.	.	.	.	.
Marital status	Single	-1.256	1.001	.210	.285	.040	2.027
	Married	-1.459	.937	.119	.232	.037	1.458
	Widowed	-1.854	1.099	.091	.157	.018	1.349
	Separated	0 ^c	.	.	.	.	.
Religion	Catholic	19.178	.620	.0001	2.134	1.330	7.191
	Anglican	20.180	.641	.0001	5.806	3.653	9.040
	Muslim	19.511	.000	.321	2.974	2.974	2.974
	Others	0 ^c	.	.	.	.	.
Tribe	Munyan kole	.941	.633	.137	2.562	.742	8.850
	Muganda	1.231	.676	.068	3.425	.911	12.873
	Others	0 ^c	.	.	.	.	.
Livelihood source	Farming	.900	.343	.005	2.460	1.255	4.822
	Others	0 ^c	.	.	.	.	.
Group membership	Yes	-1.072	.345	.002	.342	.174	.674
	No	0 ^c	.	.	.	.	.

Source: Field data

a. Dependent variable is: Farmers Socio-Economic Status (SES)

b. The reference category is: Household food and income security

c. This parameter is set to zero because it is redundant.

Results of the logistic regression model for the influence of socio-demographic characteristics on the SES of urban farmers were presented in Table 13. The coefficients explained the changes in the probabilities of the outcome as a result of a unit change in the explanatory variables. Farmers SES were used as the outcome category in the equation. Eleven socio demographic characteristics were hypothesized to establish their relationship with farmers SES and only five remained statistically significant ($p < 0.05$) at multivariate level including age, gender, religion, and source of livelihood and group membership.

The coefficient of age was a positive and had a significant association with farmer's SES at 5 percent. Age decreased the log of the probability of farmer's improving on their household food and income security by .966 implying that a unit change in age affected household food and income security by .966 units (Table 13). The stated null hypothesis that there was no significant association between age and farmer's socio-economic status was rejected. This is attributed to the experience one acquires with age and accumulation of property in terms of land. This led to old farmers realizing more returns in investment in agricultural enterprises compared to young farmers.

Similarly, the coefficient of gender was a positive and had a significant association with farmer's SES at 5 percent. Males were 2.2 times more likely to become food and income secure compared to females (Table 13). The earlier stated null hypothesis was rejected. The results showed more males are engaged in farming compared to females and an indication that now agriculture is becoming a reliable source of livelihood in terms of income for the family.

Religion increased the log of the probability of household food and income security by 2.134 and 5.806 for Catholics and Anglicans respectively. Catholics believers were 2.1 times more likely to become food and income secure compared to Muslims and other religions. In addition, Anglicans had 5.8 chances of becoming food and income secure compared to Muslims and other religions (Table 13). The stated null hypothesis no significant association between religion and farmer's socio-economic status was rejected. The results showed that more Christians are engaged in urban farming than Muslims because Christians have access to agriculture extension guidance from the church leaders and churches themselves engage in agriculture projects a thing that encourages followers to get interested. Unlike Muslims who are business of trade and with no guidance from their mosque leaders.

Similarly, livelihood source increased the log of the probability of farmer's improving socio-economic status by 2.460. Those who depended on farming as a livelihood source had 2.4 chances of improving food and income security compared to those that depended on other sources like employment (Table 13). In this case, the stated null hypothesis that there was no association between livelihood source and farmer's socio-economic status was rejected.

Unlike livelihood source, the coefficient of group membership was negative but had a significant association with farmer's socio-economic status implying that group membership decreased the log of the probability of farmer's improving on their household food and income security. Farmers who belonged to groups were .342 times less likely to become food and income secure compared to those that never belonged to groups (Table 13). The stated null hypothesis that there was no significant association between group membership and farmer's socio-economic status was rejected.

4.5 Policy directives in urban agriculture on the socio-economic status of urban farmers

Sub-section 4.5 addresses research objective three which sought to establish policy directive in urban agriculture on the socio-economic status of urban farmers in Kampala and Mbarara Cities. It also looked at research question three, "What are the different policy directives of government on urban agriculture in the study areas?" The information gathered was analyzed at Univariate (using frequency counts and percentages) as presented in Table 14.

Table 14: Appropriate policy directions of UA on the SES of urban farmers.

Appropriate policy directions	Kampala (n=192)		Mbarara (n=192)		Total (n=384)	
	F	%	F	%	F	%
Enhancing access to water, inputs and basic infrastructure	33	17.1	38	19.8	71	18.5
Promoting use of vacant private lands	19	9.9	29	15.1	48	12.5
Enhancing access of urban farmers to credit and finance	25	13	21	10.9	46	11.9
Temporary leasing of vacant municipal land	15	7.8	12	6.3	25	6.5
Relocation of urban farmers to specific areas/ Demarcation of zones for urban Agriculture	15	7.8	10	5.2	25	6.5
Supporting micro-enterprise development	12	6.2	19	9.9	31	8
Strengthening farmers organizations	21	10.9	17	8.8	38	9.9
Strengthening farmer training programs	23	11.9	23	11.9	46	11.2
Development of appropriate urban centered	27	14	25	13	52	13.5

technologies						
Facilitating direct marketing by urban farmers	18	9.3	30	15.6	48	12.5

Source: Field data

Results on appropriate policy directions for farmers enhancing socio-economic status through urban farming are presented in Table 14. Results indicated that small proportion (18.5%) suggested the need to enact policies that enhance access to water, inputs and basic infrastructure like roads; when disaggregated (17.1% and 19.8% were in Kampala and Mbarara cities respectively. Respondents indicated that there are fake agro inputs in the markets and lack of knowledge in water harvesting and basic infrastructure like water tank and animal shade, access roads, electricity. In addition, they complained of high prices of agriculture inputs in the market a thing they attributed to taxes put on the inputs.

