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Original Research Article

Urban Farming for Sustainable Urban Livelihoods in Mbarara City, Western Uganda

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Abstract: The epistemological and methodological intentionality of this study was to explore how the current massive state-initiated, designed, funded and implemented citification phenomenon of Mbarara City is affecting the sustainability of Urban Farming and the urban populations that derive their livelihoods on this mode of production. The study focused on an unfolding complex phenomenon– urbanity which has invaded an agrarian economy with state support and integrating it into unplanned citification. The entire area of 32 kilometers radius was undergoing rapid urbanization that has been imposed from above albeit without any planned strategic industrial or scientific plans which would otherwise be anchored round an urban industrialization program. There was gradual expansion of unconnected, unplanned, unequal and haphazardly scattered City without thinking about sustainability future risks. Due to unplanned citification many challenges have developed such as floating human slums due to lack of housing leading to unhealthy environment; illegal occupancies are growing at an alarming rate due to increasing City population; some city residents have destroyed wetlands and occupied river Rwizi banks land which has resulted into water pollution and stagnation which have developed further complications; and lack of proper waste management which has affected public health. There is lack of proper urban planning and management (The Daily Monitor, 2 November 2022). Globally, the number of people living in cities is continuously increasing with over 55 percent of the world's population living in urban areas in 2018, and the population further projected to have grown by two-thirds by 2050 (Baeumler A, *et al.,* 2021). In Uganda, the level of urbanization is projected to increase to 50 percent by 2050, with the current urbanization rate at 5.2 percentage points per annum (UBOS, 2014). Urban farm systems are defined as plants and livestock production at home or in plots in the city or peri-urban areas, and their informal activity makes it difficult to characterize with precise data and tendencies (FAO, 2022). It consists of vegetable and fruit tree cultivation and production, including certain specialized crops such as medicinal and ornamental plants, wood production, and animal breeding or rearing, extending from common with bovines and poultry, and adding local species (Orsini *et al.,* 2013). Urban farming is therefore a subcategory of urban agriculture that specifically emphasizes the cultivation of plants and the raising of animals for food within the urban environment or area (FAO *et al.,* 2023). It is a component of urban agriculture, which is defined by the Food and Agriculture Organization of the United Nations (FAO) as "growing plants or livestock within and around cities including urban food supply systems" (Taguchi & Santini, 2019). It is the growing of plants and the raising of animals for food and other uses within and around cities and towns, and related activities such as the production and delivery of inputs, processing and marketing of produce. The continued rise in urban population, particularly in low- and middle-income Countries, has been associated with increasing urban poverty, growing food insecurity and malnutrition, especially for children, pregnant and lactating women, and increasing unemployment (De Bon H, *et al.,* 2010). One-way urban populations have tried to address food insecurity and malnutrition

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through urban farming. In 2013, an estimated 25–30 percent of urban dwellers worldwide were involved in the Agro-products sector (Orsini F, *et al.,* 2014) and urban agriculture contributing to provision of food supply to urban dwellers. In 2013, between 100 and 200 million urban farmers worldwide provided city markets with fresh horticultural goods (Kutiwa S, 2010). Urban agriculture is practiced across low-to-high-income classes living in LMICs and has strong participation from women (Idowu O, *et al.,* 2012). In addition to helping to improve nutrition and food security (Prain G, 2010), urban farming has the potential to contribute to the vitality of the local informal market (Maxwell DG, 1995) and helps to reduce urban waste through the productive re-use of organic waste as livestock feed and input to vegetable production (Kirkland, D, 2008). The world is not on track to meeting some of the United Nations Sustainable Development Goals (SDG), particularly with regard to the three targets for sustainable agriculture, food security and nutrition (World Health Organization, 2018). In both rural and urban areas, smallholder agricultural production systems are the main source of food and income for most of the world's poorest people (Pillai A, *et al.,*2016). One of the ways of improving household food security and nutrition in both urban and rural areas is the old agricultural practice of home gardens, including chicken rearing (Lal R, 2020). For centuries, urban farming has been a vital livelihood strategy of urban households in Developing Countries (Kiguli L N, *et al.,* 2003). However, urban decision-makers have only begun to recognize it as a viable livelihood strategy (Prain G, 2010). In some African countries, urban food insecurity has been a challenge for many low-income urban dwellers for decades, especially following the advent of Structural Adjustment Programs (SAPs) that begun in the 1980s(Maxwell DG, 1995). In Uganda, urban farming started as a survival strategy among the urban-poor populations especially during the time of economic hardships in the 1970s up till early 1990s (Kiguli LN, *et al.,* 2003). Structural Adjustment Programs consist of an array of monetary, fiscal and social policy measures, mainly advocated by the International Monetary Fund (IMF) and the World Bank to Countries that experience economic crises (Thomson M, 2017). As a response to the economic crises exacerbated SAPs in the Developing Countries and increasing migration to urban areas, urban farming began expanding rapidly (Idowu O, *et al.,* and 2012). In line with the growth of Cities in Developing Countries, urban farming with its multiple facets has emerged as an important type of livelihood source (Orsini F, *et al.,* 2014) as it provides an opportunity for improving food supply and security of urban dwellers. Most urban farmers belong to the economically disadvantaged populations and 65 percent of the urban farmers are women (Orsini F, *et al.,* 2014). Thus, urban farming not only favors social inclusion but also has the potential to contribute to the reduction of gender inequalities. Despite the prospect that urban farming could be one method to help address gender inequality, socio-economic disparities also exist in urban farming. For example, Lee-Smith found that economically advantaged households in Africa were benefiting more from urban farming than the majority of poor households (Lee-Smith D, 2010). Despite this disparity, urban farming is widespread within and around African cities and remains one promising strategy for addressing urban food insecurity especially among the urban poor who experience food insecurity (Prain G, 2010). Previous studies looked at urban farming at a point in time as an urban livelihood for the poor that struggle without a living, without the current dynamism, which attracts the non-poor into the practice (Atukunda G, 1998). Vegetable production and livestock keeping primarily poultry, dairy farming and rearing of pigs were the dominant urban farming practices in Uganda (Atukunda G, 2003). The world is not on track to meeting some of the United Nations Sustainable Development Goals (SDG), particularly with regard to the three targets for sustainable agriculture, food security and nutrition (World Health Organization, 2018). In both rural and urban areas, smallholder agricultural production systems are the main source of food and income for most of the world's poorest people (Pillai A, *et al.,*2016). One of the ways of improving household food security and nutrition in both urban and rural areas is

the old agricultural practice of home gardens, including chicken rearing (Lal R, 2020). ***Methods: Sampling Strategies and Sample Size:*** The investigator employed convenience, purposive, and snowball sampling techniques to establish a sample size of 30 participants, ensuring a diverse range of experiences and views. Convenience sampling involved engaging with local council chairpersons, councilors, village members, and religious leaders in the North and South Divisions. Through this method, the investigator made initial contact with 100 potential participants as the study population size. After scrutinizing the demographic characteristics of these individuals in the local council chairperson registers, the investigator chose to employ snowball sampling by networking with Mbarara city leaders and LC1 chairpersons in selected locations or communities. This purposive selection aimed to identify participants who were willing to participate in the study voluntarily. From the initial population of 100, only 30 were purposively selected during this sampling phase. In addition to the sample of 30 participants targeted for key informant interviews (KIIs), the investigator also conducted two focus group discussions (FGDs), each consisting of 6 members. The FGDs targeted mainly urban farmers, those displaced from their land by the citification process, and local leaders with city knowledge since inception. One group was selected from Katete ward, Mbarara City South and second one from Nyakinego ward, Mbarara City North. These areas had a lot of urban farming activities and with creation of the city, a lot of farming activities have been replaced by commercial buildings construction, residential houses, new zoning policies, and the establishment of health and educational institutions. Key informants included: the City Clerk, two division Town Clerk, the Lord Mayor, City agriculture officer, City Veterinary officer, and the City Chief Planner. ***Findings:*** The research findings revealed that urban farming activities provide a supplementary income by enhancing their financial stability, providing a source of livelihood and entrepreneurship. The extra income helps cover household expenses and contributes to improved living standards. Farmers also expressed that urban agriculture offers economic opportunities, particularly for marginalized groups such as women and youth. Study participants highlighted that urban farming significantly improves access to fresh and nutritious food. It helps in reducing their reliance on external food sources and contribute to household food security. Furthermore, it fosters a sense of community and social cohesion. The study also revealed that urban farming contributes to environmental sustainability by promoting green spaces, reducing urban heat islands, and managing waste through composting. Despite the benefits, urban farmers face several challenges. Limited access to land, inadequate infrastructure and insufficient support from local authorities are significant obstacles. Farmers also reported difficulties with accessing quality inputs and dealing with environmental degradation, which affect their productivity and sustainability. ***Conclusion:*** Urban farming plays a critical role in enhancing food security within Mbarara City. The practice allows households to produce their own food, reducing reliance on external sources and increasing self-sufficiency. Some areas, like Biharwe, have access to land for growing staple crops and raising livestock, which helps ensure a stable food supply for residents. This local food production is crucial as it supports families with home grown food and provides a buffer against potential future disruptions in food supply due to urban expansion and infrastructural development. Urban farming contributes significantly to improving the standards of living for individuals and communities. Evidence from the study shows that urban farming not only supports economic development but also promotes social progress and environmental sustainability.

Keywords: Urban Farming, Sustainable Livelihoods, Sustainable Livelihood Model, Urban Conservation Model, City Expansion.

1. INTRODUCTION

The integration of rural areas into the city and city expansion without proper city planning has opened a debate for food resilience in cities and the need to question the desired degree of food self-sufficiency through urban farming. While the question of food sufficiency in the city still remains, town authorities and planners still prefer housing projects, transport infrastructure, leisure park places, industrialization, commercial buildings, and institutional projects which has replaced urban and peri urban farming. This has been witnessed in Cape Town, South Africa, Nairobi, Kenya, Ouagadougou, Burkina Faso, Kampala, Uganda, Tamale, Ghana, and Maputo, Mozambique (Langmeyer Johannes *et al.,* (2021). The loss of priority for urban farming in urban land-use planning has become a global trend with only a few exceptions. This has created food crisis in the city especially to the unemployed, low incomes earners, those under employed, the poor, the landless, the displaced and other vulnerable members of the city. Even Addis Ababa, Ethiopia recently has witnessed massive displacement which has threatened livelihood security (Gnamura Kejela *et al.,* 2024). This has promoted highest level of the social and ecological vulnerabilities and risk-related inequalities of urban inhabitants, food shortage among them, in the face of different scenarios of global change, including climate change or pandemic events such as Covid-19. Also there has been the disregard of the intensified negative environmental externalities caused by distant agricultural production, as well as lacking consideration of nutrient re-cycling potentials in cities, for instance, from waste water to replace emission intensive mineral fertilizer use. There is also lack of accounting for the multi functionality of urban farming and the multiple benefits it provides beyond the provision of food, including social benefits and insurance values, for instance, the maintenance of cultural heritage and agro-biodiversity (Langemeyer Johannes *et al.,* 2021).

For Mbarara City's case, currently there is rapid City growth and the population is increasing at a faster rate (91867, 2022-2023) and is expected to grow to 500,000 by 2025 (Daily Monitor, 2 November 2022) without proper planning and designs hence sustainable socio - economic urban transformation has remained a challenge. Rural areas have been integrated into the city without proper planning, proper transport design, decent housing, access to water and sanitation services, electricity and other necessary survival urban skills. City dwellers have limited access to land, insufficient infrastructure and supportive services, they face intense competition from other land users, lack of research on human health risks in growing food and lack of skills. As a result, Mbarara city has witnessed wide spread poverty, food insecurity, malnutrition, persistent child under nutrition, stubborn micronutrient deficiencies, and an alarming rise in overweight and obesity, the city has also faced structural social exclusion, excessive pollution and low climate mitigation, stagnating urban un productivity, weak governance, poor sanitation and housing conditions, related pollution (Nuwagaba E, 2022).

There has been gradual expansion of unconnected, unplanned, unequal and haphazardly scattered City without thinking about sustainability future risks. Mbarara City expansion has witnessed the invasion of square kilometers of agrarian setting neighboring Mbarara Municipality and merging them with the latter. At first the divisions of Kakoba, Kamukuzi and Nyamitanga formed Mbarara Municipality but now has been extended to include the former sub Counties of Biharwe, Kakiika, and Nyakayonjo of the Greater Mbarara district. The citification process of Mbarara city has invaded these people and their modes of production. This process subsumes the existing modes of production and existence. This of these modes is not aimed at remodeling and improving them but to exterminate them. This is because majority of the city residents are growers of bananas, coffee, beans, groundnuts, millet and vegetables. Many are graziers and paddock dairy farmers and ranchers. Their mode of production and existence has failed to be compatible with modernity and urbanity. The challenge to these farmers is the struggle to catch up with these two different modes of production, which is urbanity, peasantry and farming where on is highly capitalistic and dependent on external production for profits in shops and markets whereby it depends on imports and other from supplies from industries from other areas while the other is of producers of commodities, labor ad for their own consumption (Nuwagaba E, 2022).

Due to unplanned citification many challenges have come up in Mbarara city ranging from environmental problems like loss of agriculture land, pasture land and vegetation; displacement of farmers decreasing income; floating human slums due to lack of housing leading to unhealthy environment; illegal occupancies are growing at an alarming rate due to increasing City population; limited access to resources, including water, seeds, and other inputs; some city residents have destroyed wetlands and occupied river Rwizi banks land which has resulted into water pollution and stagnation which have developed further complications; and lack of proper waste management which has affected public health. There is lack of proper urban planning and management (The Daily Monitor, 2 November 2022; Muchelo O Ronald *et al.,* 2024).

This study investigated urban farming and Sustainable livelihoods in Uganda, specifically focusing on Mbarara City. Recently, urban farming has emerged as a promising strategy for enhancing Sustainable livelihoods, particularly by increasing food production for household use and fostering economic empowerment. The study has been prompted by the rapid urbanization and population growth in Mbarara city, which have intensified the demand for food and

restricted access to land for agricultural purposes (Atukunda G, 1998). Urban farming presents a potential partial solution to address food security and livelihood challenges in urban areas. Therefore, the study aimed at exploring how urban farming has contributed to the sustainable livelihoods of individuals and households in Cities, with a specific focus on Mbarara City.

Urban farming has gained prominence as a sustainable agricultural practice in urban and periurban areas, including Mbarara City in Western Uganda (Kyembabazi, 2020). The practice involves cultivating crops and raising livestock within city limits to enhance food security, promote sustainable livelihoods, and address the challenges posed by rapid urbanization and population growth. In Mbarara City, urban farming plays a crucial role in providing fresh produce, creating economic opportunities for smallholder farmers, and contributing to the local food system (Macky, Tusabe, & Mugaga, 2022). The integration of urban farming into the urban landscape reflects a shift towards more sustainable and resilient urban environments, where agriculture coexists with urban development to meet the needs of the growing population

Cities and indeed new urban creations like municipalities, town councils and boards are supposed to be enablers of socio- economic transformation of Uganda from a predominantly rural-peasant based society to a modern urban one with which organized living and technology help productivity. Urbanization has been a positive force for economic growth, poverty reduction and human development. Cities are places where entrepreneurship and technological innovation can thrive. Urban areas serve as herbs for development, where the proximity of commerce, government and transportation provide the infrastructure necessary for sharing knowledge and information, (United Nations, 2018).

Urban farming in Uganda has been hindered by legal constraints and governance conflicts, zoning policies and certification, lack of sufficient and suitable land for agricultural activities in cities due to preference for residential, commercial buildings, industrialization, social and economic infrastructure like establishing schools, hospitals, roads, green spaces and recreational centers. Whenever land is found, urban farming is viewed by city planners and policy makers as unhealthy practice that promotes air pollution and animals causing accidents. As such most urban farmers are growing food for subsistence purposes, live in unhealthy environments demonstrated by sharing small plots of land with plants and animals, use poor or non-organic farming practices, have poor harvest handling methods, lack basic management skills and knowledge of the value addition. It further faces challenges of: Limited lateral space, high land values, contaminated soils, theft and vandalism, pavement, loss and damage of crops from birds and rodents, high costs (water, infrastructure, permits, housing, and so on), lack of experienced skilled labor and management (Muchelo O Ronald *et al.,* 2024).

1.1 Theoretical Background

Urban farming, also referred to as urban agriculture by some scholars, is a practice that involves cultivating food crops, livestock and producing food within urban areas. It includes a wide range of activities, from small-scale backyard gardens to semi-scale commercial operations. Theories related to urban farming are diverse and interdisciplinary, drawing from fields such as agriculture, ecology, sociology, economics, and urban planning. Some of the key theories include among others;

The Urban Ecology theory views urban systems as ecosystems with their own specific ecology, where human activity and artificial land cover interact with natural land cover (Frank, Delano, & Caniglia, 2017). This theory provides a framework for understanding the complex relationships between urban agriculture, urban planning, and environmental sustainability. Another relevant theory; Neo-Rurality which emphasizes the values, services, and functions associated with unsealed soil beyond its role in urban or rural environments. Neo Rurality highlights the multifunctional nature of urban agriculture, including food production, regional products, organic farming, agri-tourism, and ecosystem services (Tan & Zhang, 2020).

A team of scholars (Yuan, Marquez, & Salonga, 2022) also mention another theory which is ‘Sustainable Livelihoods Framework’ and they say that it is particularly relevant to urban farming, as it focuses on the capabilities, assets, and activities required for a means of living. It analyzes the factors influencing livelihoods, including human capital, physical capital, financial capital, social capital, and natural capital, to understand how urban farming contributes to sustainable livelihoods.

Urban-Industrial Impact theoretical Model: This model, formulated by Von Thunen, explains geographic variations in the intensity of farming systems and labor productivity in industrialized societies. It has been expanded to explain the performance of factor and product markets linking agricultural and non-agricultural sectors in regions with rapid urban-industrial development.

Another theoretical model relevant to urban farming is the Conservation Theoretical Model.

This model emerged from advancements in crop and livestock husbandry and emphasizes the development of complex, labor-intensive cropping systems, the use of organic manures, and capital formation that requires significant labor. It is pertinent to urban farming because it underscores the significance of

sustainable agricultural practices and the efficient use of land and water resources (Procksch, 2017). This model, which highlights the development of complex, labor-intensive cropping systems, the use of organic manures, and labor-intensive capital formation, is examined in the book called Creating Urban Agricultural Systems: An Integrated Approach to Design. It is particularly relevant to urban farming because it emphasizes the importance of sustainable agricultural practices and the efficient use of land and water resources.

Last is the 'Ecopolis Concept' developed by Tjallingii, it envisions sustainable city planning, including urban agriculture, to mitigate urban sprawl, heat islands, and other environmental issues. It promotes urban agriculture as a key component of sustainable urban development (Yuan, Marquez, & Salonga, 2022).

These theories and concepts collectively provide a comprehensive understanding of urban farming, its role in sustainable livelihoods, and its relationship with urban ecology, economy, and planning. They offer insights into the challenges and opportunities of urban farming, from increasing food security and improving environmental sustainability to enhancing the quality of life for urban residents (Udemezue & Osegbue, 2018) Urban-Industrial Impact Model.

Theoretical models are numerous but the investigator chose only two to underpin the current study from the theoretical perspective. These include the 'Sustainable Livelihood Theoretical Model' Scoones (2009), and the "Conservation Theoretical Model (Procksch, 2017).

The Sustainable Livelihood Theoretical Model

The Sustainable livelihoods theoretical model is a framework used to analyze and understand how people maintain their livelihoods by accessing and utilizing various types of "assets" or "capitals" like human Capital (skills, knowledge, health, education), social capital (networks, relationships, community ties, trust), natural capital(land, water, forests, biodiversity), physical capital (infrastructure, tools, technology), and financial capital(savings, credit, remittances) while considering external factors like shocks, stresses and institutional constraints that can impact their ability to sustainable their living standards over time. The model focuses on holistic approach to understanding poverty and vulnerability by examining the complex interplay between different assets types and their accessibility within a given context

The sustainable livelihood approach includes various theories that focus on enhancing livelihoods sustainably. One key theory is the Sustainable Livelihoods Framework, which emphasizes understanding the fundamental causes and dimensions of poverty without oversimplifying the focus onto a few factors. This framework aims to capture the relationships between different aspects of poverty, enabling effective prioritization of actions at an operational level. Important to note is that the source that discusses the Sustainable

Livelihoods Framework as a key theory within the sustainable livelihood approach, emphasizing the understanding of fundamental causes and dimensions of poverty without oversimplifying the focus, and capturing the relationships between different aspects of poverty to enable effective prioritization of actions at an operational level, can be found in the document "Sustainable Livelihoods Frame work"; by the UK Government (Majale, 2002).

The sustainable livelihoods approach is a comprehensive framework designed to capture and understand the fundamental causes and dimensions of poverty without reducing the focus to just a few factors, such as economic issues, food security, or the environment. It also maps out the relationships between different aspects of poverty, including its causes and manifestations, facilitating more effective prioritization of actions. The researcher selected the Sustainable livelihoods theoretical model due to its relevance to the current study, which aims to investigate urban farming and sustainable livelihoods in an urban setting.

Another significant theory within the sustainable livelihood framework is the concept of livelihood outcomes, which includes five essential aspects vital for individuals, especially those facing poverty. These outcomes are increased food security, enhanced well-being, reduced vulnerability, increased income, and sustainable natural resource use. These outcomes reflect the core objectives of livelihood strategies in meeting people's needs efficiently and effectively. Furthermore, the Theory behind the Sustainable Livelihood Approach highlights the importance of interventions based on an understanding of what underpins livelihoods. It stresses the sustainability of livelihoods, emphasizing the ability to cope with stresses and shocks, recover from them, and maintain or enhance capabilities and assets while contributing net benefits to other livelihoods at local and global levels in the short and long term. Hence this theory is relevant to the current study since some of the target groups are equally vulnerable and depend on growing crops at a very small scale within the city.

According to Scoones (2009), the sustainable livelihoods theory provides an initial view into how people in various locations sustain their lives. Scoones agrees with Chambers (1995) in asserting that the sustainable livelihood theory serves as a framework that includes the available resources utilized and the activities undertaken for sustenance. Consequently, a descriptive analysis of livelihoods portrays a complex set of activities and interactions, emphasizing the varied approaches to living among individuals. This perspective

transcends traditional life approaches and examines rural development grounded in specific activities (Scoones, 2009). Scoones strongly advocates for Sustainable livelihoods Theory in the development programs of the 1990s, challenging the earlier emphasis on just livelihoods quotes by many development agencies, as seen in the works of Chambers and Conway (1992), Scoones (1998), and Ashley and Carney (1999). The shift in focus reflects a broader recognition of the complex nature of sustaining one's life.