A farmer from Kampala had this to say “I am almost going out of farming because of high prices and fake agro-inputs in the market mostly seeds and agro chemicals” (Verbatim).

This was supported by information got from FGD and key informants interviews who suggested that there is a need to enhance farmer’s access to water and production inputs. They also contend that access to fresh or composted organic matter and other nutritional sources depends on a year-round, affordable water supply. City authorities ought to devise methods for supplying impoverished urban farmers in community gardens with treated wastewater. This finding is consistent with Hasnain et al., 2023, Abaideen et al., (2022) and Kesari et al., (2021) claimed that city authorities can also help by endorsing the installation of composting toilets and the creation of decentralized, inexpensive facilities for the manufacture of compost. There is need for more efforts to be put towards recycling urban organic waste to support agricultural systems in urban setting. Furthermore, in order to promote sustainable distribution and access to farm-agri-inputs, it is necessary to make it easier for urban farmers to obtain high-quality seeds, organic fertilizers, and bio-pesticides in modest amounts through a network of neighborhood merchants using coupon systems.

Similarly, 12.5% of the total respondent's commended city councils to design policies that promote use of vacant private lands. Of the respondents, 9.9% and 15.1% were from Kampala and Mbarara cities respectively. Information got from FGD and key informants interview advised that in order to enhance access of urban farmers to privately own (vacant) land, city councils can put in place mechanisms that bring those in need of agricultural land in contact with the owners of vacant land. They can also hire vacant land from private landowners to lease it out to farmers group interested in using this land productively. They further suggested another effective instrument is to encourage private or institutional landowners to make vacant land available to poor urban groups. For example, city councils can assist farmers' associations in establishing gardens on privately owned land, which has proved to be a successful strategy in other cities. City council members mediating between landowners and poor urban farmers should promote the provision of longer-term leases, which allow producers to invest in the soil and farm infrastructure (Van Veenhuizen 2006). Such leases should be for at least five years, but preferably longer. Landowners willing to agree to a longer-term lease with an association of farmers that leases the plots to their members on the basis of annually renewable contracts, then to individual farmers out of fear that the latter might start seeing the land as property and become difficult to remove when the lease contract ends.

A small 11.9% proportion of respondents suggested the inaction of policies that enhance urban farmers' access of to credit and finance. Out of the respondents, 13 % and 10.9% were from Kampala and Mbarara cities respectively. FGDs and key informants corroborated this claim, stating that there is a critical need for increased access to financing and credit, with a focus on women producers and resource-poor farmers. They further suggested that City councils should stimulate existing credit institutions to establish special credit schemes for urban farmers (for example, by creating a guarantee fund) or allow participation in existing credit schemes for the informal sector which may require revision of existing loan conditions. Existing savings and credit cooperatives should be encouraged to provide credit services to urban farmers to support their farming activities. This find is consisted with Olumba et al., (2019) who stated that financially empowered farmers through credit, increases the likelihood of their access to land. Another study by Namwata et al., (2015), further indicated that lack of Access to land remains a major constraining factor in urban farming systems. Ayambire et al., (2019) also supported their argument added that Urban agriculture should be included in city council budgets with an aim of promoting urban agriculture activities. City council should allocate resources to support its

policy and programme on urban agriculture (infrastructure development, training and marketing support).

Vacant city land is earmarked for other uses (residential areas, industrial areas, hospital or school) but not yet in use as such, or it could include areas designated for buffer zones, land under power lines, and flood zones that are unsuitable for construction. It could also include property set aside for future use, which could be leased for a short or medium period of time to urban poor groups for gardening purposes (particular leaseholds). Information got from respondents 6.5% of the total respondents recommended temporary leasing of vacant city land of whom 7.8% were from Kampala and 6.3% Mbarara. This was supported by FGD and Key informants interview who urged that such land can be leased out to farmers' associations rather than to individuals (the association can then rent out plots on an annual renewable basis to its members) or written multi-annual occupation licenses or permits. This has been a success in cities such as Amsterdam, in the Netherlands, where the local Association of Gardeners (7200 members) rents over 250 ha of municipal land from the city (Ploegor & Bounjouh, 2017). They further argued that the Association rents this land out as garden-plots to individual members who pay a quota of around 300 euro per year per plot. This income allows the association to maintain fences and other infrastructure and to provide certain services to its members (e.g. training events, garbage disposal, etc.).

In addition, (Van Veenhuizen 2006) said that constraints regarding the necessary acreage, crops, and waste management techniques to be employed, as well as limits in certain situations, are frequently included in the contracts with the farmers. City councils should provide training on these practices to farmers of city council land. City council should not only provide the land but also assist in improving the quality of the land by ploughing, delivery of compost and manure, fencing, etc.

According World Bank group (2015) City councils should also provide economic incentives and technical support to neighborhood and youth groups that take action to clean up derelict and deteriorated open public spaces and turn these areas into gardens for the production of food, flowers, ornamentals, herbs, etc.

Furthermore, 6.5% of the total respondents recommended the relocation of urban farmers to specific areas and demarcation of zones for urban agriculture. Of the respondents, 7.8% and 5.2 % were from Kampala and Mbarara cities respectively. This was supported by Key informants

and FGD interviews who urged that sometimes agriculture activities like use of herbicides and synthetic fertilizers can be harmful to both human life and the environment. Therefore, city authorities must focus on re-allocating poorly located farmers whose activities may lead to serious health and/or environmental impacts. In instances where there is planned conversion of agricultural areas for other land uses, urban farmers should be provided with alternative land as well as be assisted with basic infrastructure.

Boussougou et al., (2021) argued that there is also a need to identify key agricultural zones in the urban centres. They further, reported that such zones can be demarcated with intension of supporting agriculture and/or to protect open green areas from being built upon, to create buffer zones between conflicting land uses (for example, between residential and industrial areas) or to reserve inner city space for future uses. In cities like Beijing, specific urban agricultural activities are promoted in the different peri-urban zones of the city (Yang et al., 2016).

Respondents totaling to 8% advocated for the inaction of policies that support micro-enterprise development of whom 6.2% were from Kampala and 9.9% Mbarara. Views from focus groups and interviews with key informants supported this, stating that it is necessary to support the growth of small-scale businesses, such as those that supply ecological farm inputs (compost, earthworms, open-pollinated seeds and plant materials, bio-pesticides), as well as processing businesses (food preservation, packaging, street vending, transportation). Examples of these include granting start-up licenses, tax breaks, and subsidies to micro and small entrepreneurs, as well as technical and management support and financing local infrastructure and equipment for small-scale food preservation and storage facilities. (Dita & Maulana, 2022).

More so, 9.9% of the total respondent mentioned the need to strengthen farmer's organizations/groups of whom 10.9% and 8.8% were from Kampala and Mbarara cities respectively. In the two research cities, farmers are primarily informal and ill-organized. They therefore lack sufficient channels and power to voice their needs. This was further confirmed by FGD and Key informant's interviews who observed that each farmer is independent. This limits the representation of their interests in urban policy making and planning at the various levels and hampers their participation in development programmes. Well-functioning farmers' organizations can negotiate access to land, adequate tenure arrangements and access to credit (IFAD 2008). Such organizations may also take up roles in farmer training and extension,

infrastructure development, processing and marketing, and control / certification of the quality of the products marketed (Gebremedhin et al., 2012).

More study is required to locate current farmer organizations and unofficial networks of different kinds of urban farmers, assess their needs and challenges, and determine practical solutions for advancing their development. In order to actively support farmers' organizations' capacity development and to fortify the connections between these organizations and private businesses, consumer groups, and support organizations, city councils must encourage their departments as well as universities, NGOs, and CBOs operating in the city. Of all responders, 11.2% discussed enhancing farmer training initiatives. Among them, 11.9% were from Kampala and 11.9% Mbarara city. This was in line with the opinions expressed in the FGD and by key informants, who urged that city councils and the private sector be encouraged to offer urban farmers technical assistance, training, and extension services, with a focus on ecological farming methods, appropriate risk management, farm development (such as intensification and diversification), enterprise management, and marketing. To guarantee the extension system's survival, cost-sharing arrangements involving farmers, municipalities, governmental agencies, and private businesses are required (Ozor, 2010). Education and extension institutions should be encouraged to include urban agriculture in their curricula and programmes.

Also, 13.5% of the total respondents recommended the development of appropriate urban centered technologies and among them, 14% were from Kampala and 13% Mbarara. Certain conditions apply to urban agriculture, necessitating the employment of different technology than in rural areas. These particular circumstances include the scarcity of space and the high cost of urban land, the utilization of urban resources (organic waste and wastewater), the possibility of direct producer-consumer interactions, and the close proximity to a big population (and hence the requirement for safe production methods). While new technologies must be developed to address specific urban needs, the majority of existing agricultural technologies must be modified for use in these conditions (e.g. non-soil production technologies for use on roofs and in cellars; development of safe and economical practices for reuse of wastewater). This is further emphasized by FGD and Key informants interview who suggested the introduction of innovations which are efficient and cost effective in the urban environment considering the limited space and value of land available for farming enterprises. They also recommended that extra focus be placed on introducing ecological farming practices (e.g., integrated pest and

disease management, ecological soil fertility management, conservation of soil and water), technologies that save water and space, practices that lower health risks, and the establishment of farmer study clubs and field schools that actively participate in the process of developing and evaluating new technologies.

Lastly 12.5% of the respondents recommended the need to facilitate direct marketing by urban farmers of which 9.3% and 15.6% from Kampala and Mbarara respectively.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusion and the recommendations in line with the study findings in the preceding chapters. It also suggests areas for further research.