According to Scoones (2009), Sustainable livelihoods theory help in analyzing poverty and vulnerability by identifying the specific asset gaps and vulnerabilities that individuals and communities face; designing development interventions by tailoring projects to address specific needs by enhancing access to critical assets and building resilience against shocks; monitoring by assessing the effectiveness' of interventions by tracking changes in livelihood assets and outcomes over time and evaluation.

(Scoones, 2009) in the model emphasizes the following:

(i) Livelihood Assets: That is human capital (skills, education), social capital (networks, relationships), physical capital (infrastructure, equipment), natural capital (environmental resources), and financial capital (income, savings).

(ii) Livelihood Strategies: This involves the activities people engage in to secure their livelihoods which are influenced by their access to different types of capital in terms of diversification of income sources, entrepreneurship, informal sector activities, and migration.

(iii) Sustainability: Environmental, social, and economic sustainability, including climate change resilience.

Strategies for Sustainable Livelihoods in Urban Centers include:

a) Urban Agriculture by promoting urban farming, community gardens, and rooftop gardens.

b) Green Infrastructure by investing in parks, green roofs, and green spaces to mitigate urban heat islands and improve air quality.

c) Sustainable Transportation by encouraging walking, cycling, and public transportation to reduce congestion and emissions.

d) Waste management can be achieved by implementing effective waste collection, recycling, and composting systems.

e) Social Protection Programs providing safety nets, such as cash transfers, health insurance, and education support.

f) Entrepreneurship and Skills Development by offering training programs, mentorship, and access to finance for urban entrepreneurs.

g) Community engagement and participation can be achieved by fostering inclusive decision making processes and community-led initiatives.

1.2 Objectives of the Study

The overall objective of the study was to examine the impact of urban farming on Sustainable Urban livelihoods in Mbarara city.

Specific Objectives

To examine the contribution of urban farming on sustainable urban livelihoods in Mbarara City; To investigate the opportunities and challenges brought by the creation of new cities with specific focus on Mbarara city; To explore different strategies for promoting urban farming and Sustainable urban livelihoods in Mbarara city.

2.METHODS

2.1 Study Design

The study was qualitative research. A Cross-Sectional Case study design using a qualitative research approach for data collection and analysis was employed. Yin (1991:23) defines a case study as an empirical inquiry that investigates a contemporary phenomenon with its real-life context when the boundaries between phenomenon and context are not clearly evident and where multiple sources of evidence are used.

A Cross-sectional case study allowed the researcher to collect data from a sample of individuals at a single point in time, using qualitative methods like in-depth interviews, participant observation, and FGDs to explore the phenomenon understudy by capturing snapshot of experiences and perspectives during that particular time of study from a diverse sample of participants at a single time.

A Cross-sectional case study helped in carrying out in-depth analysis and perceived respondents as experts not as sources of data and it also allowed employing several sources of information; Implying long term contacts and personal experiences in the field. A qualitative study was considered because it employed inductive data analysis to provide a better understanding of the interaction of "mutually shaping influences" and to explicate the interacting realities and experiences of researcher and participant (Lincolin and Guba, 1985). Given the constructivism position that was adopted in the study and the nature of the research questions that were used in the study, a case study was used as the most appropriate approach to employ because it provided a systematic way to collect data, analyze information, and report the results and this helped in understanding the actual problem or situation in great depth.

2.2 Study Setting

This study was carried out in Mbarara city, Western Uganda. It is the primary urban center of

Mbarara district situated approximately 240 km South-West of Kampala, the capital of Uganda, the district shares borders with the United Republic of Tanzania to the South, Rakai and Sembabule Districts to the East, Bushenyi and Ntungamo Districts to the West, Kamwenge and Kyenjojo Districts to the North.

The district has an average altitude of 1800m, receives around 1200mm of rainfall annually, and experiences an average temperature range of 15°C to 30°C. Its terrain is mainly plains with some low hills in the northeast. The majority of the local population in the district are Banyankore from two ethnic groups: the Bairu and the Bahima, who speak the common language of Runyankore. The urban areas have a diverse population including locals, Baganda, Asians, and individuals from other regions.

The City has two divisions namely, Mbarara City South division comprising Kakoba, Nyamitanga and Nyakayojo with 10 wards (Kakoba, Nyamityobora, Katete, Ruti, Bugashe, Katojo, Kichwamba, Nyarubungo 11, Rukindo, and Rwakishakizi) and then Mbarara City North Division comprising Kamukuzi, Biharwe and Kakiika with 13 wards

(Kamukuzi, Ruharo, Kakoma, Nyarubanga, Rwemigina, Kakiika, Kishasha, Nyabuhama, Rwenjeru, Bunutsya, Biharwe East, Nyakinengo, Biharwe West) . The area of study was selected because of the recent urbanization trend that has been witnessed in recent years. For instance according to 2014 population census, Mbarara city had 195,013 people. The population of Mbarara city according to 2025 census is approximately 264425. However it is estimated that the day time population is around 324,974 (UBOS, 2024).

Map 1: A Map Showing Mbarara City

Table 1: A table showing Mbarara City Divisions and Wards

Mbarara City North	Mbarara City South
Kamukuzi	Kakoba
Ruharo	Nyamityobora
Kakoma	Katete
Nyarubanga	Ruti
Rwemigyina	Bugashe
Kakiika	Katojo
Kishasha	Kichwamba
Bunutsya	Nyarubungo II
Nyabuhama	Rukindo

Rwenjeru	Rwakishakizi
Biharwe East	
Nyakinengo	
Biharwe West	
Bubaare	

Source: Documentary analysis

Table 2: A table showing population growth in Mbarara City

Historical population		
Year	**Pop.**	
1969	16,078	**±%**
1980	23,255	—
1991	41,031	+44.6%
2002	69,363	+76.4%
2014	195,318	+69.1%
2020	221,300	+181.6%

Source: UBOS 2024 Population Census report

This particular area was selected because of the following reasons:

(i) City expansion has invaded rural areas of Nyakayonjo, Biharwe, and Kakiika and integrated them into the city. The study focused on different modes of production in the area characterized by urbanity, peasantry, and farming and how they co- exist for sustainable urban livelihood. One is highly capitalistic and dependent on external production for profits in shops and markets (imports and other from industries from other areas) while the other is the producers of commodities, labor, and for their own consumption.

(ii) Mbarara City has many urban farming activities ranging from crop growing like matooke (banana), potato and seasonal crops, poultry, piggery, apiary, fruit growing, mushroom growing, tree planting and rearing of domestic animals like goats, cows, sheep and alike.

(iii) Mbarara City has been growing at a high rate with construction of residential houses, roads, commercial buildings, factories and schools. These have had a bearing effect on urban lands as the pressure for construction land puts pressure on open land for urban farming. This provided a good ground for the study.

(iv) Some areas in the City like Nyamitanga, Nyakayojo, Biharwe, Kakiika and Kakoba had a lot of agricultural activities practiced which helped the researcher to have a clear understanding of what was taking place on the ground.

(v) Reduced farm land within the city which has been caused by infrastructural development.

(vi) Also, the influence of city status which came with high demand of commercialization rather that livelihood focus. Similarly, after acquiring a city status, Mbarara city has become a hub of commercial development, shopping Centre for the neighboring growing urban centers and high influx of rural urban migration. These factors have impacted on the urban farming and as a result affected sustainable livelihood of households and individual living in Mbarara city boundaries. This is because effort is put on infrastructural development at the expense of sustainable livelihood. This is a major reason why this study was conducted to come up possible solutions to ensure sustainable livelihood amid fast growing infrastructural development of the city.

During the 1970s under President Amin's rule, the district prospered due to thriving cross- border illicit trade (Magendo) and its strategic location on major trade routes to Rwanda and the Democratic Republic of Congo. Being adjacent to Tanzania, this region became a sanctuary for refugees fleeing Rwanda through Tanzania to Uganda in the late 1950s and during the 1994 genocide in Rwanda.

2.3 Study Participants

The study population comprised all the residents in the City. It involved those practicing urban farming, those with technical knowledge on urban farming, policy makers, City administrators, area politicians and technical people involved in the field of town planning and development and those who directly and indirectly benefit from urban farming activities.

To ensure a diverse and representative sample capable of providing in-depth insights into urban farming and its impact on sustainable livelihoods among urban households and individuals in Mbarara city, the inclusion criteria for participants were carefully selected based on demographic factors such as age (18-65), gender (both men and women), and location (individuals living within Mbarara city boundaries). Additionally, participants had to be willing to discuss their experiences related to urban farming and sustainable livelihoods and how infrastructural development had affected their ability to

achieve sustainable livelihoods. Certain categories were excluded from the study to maintain focus and ensure that participants could provide relevant and meaningful insights into the targeted research questions. Specifically, individuals with unsound minds and those under 18 or over 65 years old were not included.

The rationale behind these eligibility criteria was to streamline the study to the specific context of urban households and individuals, ensuring that participants could provide relevant and meaningful insights into the research questions. The age range and mental stability criteria were chosen to maintain ethical considerations and ensure that participants could provide informed and voluntary consent. Overall, these criteria enhanced the validity and reliability of the study findings.

The investigator employed convenience, purposive, and snowball sampling techniques to establish a sample size of 30 participants, ensuring a diverse range of experiences and views.

Convenience sampling involved engaging with local council chairpersons, councilors, Village members, and religious leaders in the North and South Divisions. Through this method, the investigator made initial contact with 100 potential participants as the study population size.

After scrutinizing the demographic characteristics of these individuals in the local council chairperson registers, the investigator chose to employ snowball sampling by networking with Mbarara city leaders and LC1 chairpersons in selected locations or communities. This purposive selection aimed to identify participants who were willing to participate in the study voluntarily. From the initial population of 100, only 30 were purposively selected during this sampling phase. In addition to the sample of 30 participants targeted for key informant interviews (KIIs), the investigator also conducted two focus group discussions (FGDs), each consisting of 6 members. The FGDs targeted mainly urban farmers, those displaced from their land by the citification process, and local leaders with city knowledge since inception. One group was selected from Katete ward, Mbarara City South and second one from Nyakinego ward, Mbarara City North. These areas had a lot of urban farming activities and with creation of the city, a lot of farming activities have been replaced by commercial buildings construction, residential houses, new zoning policies, and the establishment of health and educational institutions. Key informants included: the City Clerk, two division Town Clerk, the Lord Mayor, City agriculture officer, City Veterinary officer, and the City Chief Planner.

2.4 Data Collection Procedures and Protocol

Different countries and institutions have distinct protocols that scholars must adhere to when applying to conduct research within the country or study institutions. These protocols often involve obtaining approval from relevant authorities. In Uganda, research activities are overseen by the Uganda National Council for Science and Technology (UNCST) which regulates the quality and scope of research conducted in the country. Accordingly, the researcher obtained permission to conduct research in the chosen area, Mbarara City. Upon submission of the application, the Council approved it, issuing a letter of authorization and an identification card. Additionally, introductory letters were sent to the Division Mayors of Mbarara City, requesting permission for the researcher to access government officials, records, and archives for data collection purposes. This was after getting approval letter from Research and Ethical Committee (REC) of Bishop Stuart University and clearance letter from the Uganda National Council for Science and Technology (UNCST).