5.2 Summary of the findings

The study analyzed the effects of the forms and drivers of urban agriculture on the socio-economic status of farmers in Kampala and Mbarara Cities, Uganda. The objectives were to; 1) examine the influence of forms of urban agriculture on the socio-economic status of farmers, 2) examine the influence drivers of urban agriculture on the socio-economic status of farmers, 3) establish the influence of socio-demographic characteristics on the socio-economic status of urban farmers, and 4) establish the impact of policy directives in urban agriculture on the socio-economic status of urban farmers in Kampala and Mbarara Cities. The study adopted a cross-sectional survey design combined with qualitative and quantitative methods for data collection and analysis. A multistage cluster sampling technique involving both simple random and purposive approaches was employed to get the required number of respondents. Using questionnaires, focus group discussions (FGDs), key informant interviews and observations, data was gathered from a sample of 384 respondents and some additional important informants. Microsoft EXCEL and SPSS Version 21.0 were used to analyze the data and produce both descriptive and inferential statistics. The findings generated reflected the objectives as summarized below.

1. Objective one was analyzed at three stages of analysis (univariate, bivariate, multivariate levels). The study registered a significant variation between the cities at univariate level (Table 5). The study found a strong association between forms of urban agriculture and socio-economic status of the urban farmers in Kampala and Mbarara Cities. Household socio-economic status was substantially correlated with subsistence forms, commercial forms, and tourist forms. Subsistence farms (backyard, roadside and rooftop gardens), commercial farms (zero, poultry, fish farms and crop farms), and tourist farms (demonstration sites) had a significant influence on household food and income security of farmers. These forms indicated significant variations between Kampala and Mbarara cities.
2. Objective two was analyzed at three stages of analysis (univariate, bivariate, multivariate levels). The study realized a small difference at univariate level as far as access to formal markets were concerned with Kampala registering high percentage share (88%) compared to Mbarara (65%), also access to capital with Kampala still registering a high percentage (92.5%) and Mbarara (60.9%). The study also discovered a significant relationship between drivers of urban agriculture and socio-economic status of the urban farmers. Household socio-economic status was significantly influenced by urban agriculture drivers like access to capital, access to financial grants, market system or nature of market accessed and per unit value added.
3. Objective three was analyzed at two stages of analysis (bivariate, multivariate levels) and the study found a strong association between socio-demographic characteristics and socio-economic status of the urban farmers. Demographic characteristics like age, gender, religion affiliation, livelihood source and being a member to group were found to significantly influence socio-economic status of urban farmers in Kampala and Mbarara Cities.
4. Objective four was analyzed at univariate level and the study further established policy directives for urban agriculture in Kampala and Mbarara Cities. Policies that could enhance access to water, inputs, basic infrastructure, credit and finance, promote use of vacant private lands, temporary leasing of vacant municipal land, demarcation of zones for urban, support micro-enterprise development, development of appropriate urban centered technologies as well as strengthening farmer's organizations and training programs were recommended.

5.3 Conclusions

Objective one:

In conclusion, the study confirmed a strong association between forms of urban agriculture and socio-economic status of the urban farmers in both Kampala and Mbarara Cities. Subsistence farms (backyard, roadside and rooftop gardens), commercial farms (zero, poultry, fish farms and crop farms), and tourist farms (demonstration sites) had a significant influence on household food and income security of farmers. The hypothesis that forms of urban agriculture have no significant influence on social economic status of urban farmers was rejected.

Objective two:

The study also confirmed a significant relationship between drivers of urban agriculture and socio-economic status of the urban farmers. Urban agriculture drivers like access to capital and financial grants, nature of market accessed and value addition had a significant influence on household socio-economic status. The hypothesis that there is no significant influence between the drivers of urban agriculture on social economic status of urban farmers was rejected.

Objective three:

The study concluded that there a strong association between socio-demographic characteristics and socio-economic status of the urban farmers. Demographic characteristics such as; age, gender, religion, livelihood source and group were found to significantly influence socio-economic status of urban farmers in Kampala and Mbarara Cities. Therefore the hypothesis that there is no significant relationship between social demographic characteristics on social economic status of urban farmers was rejected.

Objective four:

The study further confirms that policies aimed at enhancing access to water, inputs, basic infrastructure, credit and finance, those that promotes use of vacant private lands or temporary leasing of vacant municipal land, demarcation of zones for urban and support micro-enterprise development are the appropriate policy directions for urban agriculture development in Kampala and Mbarara Cities.

5.4 Recommendations

Based on the findings, the study made the following recommendations;

Objective one: Influence of forms of UA on SES of farmers.

Access to land is one of the major obstacles of urban farming. So, city authorities should encourage and promote use of available local and cost effective technologies to solve the problem of land shortage. This can be achieved by encouraging farmers to use a variety of options which include use of vertical space with hanging gardens, use rooftop for farming, use of various empty containers (buckets and sacks for crop growing) and also urban farmers to be guided on types of crops and soil/nutrient types to use in their farming endeavors.

City Authorities with MAAIF should promote the use of improved crop varieties and animal breeds to solve the problem yields.

Government must plan and invest in urban farming demonstration sites and education centers to improve knowledge on urban farming technologies since urban farmers cannot be easily be located by extension service providers in their gated premises.