2.5 Data Analysis

Bogdan and Biklen (2003) define qualitative data analysis as "working with data, organizing them, breaking them into manageable units, coding them, synthesizing them, and searching for patterns. The collected data was categorized and organized as per their research themes. Editing the collected information was done after gathering information at the end of each working day. Open coding was applied to establish conceptual categories into which the phenomena observed was grouped. This helped in creating descriptive, multi-dimensional categories that provided a preliminary framework for analysis.

Data analysis in a qualitative research approach involved scrutinizing, categorizing, and organizing evidence based on the study questions. This implied that the investigator followed qualitative methods to analyze raw data through a progressive analysis approach.

The analysis occurred in a four-stage process:

(i) Gradual examination of qualitative views and opinions from participants,
(ii) Conducting interviews to gather qualitative data,
(iii) Employing content analysis to identify various themes within the data, and
(iv) Analyzing the themes to derive meaningful interpretations from the collected data.

In summary, the qualitative research employed a multi-stage process to thoroughly analyze and interpret data in relation to the study questions. The goal was to form patterns that connected questions to data, and ultimately, the investigator aimed to link data sources to address the research questions. A detailed triangulation of raw data related to the research problem and questions was conducted. The investigator performed a comprehensive analysis of each aspect to gain a thorough understanding of the phenomena. The initial analysis followed a pattern-matching plan, correlating different

pieces of information or evidence from the same data source with theoretical propositions. Developing such relationships helped reinforce the theoretical arguments upon which the selection of phenomena was grounded. Concurrently, it facilitated pattern matching to determine whether there was a link among the study variables.

During the data analysis phase, a combined approach of constructivist and Thematic Analysis was utilized to identify meaningful themes and patterns within the collected data. This dual analysis aimed at categorizing and illustrating how urban residents utilize urban farming for sustainable livelihood. Constructivists were chosen for its suitability in exploring and understanding the subjective experiences and meanings associated with urban farming and sustainable livelihood among participants. This method allows for a deep drive into individual perspectives and constructivism of the phenomenon under study.

Thematic Analysis, on the other hand, offered a structured and systematic method to identify, analyzing, and present patterns within the data. Through this approach, the researcher aimed at uncovering recurring themes that provide a comprehensive understanding of how urban farming serves as a source of sustainable livelihood for households and individuals in Mbarara city.

2.6 Data Analysis Soft Wares

Suitable software options that the investigator chose included QDA Miner Lite, which was a userfriendly qualitative data analysis tool offering features for coding, retrieving, and visually presenting qualitative data. It supported the analysis of various data formats such as text, audio, and video. NVivo, a leading qualitative data analysis software used across various industries and research fields, was also considered. It supported the analysis of text, audio, video, and other multimedia data. Quirkos, a-user-friendly qualitative data analysis software with a visual interface for coding and exploring themes, was another option. Monkey Learn, an AI-powered qualitative analysis software that automated the process of identifying patterns and themes in text-based data, was also included. Based on the magnitude of the data collected, the researcher chose the most suitable software for analyzing the qualitative data from the field.

3. RESULTS

Themes Which Emerged Out of Analysis of KII Data

This analysis explores the data gathered from key informant interviews on urban farming practices in Mbarara City. The themes which emerged out of data analysis include Types of Urban Farming; Benefits of Urban Farming themes like; income generation, food Security, and Improved Standards of Living. Challenges of Urban Farming with subthemes of limited. Land, access to raw materials, Pests and Diseases: Unfavorable Policies, Theft and Robbery, Climate Change: Government Support with subthemes of Limited Awareness and Desired Improvements). Even though Mbarara City is undergoing a lot of infrastructural development with massive construction, growing food within the city, urban farming is still a major way for people to make a living, have reliable access to fresh food, and improve their overall quality of life. However, there are some challenges that make it difficult, including lack of enough space to farm, not having the resources they need, and government rules that are not helpful sometimes by not favoring the poor who survive on urban farming. If people were more aware of the government programs that can help with urban farming, and if city officials worked together better with the farmers, it would be easier to overcome these challenges and make urban farming an even bigger success in Mbarara City.

3.1 Themes Which Emerged Out of Analysis Focus Group Discussions (FGDS) Data

Raw data gathered from FGDs from the field was transcribed first to convert it from audio form to written text. The transcribed data was analyzed using "Thematic Analysis" as a suitable tool among tools for analyzing qualitative data. Hence after analyzing data using thematic analysis, several 'themes' emerged which the investigator used to structure and arrange data presentation.

Types of Urban Farming: The study identified various urban farming practices in Mbarara City, including home gardens, back yard gardens, container gardening, and growing crops such as maize, beans, peas, tomatoes and others on rented smaller pieces of land, animal husbandry, aqua culture, horticulture, epi culture, agro forestry, street landscaping, green houses, urban bee keeping and so on.

Benefits of Urban Farming: Data provided by FGD participants indicates the advantages of urban farming, such as access to fresh produce, improved food security, improved nutrition and quality of food, income generation, reduced unemployment, reduced poverty, and environmental benefits.

Challenges of Urban Farming: The data from FGDs highlights the challenges faced by urban farmers, including scarcity, lack of security of land tenure, competition with infrastructural development, and lack of awareness about government support programs.

Government Support: FGD data explores that there are Ugandan government initiatives which promote urban farming, including providing seeds, training programs, and economic support programs like Parish Development Model and collaborating with NGOs.

Sub-Themes:

Land scarcity: Participants expressed difficulty finding land for urban farming due to the City's expansion and rising demand for space to increase commercial infrastructure and public offices including schools, hospitals, and government office departments.

Impact of infrastructure development: Data revealed how road construction, commercial developments, education and health institutional establishments, and building residential projects destroy crops hence affecting urban farmer's livelihoods.

Limited knowledge of support programs: Data from the two FGDs indicates the level of participants' knowledge about the extent of government support available for urban farming practices.

3.2. Data Presentation and Synthesis According to the Themes from Key Informants (KIIs)

This section presents data according to the themes which emerged out of data analysis.

3.2.1 Types of Urban Farming

The study focused on the investigation of urban farming and its contribution to livelihoods.

The researcher was particularly interested in the individuals understanding and conceptualization of urban farming as a practice and how it facilitates livelihood. To analyze this, the investigator classified participant's views on the different types of urban farming in suitable themes after data analysis. In this section of data presentation, the investigator begins by explaining the meaning of urban farming from a broader perspective which at the level of synthesis. This involves considering scholars who have studied and written about urban farming and what they have documented in various views provide several perspectives. For example, Ackerman *et al.,* (2014) explain that one of the type of urban farming practice in called 'Rooftop gardens' which utilize some kind of rooftop spaces to grow vegetables, herbs, and fruits, offering benefits like reducing the urban heat island effect and improving air quality. Ackerman et al. (2014) goes ahead to note that rooftop gardens significantly enhance urban agriculture, food security, and green infrastructure in cities such as New York. In addition, another type of urban farming is referred to as 'Vertical farming', which involves growing crops in vertically stacked layers and often employs controlled environment agriculture, maximizing space efficiency, reduces water usage, and enables year round production. Hence Al-Kod many (2018) reviews vertical farming development and implications for urban settings, emphasizing its transformative potential for city landscapes which also has a component of livelihood.

Broader data also indicates that there is a type of urban farming known as 'Urban community gardens', grown collectively by urban community groups, the process fosters social interaction, provides access to fresh produce like vegetables, and educate participants about agriculture. Guitart *et al.,* (2012) highlight that urban community gardens are important in urban environments and provide positive impact on social cohesion and food security in urban setting. Barbosa *et al.,* (2015) also provide another style of urban farming called 'Hydroponics' which refers to growing plants without soil using nutrient-rich water, promotes faster growth, requires less space, and reduces pesticide use, making it more sustainable. Similarly, data from a broader perspective continues to provide other forms of urban farming. One of them is 'Aquaponics' which is a type of urban farming that combines aquaculture with hydroponics and uses fish waste for plant nutrients, conserving water and producing both fish and plants as pointed out by Love *et al.,* (2015). Equally, data indicates 'Urban beekeeping' as a type of farming which supports pollinator populations and biodiversity while providing honey, as documented by Samuelson *et al.,* (2018). Important to mention is also 'Container gardening', which uses containers for plants in small urban spaces, it is flexible and easy to manage, and Taylor & Lovell (2014) emphasize its role in urban agriculture. Lastly, broader data revealed a type of urban farming called 'Permaculture' which is a system of sustainable agricultural design principles, promotes biodiversity and resilience, with Ferguson & Lovell (2014) reviewing its potential for creating sustainable urban farming systems. These urban farming practices collectively contribute to environmental sustainability and urban community cohesion. Hence, during data analysis, the investigator learnt about the views of participants from Mbarara city on their knowledge about the types of urban farming. Reference is made to Samuelson *et al.,* (2018); Love *et al.,* (2015); Barbosa *et al.,* (2015); Taylor & Lovell (2014).

Data about the theme on 'types of urban farming' as revealed by data analysis. One of the participants explained that "*According to me, we grow beans, and cabbages; sometimes their prices are high and sometimes they are low, and Mbarara is now a city, we no longer practice farming*"; "*cabbage is grown by those in swampy areas. All the beans we grow and cabbages we grow are for consumption but sometimes we also sale the surplus to get money to but other necessities*" (Key Informant, 2023).

According to the data, without taking a comprehensive inquiry from so many people, information available from a key informant shows that urban farmers in Mbarara city understand urban farming as a practice of growing crops like beans, maize, potatoes, cabbages and alike on very small scale considering the fact that urban farmers possess little spaces to practice farming. This was considered as subsistence form of farming since it was not done for commercial purposes.

Data indicates that some participants in this study understand 'zero grazing' as a type of farming practiced in the city. One of the key informants mentioned that zero grazing is practiced by some people in urban setting on a small piece of land. According to one of them, zero grazing refers to rearing a cow or a pig in small, fenced place in the back yard of a household.

"*Let me tell you. I have lived in this place for more than 30 years and some people here who have small pieces of land keep cows, pigs, and even goats in a very small space. For example, my immediate neighbor has two cows which he feeds in a small fence at his home, he gets banana peels from for the neighbors to feed his cows. He also gives water to his cows from a trough made at home. Another farmer had more than 10 goats which just feed on people's meals overs and they look healthy. Some are also keeping pigs just feeding them on food left overs. That man who keeps the cows and is able to sale milk for income to educate his children*" (Key Informant, 2023).

The information gathered from the above key informant indicates that urban farming is real and people know it as 'zero grazing'. One of the youth participants expressed his experience on urban farming and according to him urban farming does not mean growing of crops but also keeping domestic animals and birds which can provide both food and income. One respondent stated:

"*According to me, urban farming involves keeping animals and birds but not only growing crops. I know some homes which have rabbits, poultry and they are getting good money by selling eggs, off-layers, broilers, and even the rabbits have a high market here in Mbarara. Most foreigners like Chinese usually look for rabbit meat in supermarkets which is an indication that they are on high demand. For me I think poultry and rabbit keeping is also a type of urban farming that helps people to get out of poverty*" (Key Informant, 2023).

More views about the types of urban farming were provided while conducting interviews with more key informants. A community leader (a woman of 36 years old) explained that according to her growing crops in broken pots, buckets and even in sucks is also a form of urban farming. In her own words, she explained to the interviewer that.

"*According to your question, I am a woman leader here in our cell and I know how to plant vegetables in broken pots and buckets including polyp thane bags. The NAADS people when they were training us the said that this type of farming is called 'back yard farming' which is commonly practiced in urban areas where people have little land*" (Key Informant, 2023).