Objective two: influence of drivers of UA on SES of urban farmers

City authorities need to encourage farmers to develop community networks such as community urban farming or urban market gardening on a co-operative basis. This will enable urban farming communities to negotiate urban farmers' concerns including agro-produce prices. These networks can help to realize economies of scale thereby reducing production and marketing costs. They can also encourage participatory issue solving and make information sharing easier.

Government should promote non collateralized agricultural loans for urban farmers since urban farming is capital intensive. This money should be invested in infrastructure, urban farming latest improved technologies, various inputs and transport facilities to marketing of agriculture produce. The government should set up a strong credit program for farmers to enable them to borrow money to increase the output of crops and livestock.

Agric extension should to train farmers on aspects on different technologies that are cost effective for their urban farms. Such technologies include use of local materials at the farmers' disposal from sacs, polyethylene bags, empty containers and improved seeds and animal breeds. Further, extension service providers can train farmers on pest and diseases control

City authorities should promote and encourage biological treatment of wastewater for irrigation purposes, and organic recycling of wastes for production of crops for urban population.

Objective three: Influence Social demographic characteristics of urban farmers on their SES

Since UA is practiced by both men and women, there is need for fully support of the sector by government and city authorities as it has proved to be a livelihood source that needs support like any other sector. Government poverty alleviation programs like parish development model (PDM) should also be extended to UA farmers.

Also since the study revealed that UA is practiced by majority young aged, it's high time it considered as an alternative source of employment for youth. The youth can be encouraged and supported to start UA enterprises like poultry, piggery, rabbits, mushroom cultivation and vegetables among others.

Objective four: Impact of policy directives on UA

City authorities should enact UA policy, because of its unique characteristics for food production in space-constrained conditions. Shortage of land in cities is a perennial challenge for UA. Adaptation to the constraints of space can help to ensure sustainable urban food production.

Urban authorities should support the organization of urban farmers into strong agriculture trade associations to benefit from government programs.

Government and city Authorities should plan and invest in UA forms that are not widely practices to improve food production and employment such as development of agro tourism centers, fish farming, piggery and rabbit farming on large scale with value addition.

5.5 Areas for further research

The study pointed out the positive role UA plays in household food security of low-income households. However, studies on UA contribution are still few and most them a decade older. Updated, comprehensive studies are needed to assess the changing nature of urban food security in Mbarara municipality and the role of UA, and to more fully estimate the percentage contribution of UA to household food provisioning and income across different economic strata.

There is also need to study the changing food consumption habits of urban population since urban consumers are not getting enough supplies of food stuff grown domestically

Still there need to study the appropriate extension and marketing strategies for urban farmers by nature of the set up in congested environments and scattered.

Additionally, studies are needed to better understand the multifunctional benefits of UA to environmental sustainability and a “greener” Mbarara and Kampala. Specific areas for research and technological development include farming in confined spaces, storage and processing, access to markets, efficient and better utilization of locally available livestock feed resources, rearing animals close to homesteads, efficient and effective rainfall water use, land-productivity enhancement and reducing the health risks in farming practices, such as those associated with use of wastewater for irrigation.

There is need to study the effect policies on end users as more respondents proved to be ignorant of the policies that affect their farming.

Also there is need to study the relationship between of urban agriculture and ownership of property.

Lastly, there is need to study how government grants could benefit urban poor farmers as they seem to left out of the government poverty alleviation programs.

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APPENDIX I: SEMI-STRUCTURED INDIVIDUAL INTERVIEW TOOL FOR URBAN FARMERS

Bishop Stuart University

FORMS AND DRIVERS OF URBAN AGRICULTURE ON FARMERS SOCIOECONOMIC STATUS IN UGANDA

Good Morning/Afternoon, I am Ninsheka Leonard a PhD student in the field of Agriculture from Bishop Stuart University. I am carrying out a study concerning urban agriculture and I hope results of the study will be used to improve services to the urban farmers. I would like to request you to participate in this interview. The information you will provide in this interview will be treated with the utmost confidentiality. I, therefore, request your valuable time.

Questionnaire 1. Urban farmers' individual interview;

Date:	Start:	End:
Name of enumerator :		Ward/Lc1:

Section A: The socio demographic factors of urban farmers

- A1. 1. City 2. Division
3. Parish 4. Village (Zone)
- A2. Gender of the house hold head: 1. Male 2. Female
- A3. Age of the house hold head (years)
- A4. Level of education of the household head in years
- A5. Marital Status
- A6. Non-farm employment for household head
- A7. Family Size:

The number of dependents and their respective Age bracket

Age bracket	Corresponding no. of dependents
1 Less than 1 year	[_____]
2 1-5 years	[_____]
3 6-10 years	[_____]
4 11-15 years	[_____]
5 16-20 years	[_____]
6 Above 20 year	[_____]

A8. Location of the farm

A9. (a) Size of farmer's land1. Small farm(0-2 acres) []	2. Medium farms (2-10 acres) []	3. Large scale farms (10-50 +acres) []
4. Others specify		

A9 (b). Landholdings/tenure arrangement.

1.Hire land []	2. Own the land []	3.Tenant []
4.Others specify[_____]		

A10. Farming experience in years.....