In relation to types of urban farming, the investigator also asked to inquire about a question related to the nature of urban farming (commercial or subsistence), indeed participants perceived this in their own ways as noted by the investigator.

A key informant noted that "*Just because we are overcrowded there is nowhere to graze animals from, so most urban farmers prefer to grow fast growing crops like beans, cabbages, because when you grow a lot you can sale some and remain with the rest". The crops grown within the city are mainly to provide food at home but if a farmer gets a better harvest, he/she can sale some but mainly in town we grow crops to facilitate food in the homes*" (Key informant, 2023).

According to data analysis, urban farmers engage in fast growing crops due to limited space targeting home consumption foods like vegetables. This implies that urban farmers ought not to practice commercial farming because of space scarcity. On the concern as to whether urban farmers have land or rent for growing crops, participants provided their views.

"*Many people who grow crops do not have much land of their own; they actually have smaller plots, so majority rent from those with land which they are not fully using. Farmers pay rent of Sh. 50,000 on a plot of land of (20x60) in size. The season is usually three to four month to harvest beans to cabbage which are common plants grown in city of Mbarara. However, land lords do not allow crops like bananas, coffee, and others which take a very long time to grow. This is because any time the land lords may want to develop their land or sale it.*" (Key Informant, 2023).

3.2.2. Benefits of Urban Farming

The investigator wanted to find out whether urban farming has any benefits to urban farmers.

This information was captured in the subthemes created during data analysis.

Income Generation and Urban Farming: different questions were posed, can urban farming generate income for urban growers? If so, how does urban farming contribute to income generation from a broader perspective according to data available?

Urban farming has emerged as a powerful tool for generating income and improving livelihoods in urban communities. Studies have shown that urban agriculture significantly increase household income, particularly for low-income families (Okon *et al.,* (2016). This income generation can come from a variety of sources. One of the most direct ways to earn income through urban farming is by selling fresh produce. This can be done through direct sales at farmers markets or through Community Supported Agriculture (CSA) programs (Mutshakambi, 2019). Online platforms have also become a popular option for urban farmers to connect with consumers seeking fresh, local produce (Nyanga *et al.,* 2020). Additionally, urban farms help in establishing relationships with local restaurants and cafes, supplying them with high-quality, locally grown ingredients (Mutshakambi, 2019). Beyond selling fresh produce, urban farmers create value-added products to extend their earning potential. This involves turning harvests into shelf- stable products like jams, jellies, pickles, or dried herbs and spices (Specht 2014). For

those with a knack for design, urban farms can be a source of beautiful, locally grown cut flowers and arrangements.

Income generation is just one piece of the puzzle when it comes to urban farming and livelihoods. Hence, growing own food can significantly reduce grocery bills, freeing up money for other needs (Mutshakambi, 2019). Urban farms also play a vital role in increasing food security, particularly in areas where access to fresh, healthy food was scarce. The act of gardening itself provides valuable health benefits, serving as a form of exercise and promoting mental happiness. Hence, urban farming offers a unique and possible opportunity to generate income, improve food security, and contribute to a more sustainable food system within the city.

When the participants were asked to give their views as to whether urban farming is an income generating practice, they gave their views on how they realistically experience the practice.

"*As a leader I am aware that some people plat some egg plants and tomatoes around their homes because when I am moving around the community, I see those things. First, they are nutritious because they are foods, and some farmers sell them for a good income. These days, for example, one egg by a local hen is at Sh. 1000, now imagine if a farmer had 10 hens all laying and is able to sells eggs. How much do you think she can earn. I am very sure if people are not lazy, they can get good money from urban farming*" (Key Informant 2023)

Indeed, according to collected data, it is true that urban farming contributes to income generation if taken seriously. For this reason, some people have greatly benefited from urban farming; a prominent urban farmer who has experience in piggery explained the benefits he has received from piggery projects over a long time.

"*I have lived in this community for about 27 years and one of my major incomes generating activity is piggery. I have four female pigs and one male pig. Every year a pig produce twice,*

I take good care of them because each pig can produce between 8-19 piglets. Once a pig produces i normally sale the piglets at 3 months each for Sh. 100,000 and other farmers book them in advance. Once a mother pig produces 6 times I sale it but I already have one to replace for regular productivity. This project helps me to get money to buy food, pay rent and even contribute on school fees because I have five children who still go school" (Key Informant 2023). With such discussion, it's true that urban farming to a certain level is a good and reliable income generating activity.

Food Security and urban farming. Urban residents often have a good understanding of food but rely heavily on purchasing it due to limited engagement in farming activities. However, those who engage in small-scale farming view it as a vital source of food security. Before analyzing participant's perspectives, the investigator sought insights from other scholars on the same topic from a broader context.

Urban farming facilitates the production of fresh food within city boundaries, thereby reducing reliance on external sources and mitigating risks associated with supply chain disruptions. The ability to grow food locally implies that urban farmers ensure a continuous supply of fresh produce for city dwellers. This practice enhances the resilience of urban food systems and helps buffer against crises that could disrupt food supplies, such as natural disasters or global pandemics (Fenestra, 2009). Similarly, local food production reduces the distance food moves from farm to table, resulting in fresher produce and lower transportation costs and emissions. A shorter supply chain allows food to be harvested at its peak ripeness and quickly delivered to consumers, preserving its nutritional value and flavor. Furthermore, reducing transportation contributes to lower greenhouse gas emissions, supporting environmental sustainability (Zezza & Tasciotti, 2010).

Moreover, urban farming increases the availability of diverse and nutritious food, especially in urban areas where access to fresh produce may be limited. Many urban neighborhoods, particularly low-income ones, are often referred to as food desert due to the lack of affordable and healthy food options. Urban farms can address this issue by providing a steady source of fresh fruits, vegetables, and herbs, thereby improving the overall diet quality and health of urban residents (Kimberley, Caton & Bailkey, 2010).

Data collected indicates that some urban farmers in Mbarara city consider urban farming practice as a source of food security. Hence participants expressed their views to confirm how urban farming is viewed as a source of food security.

"*The city has been expanded to include areas which have some space to grow food like bananas, maize, and greens. Even some people keep animals like goats, cows and pigs and birds (poultry). When you consider people who are doing all this, the get food to feed their families. Here in Biharwe, almost every home has banana plantation and some land for grazing animals, so we get food from our gardens. I think the challenge will come when construction of commercial houses reaches here. It will them be hard to continue having our banana plantations and land for grazing*" (Key informant 2023).

This is true because the city infrastructural development has not yet covered all the areas like some parts of Biharwe where people are having their banana plantations which give them food security and the land for keeping their livestock.

Improved Standards of Living. Urban farming is perceived to make a contribution to improved standards of living according to data analysis. The researcher looked at this scenario both from the wider view and also local perspective. From a broader perspective, data from previous documents provides information about improved standards of living in a range of options/indicators.

Economic Benefits. Urban farming projects create employment opportunities in agriculture, distribution, marketing, and sales. These jobs can provide steady incomes, especially in economically disadvantaged urban areas. Hence, engaging in urban farming, residents can gain access to various job opportunities that contribute to their financial stability and overall economic well- being. Additionally, urban farming supports entrepreneurship through the development of local businesses such as farmers, markets, community-supported agriculture (CSA) programs, and urban farm stands. These entrepreneurial ventures not only generate income for individuals but also stimulate the local economy by keeping money within the community and fostering economic growth (Yariv & Rahaman et al. 2014) .

Social Benefits. Urban farming fosters community involvement and strengthens social ties as people come together to work on farming projects, share knowledge, and support each other. This collective effort builds a sense of community and belonging among urban residents, which can improve social cohesion and reduce isolation. Many urban farms also offer educational programs that teach residents about sustainable agriculture, nutrition, and cooking, enhancing their skills and knowledge. These educational opportunities empower individuals with the information and tools needed to make healthier lifestyle choices and engage in environmentally friendly practices (Sandiford 2017).

Health Benefits. Urban farming increases access to fresh, nutritious food, which can lead to improved diets and better health outcomes. This is particularly important in food desserts where healthy food options are limited. By providing a reliable source of fresh fruits and vegetables, urban farms help combat malnutrition and diet-related diseases. Additionally, participation in urban farming activities promotes physical exercise, which can improve overall physical health and well-being. Gardening, planting, and harvesting involve physical labor that contributes to maintaining a healthy and active lifestyle.

Environmental Benefits. Urban farms create green spaces that enhance the urban environment, providing areas for relaxation and recreation. These green spaces not only beautify neighborhoods but also contribute to the mental well-being of residents by offering a natural respite from the concrete jungle. Moreover, involvement in urban farming raises awareness about environmental issues and promotes sustainable living practices. Through hands-on experience, urban farmers learn about composting, water conservation, and organic farming methods, which can lead to more environmentally conscious behavior in the community (Sala, 2021).

Quality of Life. Urban farms and gardens improve the aesthetic quality of neighborhoods, making them more attractive places to live. The presence of greenery and well-maintained gardens can boost property values and create a more pleasant living environment. Furthermore, by providing a local source of food, urban farming enhances food security, reducing the stress and uncertainty associated with food access. Knowing that fresh, healthy food is readily available can significantly improve the quality of life for urban residents, offering peace of mind and a greater sense of security (Mullan, Porteous *et al.,* 2005). Overall, urban farming can play a vital role in improving standards of living by providing economic opportunities, fostering community engagement, improving health, and enhancing the urban environment. These factors combined contribute to a higher quality of life for urban residents, making cities more sustainable and livable places.

From a local perspective, urban farming benefits was in form of improving the standards of living. For example, a youth leader from Nyakayonjo, South Division mentioned the contribution of urban farming to improved standards of living.

"*For people who are serious, they benefit from urban farming if they follow the guidance given during training. For example, NAADS which is the government strategy targeting improving standards of people through agriculture has offered trainings and provided seeds, and animals to people both in urban setting and rural areas to improve their standards of living. This government cares about the lower people to get out of poverty through many programs including PDM which has a component of supporting people to work in groups to improve their standards of living. There is nobody who can stop a hard working person be in it in the city or urban areas. So for me, urban farming contributes much to peoples standards of living when they are serious*" Key informant 2023).

On the question as to why people practice urban farming, the investigator received different reasons. However, before engaging the participants, the investigator considered views of other scholars:

'Food Security and Access to Fresh Produce' to provide a reliable source of fresh, locally- grown produce. This is particularly important in food deserts where access to fresh fruits and vegetables is limited. By growing their own food, urban dwellers can ensure a consistent and affordable supply of nutritious food. Also 'Environmental Benefits' in which urban farming is recognized for its contribution to environmental sustainability. Others like rooftop gardens, vertical farming help reduce the urban heat and its effect, improve air quality, and make use of otherwise unused spaces (Samuelson *et al.,* 2018; Love *et al.,* 2015; Barbosa *et al.,* 2015; Taylor & Lovell (2014).

The urban farming scholars also maintain that urban farming can create economic opportunities through the sale of locally-grown produce and products like honey from urban beekeeping. It also provides employment and entrepreneurial opportunities, particularly in underserved communities. The scholars further assert that urban farming has 'Health and Wellness' component in which they maintain that urban farming activities promotes physical activity and mental well-being Samuelson *et al.,* (2018); Love *et al.,* (2015); Barbosa *et al.,* (2015); Taylor & Lovell (2014). The 'Educational Value' is also mentioned as one of the reason for urban farming because it offers educational opportunities for both children and adults. It helps people understand where their food comes from, teaches valuable agricultural skills, and raises awareness about sustainability and environmental stewardship. In addition the scholars believe that urban farming is practiced for reasons like 'Biodiversity and Ecosystem Support' for instance the practices of urban beekeeping and permaculture support local biodiversity by providing habitats for pollinators and other beneficial organisms. These practices help maintain healthy urban ecosystems. Lastly, there is a reason about 'Aesthetic and Recreational Benefits 'in which urban farms and gardens enhance the aesthetic appeal of urban areas, turning unused or derelict spaces into green, productive areas.

These spaces can also provide recreational opportunities and improve the quality of life for urban residents (Samuelson *et al.,* 2018; Love *et al.,* 2015; Barbosa *et al.,* 2015; Taylor & Lovell (2014). Hence once these areas mentioned are in place it would be right to say urban farming serves as a multifaceted solution to various urban challenges.

According to the key informants who participated in this study, they also provided reasons why urban farming is practiced, more so in Mbarara city of their own. Hence the investigator gathered information about the benefits of urban farming taking care of the key informants' views. A woman who is a community member and who grows some crops specifically greens and mushrooms explained explicitly the benefits she has achieved from urban farming. The investigator documented her story as follows:

"*We were trained how to grow mushrooms and plant greens in the backyard by NAADS.*

Some people put the training in practice and grow mushrooms in sucks, we are a group of eight women and we all have structures where we grow mushrooms. We harvest after every four days and pack our mushrooms. The market for mushrooms is amazing because the buyers just find us at home, we sell each kilo of fresh mushrooms at (Sh.12, 000) and in each week I harvest twice. I able to sale between 18-20 kilo grams of mushrooms. If you multiply, you can also find out how much I get just by growing mushrooms. I was able to buy a plot of land (Sh. 16,000,000) from the project of mushrooms, and I also get money to pay for rent, school fees, clothes, and even buying food. I also get money to pay the workers at the farm in the village (Key informant 2023).

3.2.3 Specific benefits from data analysis about urban farming

To make it more feasible, urban farming ensures a consistent and affordable supply of fresh produce, especially vital in food deserts, while significantly contributing to environmental sustainability through practices like rooftop gardens and hydroponics. It fosters social cohesion and educational opportunities, enhances economic prospects by generating income and jobs, and promotes physical and mental well-being through gardening activities.

Additionally, urban farming supports biodiversity and ecosystem health by providing habitats for pollinators and enhances urban aesthetics by transforming unused spaces into green areas.

By addressing food security, environmental issues, social interaction, economic development, health, education, biodiversity, and aesthetics, urban farming offers a comprehensive solution to various urban challenges (Al-Kodmany, 2018; Samuelson *et al.,* 2018).

The participants in this study mentioned some of the benefits they find for practicing in urban farming. A key informant who interacted with the investigator mentioned that;

> "*We practice urban farming because we have children, who want to eat; drink and who need school fees but also for we practice urban farming for personal development. Food for eating, paying schools for children…if you do not eat you can't survive. And when you grow your own crops, you do not buy food. Also after selling you can get money to add on school fees for the children* (Key Informant, 2023).

3.2.3.1 How has urban farming sustained urban livelihoods?

From a general perspective, urban farming sustains urban livelihoods by enhancing food security,

creating economic opportunities, promoting environmental sustainability, fostering community building, improving health and wellness, providing educational benefits, supporting biodiversity, and enhancing the aesthetic and recreational value of urban spaces. These multifaceted benefits make urban farming a vital component of sustainable urban development.

One key informant stated: "*If you have food and your neighbor does not have you sell to her. If you have sold to them or just given them for free and they eat as well*" (Key Informant, 2023).

On the question to explain major factors that have contributed to urban farming in Mbarara City, participants gave their views:

Urban farming is bolstered by the availability of accessible urban spaces such as rooftops, vacant plots, and community gardens, which serve as fertile grounds for cultivation and animal rearing even within densely populated city centres (Ackerman *et al.,* 2014). These spaces not only utilize underutilized areas but also contribute to local food production and community self-sufficiency. Technological innovations like hydroponics, aquaponics, and vertical farming further optimize urban space utilization by reducing water consumption, increasing crop yields, and facilitating year-round production (Barbosa *et al.,* 2015; Al-Kodmany, 2018). These methods are particularly valuable in urban settings where land scarcity is a challenge.

Community engagement plays a pivotal role in sustaining urban farming initiatives, with projects like community gardens fostering social interaction, education about sustainable food practices, and collective responsibility for local food production (Guitart, Pickering, & Byrne, 2012). Such initiatives not only enhance food security but also strengthen community bonds and promote environmental stewardship. Policy and regulatory support are essential for the growth of urban farming, encompassing zoning regulations that permit agricultural activities in urban areas and incentives for start-ups (Samuelson *et al.,* 2018). These policies provide a framework that encourages investment in sustainable agriculture and ensures the long-term viability of urban farming projects.

Environmental awareness and sustainability concerns, driven by issues such as food security and climate change, motivate urban farming practices that emphasize ecological balance.

Techniques like composting and organic farming reduce environmental impact and promote healthier ecosystems within urban environments (Ferguson & Lovell, 2014). Moreover, urban farming contributes significantly to economic viability through the sale of locally grown produce, workshops, and job creation, thereby enhancing local economic resilience (Samuelson et al., 2018). This economic aspect not only supports livelihoods but also strengthens community ties and fosters entrepreneurship.

Beyond economic and environmental benefits, urban farming provides substantial educational and health advantages. Educational programs associated with urban farming educate communities about nutrition, sustainable agriculture practices, and environmental stewardship (Taylor & Lovell, 2014). Access to fresh, locally grown produce improves food security and dietary diversity, thereby enhancing public health outcomes in urban areas.

Furthermore, urban farms contribute to aesthetic improvements in cities by transforming vacant lots into green spaces that mitigate urban heat island effects and improve air quality, thereby enhancing overall urban living convictions (Taylor & Lovell, 2014). These factors collectively contribute to the expansion and sustainability of urban farming. These factors may contribute to addressing diverse societal challenges such as food security, environmental sustainability, economic resilience, and public health, urban farming enhances community resilience and well-being in urban environments. Through innovative practices, community engagement, supportive policies, and educational efforts, urban farming continues to play a crucial role in shaping sustainable and habitable cities for the future.

One of the Key informants stated that: "*If you have something, you sell it and get money and the city benefits as well. When you sell something from the city it develops. If there is no urban farming, how will people survive in the city, I thought people in the city benefit from urban farming. How? If they stay in the city without food to eat and what to drink how will they survive in that city. So, you grow crops, the people in town that do not farm, take them that is how they benefit"* (Key Informant, 2023).

Objective two of the study was about the "Evaluate how urban infrastructural development has impacted on sustainable livelihood strategies for households and individuals living in Mbarara city". Hence the investigator gathered information from members of the public to get views of the participants on their level of understanding the given aspect. The investigator begun by assessing the actual impact of infrastructural development on sustainable livelihood in cities from a broader perspective and later captured the views of the participants for comparisons with the local situation in the area of the study. Most of these were captured under the theme and sub themes of 'Government Interventions' during data analyses.

3.2.4 Government Policies/ Programmes that Support Urban Farming and Infrastructure Develpoment in the City

From a broader view, urban infrastructural development refers to the planning, construction, and maintenance of essential systems and structures that support the functioning of cities.

This encompasses a wide range of physical and organizational components, including transportation networks, water supply systems, waste management facilities, energy grids, and telecommunications infrastructure. Effective urban infrastructure is essential for economic development, public health, environmental sustainability, and overall quality of life in urban areas. Urban infrastructural development involves creating and improving transportation systems such as roads, bridges, public transit, and pedestrian pathways, which facilitate the efficient movement of people and goods (Gakenheimer, 1999). Reliable and efficient transportation infrastructure reduces traffic congestion, lowers greenhouse gas emissions, and improves accessibility, contributing to the economic vitality and sustainability of urban areas. Furthermore, water supply and sanitation infrastructure is another critical component. Developing robust systems for water distribution and sewage treatment ensures that urban populations have access to clean drinking water and effective waste disposal. This not only protects public health but also supports economic activities and sustainable urban growth (WHO/UNICEF, 2019).

Energy infrastructure development focuses on creating reliable and sustainable energy sources to power homes, businesses, and public services. This includes expanding the electric grid, integrating renewable energy sources, and implementing smart grid technologies to enhance energy efficiency and resilience (IEA, 2020). Access to reliable energy is essential for economic activities, public safety, and the overall functioning of urban areas. On the other hand telecommunications infrastructure, including broadband networks and wireless communication systems, supports the connectivity needs of modern cities. High-speed internet and mobile communication enable economic activities, educational opportunities, and access to information, contributing to social and economic inclusion (World Bank, 2016).

Urban development also has a component of waste management infrastructure, which includes waste collection, recycling, and disposal systems, is essential for maintaining public health and environmental quality. Efficient waste management reduces pollution, conserves resources, and supports sustainable urban living (UN-Habitat, 2015). Similarly, effective urban infrastructural development also involves planning for resilience and adaptability to climate change and other challenges. This includes creating green infrastructure, such as parks and green roofs, which mitigate urban heat island effects, enhance biodiversity, and improve storm water management (Gill *et al.,* 2007). Incorporating climate-resilient designs and materials in infrastructure projects helps cities withstand and recover from extreme weather events and other environmental stresses.

Therefore, urban infrastructural development is a complicated and critical process that underpins the functioning and growth of cities. Investing in and maintaining vigorous infrastructure systems, cities can promote economic development, protect public health, enhance environmental sustainability, and improve the quality of life for their residents by ensuring sustainability. This study however, is concerned about livelihoods which could have been affected by the infrastructural development.

Having explained the components of infrastructural development components, the investigator interacted with Mbarara city dwellers to find out their views on how the perceive the impact of infrastructural development on livelihood. A participant explained his views about infrastructural development and urban farming in general.

"*Sometimes you find when you do not have where to graze from, if you do not have where to graze, there is no way you can keep the livestock. This is because the city is growing and there is a lot of construction which reduces the space for grazing animals and yet these animals give us milk, sometime we can sale them when we have a problem. Therefore according to your question, I feel development is good but those with authority should also consider how people are supposed to survive*" (Key Informant, 2023).

Another key informant commented about the problems people face because of city development processes in Mbarara city.

"*You are not allowed to graze or tie a goat near the road; if you do you will be accused. If you are rearing chicken it's not supposed to go to the neighbor. If it goes there and spoils their garden, then it is also a big problem. Sometimes, our animals and chicken are knocked by boda-boda, and cars and there is no body who cares about such losses because many people mind about business and not people's property. Those are some of the problems we find in city development*" (Key Informant, 2023).

Informants Views about Crop Farming:

"*First of all, we buy seeds for sowing on credit once our small gardens have been prepared but you have to pay the money you will have promised, if you fail to get it you will be apprehended or they take them away from you. Growing crops in the city is not easy even if the land belongs to you. Any time the city authorities can come and they want to expand the road, they then destroy your crops saying that development cannot wait for the*

crop to grow. This happened to my sister in law when they were expanding the roads in Nkokonjeru, the tractor just cut part of her maize garden on the road side and she was not compensated. Can you imagine, all the effort and loss which she made?" (Key Informant, 2023).

About the any laws/policies limiting urban farmers to practice urban farming, participants provided their views:

> "*They tell us to pay money first to plant any crops in the city if the plot of land belongs to your neighbor. You have to first pay money, if you do not have it; there is no planting/digging. This money is paid to the owner of the plot and not city council*" (Key Informant, 2023).