A11 (a). Membership of farming group

Yes []	Not sure []	No []
-----------	----------------	----------

A 11 (b) if yes what is nature of your farming group

1.Marketing of produce group []	2.Input dealers group []	3.Rotation cycle group []
4. Others Specify [_____]		

Section B: Forms of Urban Agriculture.

B1. Intension of your engagement in farming

B2. Farmers' production system adopted at your farm

B3 (a). Agriculture activities being engaged.

B3 (b). **For crop farmer's**, nature of your garden

B 3 (c). **For animal farmers'**, number of animals stocked.....

B 3 (d) (i) Source of the animal for stocking on your farm.....

B 3 (d). (ii) Source of feeds for the animals

B 3 (d) (iii) Method of feeding your animals on your farm

B 3 (e). Amount produced (quantity)

B 4. Distance from farm to main market

1.Very near /less than 5km []	2.Near/ 5-10 km []	3. Far /10-15km []
4.Very far /more than 15 km []	5.Other specify [_____]	

Section C: Drivers of Urban Agriculture

C1. Extension services

C1.1 (a). Are there agriculture extension services providers in your community?

1. Yes []	2. Not sure []	3. No []
---------------	--------------------	--------------

C1.1 (b). If yes, who are the agriculture service providers in your community?

.....

C1.1 (c). If no, how do you get information on farming?

C1.2. How have service providers benefited you as a farmer?

C 2. Credit services

C2.1(a). Are you aware of agriculture credit in Financial Institutions?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C2.1 (b). If yes, what are the financial institutions do you deal with?

.....

C2.2 (a). Do you access credit facilities in these financial institutions?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C2.2 (b). If yes, what is your Credits status?

C2.2 (c). If no, how do you raise money to invest in your farming business

.....

C2.3. What kind of credit facility do you access from commercial institutions as a farmer?

.....

2.4. How do you rate the credit facilities available to farmers?

1.very affordable []	2. affordable []	3. expensive []	4.very expensive []
5.Explain your choice above [_____]			

C 2.5 (a). Do you access financial grants?

Yes []	2. Not sure []	3.No []
-----------	-------------------	------------

C 2.5 (b). If yes, what kind of grants do you access?

C3. Technology and infrastructure

C 3.1(a). Do you have a reliable source of water on your farm?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C 3.1(b). If yes, what is the source of water on farm?

C3.2. How do you use this water on your farm?

C3.3(a). Do you have access to electricity on your farm?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C3.3 (b). If yes, what is the source of electricity?

C3.3(c). If no, what kind of power source do you use at farm?

C3.4(a). Are there access roads connecting your farm to the market?

1. Yes []	2. Not sure []	3.No []
--------------	-------------------	------------

C3.4 (b). If yes, what is the condition of the road?

C3.5. What is means of transport do you use to reach your farm produce to the market?

(For crop farmers only)

C3.6 (a) Do you use fertilizer on your farm?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C3.6 (b) If yes, what type of fertilizers do you normally use?

C3.6(c) If organic fertilizer what is source of your fertilizer?

C3.7 (a) Do you use Indigenous microorganisms (IMO) on your farm?

1. Yes []	2. Not sure []	3.No []
--------------	-------------------	------------

C3.7 (b) If yes, what are the benefits you get from using IMO on your farm?

.....

C3.7 (c) Which enterprise do you use IMO on your farm? (Choose all that applies)

.....

C3.8 Where do you get the IMO solution to use on the farm?

.....

C.4. Marketing systems used by the urban small holder farmers

C4. 1. Informal /Formal markets

C4.1.1 (a) Do you sell your farm products?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C4.1.1 (b) If yes, who are your target customers

C4.1.1 (c) Where do sale your farm products

C4.1.1 (d) What is the condition of the products you are selling to your customers?

.....

C.4.2 (a) Do you add value to your products

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

C.4.2 (b) If yes how do add value to your produce

C 5. Post-harvest handling/value handling

C5.1. What is the shelf-life of your products?

1. Very perishable []	2. Moderately perishable []	3. Last long []
4. Other specify [_____]		

C5.2. What are kinds of losses incurred through post harvesting handling?

.....

C5.3. How do preserve your agriculture products?

C5.4 What kind of transport do you use for your perishable products to market?

.....

C6. Waste management

C6.1. What kinds of waste generated through agriculture activities?

.....

C6.2. How do manage your Solid waste generated as result of your farming activities?

.....

Section D: Urban Agriculture Policy framework.

D 1. Urban agriculture Policies regulating farming.

D.1.1 (a) Are you aware of urban agriculture policies regulating farming activities?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

D.1.1 (b) If yes, what are some of the policies do you know regulating farming in your town

.....

D.1.2 (a) Is there a need for securing permission from city authorities to engage in farming in the urban area?

1. Yes []	2. Not sure []	3. No []
--------------	-------------------	-------------

D.1.2 (b) If yes what kind of regulations do you subscribe to?.....

D.2 Land use policies on Urban Agriculture

D.2.1 Are you aware of the land policies in your city?

D.2.2 How do you access land for farming in your city?