On the programs that support urban farming in the city, participants mentioned various views but one of them explained:

> "*When you keep/rear animals, plan for them so that they do not inconvenience the town. This is what the city council authorities tell the urban farmers. If the car or a goat is knocked by the car, they say it is the farmers' problem and loss because all farmers must tie their animals and not just let them move anyhow. One a car or boda-boda knocks your animals, you have nowhere to report you just bear the loss. Sometimes not even able to eat based on the magnitude of the damage cause to the knocked animal*" (Key informant 2023).

About the government programmes that support urban farming despite the infrastructural development that is at fast pace, respondents explained that:

> Over time, the government of Uganda has shown support for urban farming in several ways.

Policy and strategy development have been key aspects of this support. The National Urban Policy (2017) recognizes urban agriculture as an important element for urban resilience, food security, and economic development. Additionally, the Kampala Capital City Authority (KCCA) has incorporated urban farming into its planning and development strategies, promoting the practice within the city. To achieve this, capacity building and training have also been essential. The government provides training and support to urban farmers through agricultural extension services, helping them improve their farming practices and productivity. Collaborations with nongovernmental organizations (NGOs) have led to various training programs and initiatives aimed at empowering urban farmers. This has been successful because the government has been active in financial support and incentives.

Subsidies and grants are offered to urban farmers to encourage agricultural activities within urban areas. Furthermore, access to microfinance and credit facilities has been facilitated to support urban agricultural projects.

Research and innovation have also played a significant role since institutions like the National Agricultural Research Organization (NARO) conduct research on urban farming techniques, suitable crop varieties, and sustainable practices. There is also support for agricultural innovation hubs and incubators that focus on urban farming solutions. This is also in collaboration with environmental and health initiatives which are part of the government's approach as well. Programs promoting the use of organic waste for composting and urban farming help reduce waste and improve soil health. Additionally, the encouragement of urban farming as part of green space development aims to enhance urban environments and provide fresh produce.

Community engagement and awareness efforts are integral to the government's support.

Awareness campaigns and community initiatives promote the benefits of urban farming and encourage community participation. Moreover, initiatives to incorporate urban farming into school curricula educate children about agriculture and sustainability. These efforts reflect the Government's commitment to promoting urban farming as a means to enhance food security, support livelihoods, and contribute to sustainable urban development in Uganda.

The investigator picked up data from the participants to learn from them about their knowledge related to government support to urban farming.

"*From my side, I know the government is aware of the people who are helpless and needy within the city, so, sometimes we are given maize seeds for planting. This is because those who have some small plots of land can afford to grow maize, beans, tomatoes for consumption and even the surplus is sold. Once we get money we can buy other necessities which we use in daily life. However, the land is very small; the expansion of the city is affecting people every day because the road construction, building hotels, and commercial building and factories are taking away land which city farmers have been using to grow crops*" (Key Informant, 2023).

About the organizations that give support to urban farming, participants provided Information that Several Non-Governmental Organizations (NGOs) support urban farming in Uganda, contributing significantly to the promotion, training, and implementation of urban agriculture practices. Here are some notable NGOs involved in this field:

UGADEC (Uganda Decent Living Association) supports urban and peri-urban agriculture to enhance food security and income generation. They provide training and resources to urban farmers, promoting

sustainable agricultural practices and the use of organic waste for composting. By focusing on these areas, UGADEC helps urban farmers adopt environmentally friendly practices that boost productivity and sustainability (UGADEC, 2020).

The Kampala Urban Agriculture Network (KUAN) promotes urban agriculture as a means to improve food security, nutrition, and livelihoods in Kampala. KUAN offers training programs, supports urban farming initiatives, and works to integrate urban agriculture into city planning and policy frameworks. Their efforts aim to make urban farming a viable and recognized component of urban development (KUAN, 2019).

Similarly, Caritas Uganda, part of the international Caritas network, supports various agricultural initiatives, including urban farming, to alleviate poverty and hunger. Caritas Uganda provides technical support, training, and resources to urban farmers, focusing on sustainable and organic farming practices. Their comprehensive approach helps farmers adopt best practices that improve both yield and environmental health (Caritas Uganda, 2018).

The Food Rights Alliance (FRA) advocates for food security and sustainable agricultural practices, including urban farming. FRA engages in policy advocacy, provides training, and supports community-based urban farming projects to enhance food access and nutrition. By working at the grassroots and policy levels, FRA seeks to create an enabling environment for urban farming to thrive (FRA, 2021).

Voluntary Service Overseas (VSO) supports urban agriculture as part of its broader mission to reduce poverty and improve livelihoods. VSO collaborates with local communities to implement urban farming projects, offering training and technical support to promote sustainable farming practices. Their involvement helps urban farmers build the skills and knowledge needed to succeed (VSO, 2019).

Environmental Alert focuses on environmental conservation and sustainable development, including urban farming. They support urban farmers through capacity-building programs, promote the use of organic farming techniques, and advocate for policies that support urban agriculture. This holistic approach ensures that urban farming practices are both sustainable and environmentally friendly (Environmental Alert, 2020).

Action Aid Uganda works to fight poverty and injustice, with urban agriculture being one of the methods to improve food security and income for the urban poor. Action Aid Uganda provides training, resources, and support to urban farmers, emphasizing sustainable and climate-resilient farming practices. Their efforts aim to empower urban farmers and build resilient food systems (Action Aid Uganda, 2021).

SNV Netherlands Development Organization supports urban agriculture as part of its efforts to improve livelihoods and food security. SNV engages in capacity building, provides technical assistance, and promotes innovations in urban farming practices. Their support helps urban farmers adopt new technologies and practices that enhance productivity and sustainability (SNV, 2019).

These NGOs play a crucial role in advancing urban farming in Uganda, helping to create sustainable food systems, improve livelihoods, and enhance food security in urban areas.

"*Yes, some organization give seeds to the chairmen and the chairmen bring them to the people but for me I do not know these organizations. I think they the leaders are the ones who are connected to these organizations and the government to help urban farmers with seeds.*

Not sure, as for me, the seeds are given by the chairman LC1, anything beyond that we don't know. But the problem is that after giving us seeds to grow our crops sometimes are cut before harvest because of building houses for rent and constructing roads. Many people who grow crops alongside roads are victims of loss all the time because anytime a tractor comes and destroys crops. They do not even alert you are give you time like one month to harvest your crops. This is not good even though we need development but we also need food for our children and even selling to get money" (Key informant 2023).

About other government program apart for providing urban farmers stated that:

> "*Apart from giving us seeds, I can say that the government has us freedom to work and live in give us peace because the level of security is high. Since we also need the town to grow sometimes when our crops are destroyed we just keep quiet, because we know development is good for us and our children and grandchildren. For me I think if the government can stop destroying our gardens during construction of roads and houses by waiting for us to harvest, everything would be good. I can tell you the poor always suffer and the government does not help them especially here in Mbarara city, so destroying their gardens is not good at all*" (Key informant 2023).

Other participants stated:

"*Some people have been given pigs, cows and they start from there. NAADS gave some people pigs and cows to keep on a small piece of land. Even when development is at a high rate some pole like in*

Nkokonjeru, Katete, Kakoba who have small pieces of land are keeping their animals on zero grazing and getting money to feed their families" (Key informant 2023).

Despite the need for development there are some government programmes that support sustainable urban livelihoods. According to the participants:

> "*During the time of famine sometimes, they bring us maize flour, beans and things like that. This provided by the government but through the chairman who know people who are needy in a given zone/location*" (Key informant 2023).

3.3 Constraints Faced by Urban Households to Sustainable Livelihoods

It is very possible that urban households and individuals may often face several constraints in achieving sustainable livelihoods. These constraints can be categorized into economic, social, environmental, and institutional factors, each posing significant challenges that need to be addressed for sustainable urban living.

Economic Constraints. Income instability is a major hurdle for many urban households. The prevalence of informal employment, which lacks job security and benefits, makes it difficult to sustain a stable livelihood (ILO, 2018). This unpredictability in income can prevent families from planning for the future or making necessary investments in education, health, and sustainable practices.

Additionally, the high cost of living in urban areas further exacerbates economic challenges. Expenses related to housing, transportation, healthcare, and education consume a large portion of household income, leaving little for savings or investments in sustainable practices (World Bank, 2019). This financial strain can limit the ability of urban households to improve their living conditions or pursue opportunities for economic advancement.

Limited access to financial services is another significant constraint. Many urban residents do not have access to credit, savings, and insurance services, which are essential for investing in businesses, education, or health. This lack of financial inclusion can severely limit economic opportunities and resilience to economic shocks (UN-Habitat, 2016). Also, despite the fastest growing rate of Mbarara city, some city dwellers have had challenges to meet their livelihood needs due to the on-going process of infrastructural development. In addition to specifically focusing on urban farming and livelihood, the investigator also examined the range of key constraints city dwellers face to achieve their livelihoods.

Participants expressed their views in regard to economic constraints.

> "You see many people here in town do not work in offices, a very big percent is of the people in Mbarara city are self-employed or working for others to meet their daily needs. The problem these days money is a big problem everybody is crying on money. Businesses are low because money is scarce. This is why I can say people living in the city of Mbarara have a big problem of money for growing their businesses. This also relates to other problems like school fees and house rent mostly" (Key informant 2023). Access to financial services to improve businesses in the urban setting:

> "*According to this question, many of us people who stay in the city doing business, we have a challenge of finances because it is hard for the commercial banks and money lenders to give you a loan without a big security like loan, car or house. Even when you have security, banks and money lenders charge high interest rates that the borrowers eventually fail to pay in time. Recently, a friend mine faced a problem with the family after their land was taken by centenary bank for failing to pay the loan of 40M which he borrowed for his business. To make matters worse, he put the house to the bank as security without involving other family members and when the bank people came to take the house it became a very big problem for all family members. The man is now in hiding*" (Key informant 2023).

How people who live in rented houses manage to pay rent in time and cater for other daily needs. One of the challenges faced by city dwellers is house rent for both accommodation and commercial rent. Participants on this concern explained their challenges in the following ways: "*When it comes to house rent, this is a big problem for many people who live in the city of Mbarara. For example a house of two rooms in now at sh. 400,000 and yet even the business is not doing well to afford this rate of rent. I think those who rent big commercial houses in the city Centre some of them could be paying in million and above per month. The land lords do not understand that sometimes the situation is not good, for them they just I want my money. In case you fail to pay rent, the landlord can evict you and another person enters because we do not have the same level of income. This is a big problem because sometimes you can pay rent and fail to pay school fees in time*" (Key informant 2023).

Another participant also mentioned about the hardships of city dwellers in terms of economic aspect to achieve their daily livelihoods.

> "*When it comes to living in the city, life is not very easy, for example I personally operate a restaurant to meet all my family needs. I have six children who go school and they demand a lot of money I also pay rent for this place you see. Buying food to cook from the market is very expensive especially meat and bananas these days are on a rise and yet customers in Mbarara must eat a meal which has bananas. Therefore we people*

who operate restaurant we also increase the price of a plate of food. If a customer wants eat food with meat, we charge Sh. 4000 for one piece of meat and Sh. 5000 for two pieces. If you do not balance the business very well, you can make losses. However, still the cost of living is high because money is scarce" (Key informant 2023).

Social Constraints: The education and skills gap is a critical social constraint. Inadequate access to quality education and vocational training can limit individuals & #39; ability to secure well paying jobs. This skills gap hinders economic mobility and the capacity to achieve sustainable livelihoods (OECD, 2018). Without the necessary skills and education, many urban residents are unable to improve their economic situation.