D.2.3 What is the status of the land holding for your farm? (Choose all that applies)

1.Private titles deed []	2. Institutional [specify_____]	3. lease holding []
4.friends/relative land []	5. Public land/vacant plots. []	6.Family land []
7.rent []	8.Others specify [_____]	

D.2.4 How has urban land zoning policies affecting your farming business.

[_____]

D 2.5 How is the condition of your farmland as for as suitability for agriculture is concerned.

1.Very fertile []	2.Fertile []	3.Infertile []	4. Barren []	5.Polluted []
6. Swampy []	7.Other specify [_____]			

D.2.6 (a) Are you aware of city taxes

1.Yes []	2. Not sure []	3. No []
-------------	-------------------	-------------

D2.6 (b) If yes, what are forms of taxes do you pay as a farmer?

D2.6 (c) How has the tax regimes affected you're farming business?

D 2.7 Apart from farming how do you use the rest of your land?.....

D.3.3 Environment policy on urban farming

D3.3 (a) Where do you practice your farming activities?

1.Prime land []	2. Swamp []	3. Roadside []	4.Indoor []
5. Rooftop []	6. Containers []	6. Others specify.[_____]	

D3.3. (a) How do you manage your farming activities concerning environmental conservation?

.....

3.3(b) How does environmental protection policy affect your farming?

.....

Section E: Urban Farmers Socio Economic Status

E.1 What motivates you to engage in farming?

E. 2(a). Are you happy with farming activities?

1.Yes []	2. Not sure []	3.No []
-------------	-------------------	------------

E 2 (b). If yes, how have you benefited from undertaking of urban farming?

.....

E 2 Do you have enough food at home?

E 3. What is the average monthly income from agricultural activities on your farm?

1. Less than 500,000/= []	2. 500,000/= to 1,000,000/= []	3. Above 1,000,000/=
4. Don't earn at all []	5. Please specify any other source	

E 4. Household assets and housing quality are used to construct the asset to ascertain wealth status.

Variable	Level of measurement
Ownership of house	1 = yes, 2 = no
Does the household share compound with other households?	1 = yes, 2 = no
Material of housing construction	1 = brick, 2 = else
Presence of electricity	1 = yes, 2 = no
Presence of piped water	1 = yes, 2 = no
Use of gas for cooking	1 = yes, 2 = no
Presence of air conditioner	1 = yes, 2 = no
Presence of conventional telephone	1 = yes, 2 = no
Possession of car	1 = yes, 2 = no
Possession of motorbike	1 = yes, 2 = no
Possession of bicycle	1 = yes, 2 = no
Possession of color TV	1 = yes, 2 = no
Possession of refrigerator	1 = yes, 2 = no

Thank you very much for sharing with me your experience regarding forms and drivers of urban agriculture on farmer's socio-economic status in your town.

APPENDIX II: FGD INTERVIEW GUIDE FOR URBAN FARMERS

Bishop Stuart University

FORMS AND DRIVERS OF URBAN AGRICULTURE ON FARMERS SOCIOECONOMIC STATUS IN UGANDA

Good morning/afternoon, I am Ninsheka Leonard a PhD student in the field of Agriculture from Bishop Stuart University. I am carrying out a study concerning urban agriculture and I hope results of the study will be used to improve services to the urban farmers. I would like to request you to participate in this interview. The information you will provide in this interview will be treated with the utmost confidentiality. I, therefore, request your valuable time.

FGD checklist

1. Formers Socioeconomic status

- 1.1 What motivates you to engage in farming?
- 1.2. How have you benefited from the undertaking of urban farming?

2. Forms of Urban Agriculture.

- 2. 1. What types of urban Agriculture are farmers using in their farms?
- 2.2 What Agriculture activities are being engaged in by farmers in your area?
- 2.3 What is the source of animals for stocking on their farm?
- 2.4 Where do farmers get feeds for the animals on their farms?
- 2.5 Which Method of feeding animals do most farmers use in their farms?
- 2.6. How much do produce Amount produced on your farm?

3. Drivers of Urban Agriculture

3.1 Extension services

- 3.1.1 How do you get information on farming in your community?
- 3.1.2 Who are the agriculture service providers in your community?
- 3.1.3. How have service providers been benefited you as a farmer?
- 3.1.4 What kind of extension services do you receive from service providers?

3.2. Credit services

- 3.2.1. What is your Credits status?
- 3.2.2 What are financial institutions do you normally deal with?
- 3.2.3 What kind of credit facility do you access from commercial institutions as a farmer?
- 3.2.4 How do you raise money to invest in your farming business apart from loans?
- 3.2.5 How do you rate the credit facilities available to farmers?

3.2.5 What kind of grants do you access to boost your farming business apart from credit?

3.2.5 What kind of training do you get on financial literacy?

3.2.5 What insurance company are you dealing with?

3.2.6. What insurance package are you subscribed to?

3.3. Technology and infrastructure

3.3.1 What is the source of water on farms?

3.3.2. How do you use this water on your farms?

3.3.2. What kind of power source do you use at your farms?

3.3.4. How far are your farms from the main market?

3.3.5 What is the condition of the road?

3.3.6. What is means of transport do you use to reach your farm produce to the market?

3.3.7. What type of fertilizers do you use?

3.3.8. What is the source of your fertilizer?

3.3.9 What is the breed of the animals you are keeping on the farms?

3.3.10 Source of the animal for stocking on your farms

3.3.11 Method of feeding your animals on your farms

3.3.12. What is the source of feeds for your animals on the farms?

3.4 marketing systems used by the urban farmers

3.4.1 Informal /Formal markets

3.4.1.1 Who are your target customers?

3.4.1.2. Where do sale your farm products?

3.4.1.3 How are your farm products sold?

3.4.1.4 How do you add value to your product?

3.5. Post-harvest handling/value handling

3.5.1. What is the shelf-life of your products?

3.5.2 What are the kinds of losses incurred through post-harvesting handling?

3.5.3 How do you preserve your agricultural products?

3.5.4 What kind of transport do you use for your perishable products to market?

3.6 Waste management

3.6.1 What kinds of waste are generated through agriculture activities?

3.6. 2 How do manage solid waste generated as a result of your farming activities?

4. 0 Urban Agriculture Policy framework.

4.1. Urban agriculture Policies regulating farming.

4.1.1 What are the urban agriculture policies regulating the farming activates in your area?

4.1.2 What kind of regulations do urban farmers need to satisfy to engage in farming?

4.2 Land use policies on Urban Agriculture

4.2.1 How do you access land for farming in your city?

4.2.3 What is the status of the landholding for most farmers in your area?

4.2.4 How has urban land zoning policies affected farmers in your area?

4.2.5 What is your comment on the condition of land as for suitability for agriculture?

4.2.6 What are forms of taxes do you pay as a farmer?

4.2.6 How has the tax regimes affected your farming business?

4.2.7 Apart from farming how do you use the rest of your land?

Thank you very much for sharing with me your experience regarding forms and drivers of urban agriculture on farmers' socioeconomic status in your town.

APPENDIX III: KEY INFORMANT INTERVIEW GUIDE

Bishop Stuart University

FORMS AND DRIVERS OF URBAN AGRICULTURE ON FARMERS SOCIOECONOMIC STATUS IN UGANDA

Key informant guiding questions

Date:	Start time:	End:
Name of enumerator:		
Name and position of interviewee:		Town:

Checklist

1. What motivates farmers to engage in farming?
2. How have farmers benefited from undertaking urban farming business?
- 3 What are the bottlenecks that farmers are facing in trying to manage their farms?
4. How do farmers get information on farming in your community?
5. Who are the agriculture service providers in your community?
6. How have service providers been benefited farmers in your community?
7. What kind of extension services do they receive from service providers?
8. What are financial institutions do farmers in your community normally deal with?
9. What kind of credit facility do farmers access from financial institutions?
10. What kind of grants are available to farmers to boost their farming business apart from credit?
11. What kind of training do farmers get on financial literacy?
- 12 What is the source of water in your community available for farmers to use?
13. How do most farmers use this water on their farms?
14. What kind of power source do farmers use in their farms?
15. How do farmer's sell their products in your community?
16. What is means of transport do farmers use to reach their farm produce to the market?
17. What type of fertilizers do farmers use?
18. What is the source of their fertilizer?
- 19 What is the breed of the animals most farmers keep on their farms?
- 20 Source of the animal for stocking on most farmers' farms?

- 21 Method of feeding animals most farmers use on their farms?
22. What is the source of feed for their animals on the farm?
23. Where do farmers sell farm products?
24. How do they sell their products?
25. What are the kinds of losses incurred through post-harvesting handling?
26. How do farmers preserve their agricultural products?
27. What kind of transport do farmers use for their perishable products to market?
28. What kinds of waste are generated through agriculture activities?
29. How do farmers manage solid waste generated as a result of their farming activities?
30. What are the urban agriculture policies regulating the farming activities in your area?
31. What kind of regulations do urban farmers need to satisfy to engage in farming?
32. What is the status of the farmer's landholding for their farms?
33. How has urban land zoning policies affecting farming businesses in your community?
34. How has the tax regimes affected farmers in the farming business?
35. Apart from farming how is the land used in your community?

Thank you very much for sharing with me your experience regarding forms and drivers of urban agriculture on farmers' socioeconomic status in your town.

APPENDIX IV: HOME/FIELD OBSERVATION GUIDE

Bishop Stuart University

FORMS AND DRIVERS OF URBAN AGRICULTURE ON FARMERS SOCIOECONOMIC STATUS IN UGANDA

Checklist for home/field observation

General guidelines

The following guidelines will be followed in conducting home/field observations.

The researcher will identify farmers with rich information or experience during FGDs and individual interviews for follow up. The researcher will explain to the farmer who he/ she is and the purpose of the visit.

The researcher will move with the local person from the village local council leadership to introduce him to farmers.

The research will observe, listen and take notes. Use of camera and voice recorder will be done after seeking consent

The observations will include a description of what the researcher will see as well as his/her assessment of how well it works.

The following will be observed while at the farmers' home/field:

1. What practices have been implemented by the farmers?
2. What modifications have they done to adapt the practice/technology?
3. What are the challenges farmers faces in implementing the practices/technologies?
4. What innovative ways do farmers employ to solve some of the challenges they face?
5. How do different farmers implement what they are taught by service providers?
6. What is the general assessment of what the farmer does in terms of feasibility and affordability?