According to the participants in this study, education was also mentioned as one of the major constraints people in living in the city face to meet their livelihood needs. One of the key informants mentioned that the cost of living in city set up is very costly and as a result meeting educational needs for the children is very difficult. Hence many of the children drop out of school before completing given levels of education.

"*I am a widow, my husband died 11 years ago and left me with five children and all of them were young, the elder one had just completed P.7. Since we did not have much resources/wealth in the village to depend on I stayed with the children here in town just struggling. I do not have a big source of income but I just sell charcoal, and yet the income is not enough to take all the children in good schools. I made sure the children remained in school which is a bit cheaper. When they the elder one completed P.7 he joined a vocational school because I did not have enough money for secondary school. He completed his vocational course in two years and fortunately started working; in fact he is the one who helped me on his siblings. To make a story short, one of the major challenges faced by people in urban setting is education for the children*" (Key informant 2023).

Health is identified as a major constraint limiting people who live in urban setting to sustain their livelihoods. Urban areas often face significant health challenges, including air pollution, lack of clean water, and limited access to healthcare services. Poor health can reduce individual's productivity and economic potential, further complicating efforts to achieve sustainable livelihoods (WHO, 2018).

Members of the public (participants) gave views on how health is a major constraint to people who live in urban setting. A lady who flies chips on the roadside market on Kakoba road gave her views about health hazards related to working in the city for survival.

"*I am 24 years old and I have a child of 3 years whom I got while at school. Any way when life became difficult I had to look for something to do to survive. For the last two years, my job is to fly chips in the evening and sale to people especially the university students. The problems I have face are many but mostly the dust which we face for working on the road side. This road as you can see has many cars and boda-boda which create dust for us roadside business people (lough), yes a call myself a business lady because this business sustains me and my child. So I can tell you dust is so much and it affects all the people working on the roadside including those who have shops but for us who work from outside even when it rains we do not work because we work under an umb*rella (Key informant 2023).

Social exclusion is another barrier to sustainable urban livelihoods. Marginalized groups, including migrants, minorities, and the urban poor, often face discrimination and exclusion from economic and social opportunities. This exclusion can make it harder for them to achieve sustainable livelihoods and fully participate in society (UNDP, 2016).

Since social issues were identified as part of the constraints people in cities face, the key informant provided more light it by explaining that;

"*Generally, people who live in the city especially the ones you see in Mbarara city have different problems and different income levels even different levels of education. From my own experience, I am not highly educated because I stopped in P.7. However, my desire was to ensure all my children receive better education. My first born is already at University but I am not able to pay for all of them. I decided to take the other three in vocational education to learn hand on skills. So in short people have problem of money to educate their children even though we see them in the city. This is one of the reasons you can even feel isolated among your friends whose children already go to good schools because these people can backbite you in your absence or even directly thinking that you do not work hard to educate your children in good schools. This can cause some level of discrimination which would not happen if there was no lack of money*" (Key informant 2023).

Environmental Constraints: Pollution is a major environmental constraint in urban areas. High levels of air, water, and soil pollution can negatively impact health and quality of life, reducing individual's capacity to work and sustain their livelihoods (UN Environment Programme, 2019). Environmental degradation also makes urban areas less attractive and livable. Limited green spaces in densely populated cities can impact mental and physical health. The lack of recreational areas and green spaces can reduce overall well-being and productivity, making it harder for urban residents to lead healthy and fulfilling lives (WHO, 2017).

Participants mentioned about environmental constraints reflecting on lack of trees in the city of

Mbarara to provide shade for the business people who work from outside. During the discussion, a member elaborated on the disadvantages of lack of trees in the city.

"*In Mbarara city center there are no trees and even those in the suburbs are being cut. For me I think there should be a big campaign about tree planting in the city to play the role of providing shade, absorbing dust and creating rain. Some people can work under the tree and conduct business, like those selling small things like handkerchiefs, pens, juices. Even boda- boda rides can use tree shades to avoid the sun during the heat season. So you should inform the city authorities to encourage tree planting like in villages*" (Key informant 2023).

Urban areas are increasingly vulnerable to climate change impacts such as extreme weather events, flooding, and heat waves. These environmental challenges can disrupt livelihoods and reduce the resilience of urban households, making it harder to achieve and maintain sustainable livelihoods (IPCC, 2018). Some of the issues about people who do their businesses in open place like markets or road sides.

"*I am an LC1 chairperson of this community but our people who work in open places suffer a lot, when it rains, there is no work, and during the dry season they are affected by dust because of wind. It would be good as our town Mbarara is growing into a city status to plan for our traders to have enough shades through which to conduct their businesses that give them daily bread, rent, school fees, and any means of living. Right now some vegetation cover is being cut down for commercial structures and yet we need vegetation for cool air, shade and even for rains, because when you have good vegetation, it makes rain*" (Key informant 2023).

Institutional Constraints. Participants views about government institutions assistance to people in urban setting to meet their livelihoods. Ineffective governance is a significant institutional constraint. Corruption, lack of transparency, and inefficient governance structures can impede the delivery of essential services and infrastructure. This can affect the quality of life and economic opportunities for urban residents (Transparency International, 2018). Good governance is essential for ensuring that resources are managed effectively and that all residents have access to necessary services. Inadequate urban planning and management can lead to overcrowded slums, inadequate infrastructure, and lack of basic services. This exacerbates living conditions for many urban households, making it harder for them to achieve sustainable livelihoods (UN- Habitat, 2016). Effective urban planning is essential for creating livable and sustainable urban environments.

Limited policy support for sustainable practices can also be a constraint. Inadequate policy frameworks and support for initiatives such as urban agriculture or renewable energy can constrain efforts to achieve sustainable livelihoods. Policies that promote sustainable practices are essential for supporting urban residents in their efforts to lead sustainable lives (FAO, 2019).

Addressing these constraints requires a comprehensive approach that includes economic reforms, improved access to education and healthcare, environmental protection measures, and effective governance. By tackling these challenges, urban households and individuals can move closer to achieving sustainable livelihoods.

"*Being a leader in the capacity of a mayor I can say that the government is working, institutions are in place to guide on delivery of services. For example if there are any disputes, we have judicial procedures to address them. During the elections, we have better electro processes, our parliament makes following the constitution, and the president is very serious about the corrupt officers including. I can also talk about security both within and the neighboring country in which our government is in charge of stabilizing security in the region. However, there are still gaps in service delivery due to so many demands for development, our city is growing and we are forced to displace some people who have lived in their places for long to ensure commercialization and growth. Hence the people who displaced might temporary be unstable until they are in position to settle in a new place*" (Key informant 2023).

3.4. Current Challenges to Urban Farming and Sustainable Livelihoods

Challenges faced by people in practicing urban farming in the city. Practicing urban farming presents numerous challenges, which can be broadly categorized into spatial, economic, environmental, social, and regulatory issues. Understanding these challenges is vital for developing effective strategies to support urban agriculture.

One of the primary spatial challenges is the limited availability of suitable land. Urban areas are often densely populated, with land primarily allocated for housing, commercial, and industrial use. Finding vacant lots or rooftops that can be converted into farming spaces can be difficult (Ackerman et al., 2014). Even when land is available, it may be fragmented, contaminated, or not ideally located for farming activities.

"*According to me, the land in the city areas is not very fertile for planting crops and even grazing is not very suitable. This is because the owners of the plots sometimes they grade them to make them ready for construction and they remove the top soil with manure. Also land in the cities is dusty or full of garbage from market collection and planting on such land with broken glasses can be challenging. However, there are some*

*urban people who protect their land from such contamination*s" (Key informant 2023).

Economic Challenges. Urban farming has been economically challenging due to high costs associated with starting and maintaining farming operations. Initial investments in infrastructure, such as greenhouses, hydroponic systems, and soil remediation, can be prohibitive for many urban farmers. Additionally, urban farmers often face competition for land from real estate developers, leading to higher land prices and rental costs (Despommier, 2010).

Some participants expressed why they think urban farming is sometimes a challenge. The investigator interacted with some key informants and in their views they explained the challenges which come with urban farming. An adult woman key informant from Kakoba area mentioned that;

"*Urban farming is good to increase the food in the household and even some surplus products can be sold but to some extent it is costly because of lack of enough land which is even lacking nutrients. To plant well in urban areas, you have to buy fertilizes and many people do not have enough money. Sometimes you need to spray your cabbages or tomatoes to kill the insects but still you are not very sure about the expected harvest if you put in much investment"* (Key informant 2023). About any regulations imposed on the urban farmers which affect them.

Regulatory hurdles are significant barriers to urban farming. Zoning laws and land use regulations restrict agricultural activities in certain areas, making it difficult for urban farmers to find legally permissible sites for their projects (Pearson *et al.,* 2010). Additionally, food safety regulations and permits are complex and costly to navigate, particularly for small-scale and start-up operations (Hodgson *et al.,* 2011). One informant stated:

"*The City council wants urban farmers to meet the city planning laws like planting in the road reserve. As a result some farmers have lost losing their crops when the road is being constructed and expanded.*

*Also urban farmers must grow quick growing crops like beans, tomatoes, cabbages and not those crops which take long to grow like coffee. This is because any time, some in the development programs may affect your crops like construction of commercial houses and expansion of roads. This happened when they were expanding Kakoba road; all the crops on the road side were destroyed including the stall*s" (Key informant 2023).

About logistical problems urban farmers face to practice urban farming. Logistical challenges, such as the transportation and distribution of produce, have also hindered urban farming. Urban farmers need efficient systems to get their products to market, which can be complicated by traffic congestion and lack of storage facilities (Kaufman & Bailkey, 2000). Additionally, urban farms often struggle with economies of scale, making it difficult to compete with larger, rural farms in terms of pricing and production volume. One of the key informants mentioned:

"*Most of the urban farmers are not intensive, so they only practice farming on small plots. The only challenge is when they are not able to get the seeds to sow. On the other hand, most urban farmers work on small gardens which they can manage. I think may be those who are engaged in animals and poultry need to get vaccinations, veterinary doctors to check on their animals, taking acre of the farms. It can be more expensive to maintain if you do not have another source of income*" (Key informant 2023).

About urban farmers with enough expertise to carry on urban farming. There is often a lack of knowledge and expertise in urban farming practices among city dwellers. Training and education are necessary to equip urban farmers with the skills needed to manage their farms effectively and sustainably (Taylor & Lovell, 2014). Access to technical assistance and on-going support has been limited, further complicating efforts to adopt advanced agricultural techniques and technologies.

"*According to me, urban farmers mainly do farming in small plots and not considered as big farmers. Therefore, most of them learn farming on their gardens and not attending trainings in farming. May be I can remember the NAADS officials were training people in poultry and piggery before they gave them out to farmers. That is the only training that could have provided some education to urban farmers, but those who grow crops just grow on a small scale using their experience of traditional way of farming. Others just learn from their friends and neighbors*." (Key informant 2023).

About urban farmers having access to credit from the bank or get agriculture grants. Securing funding and investment is a perennial challenge for urban farmers. Traditional financial institutions may be reluctant to invest in urban agriculture due to perceived risks and uncertainties. Grants and subsidies can be difficult to obtain and are often not sufficient to cover all expenses (Mok et al., 2014).

"*As a leader I do not find it necessary to provide funding to urban farmers because they practice farming for emergence, there is no investor or government institution which can give a loan to someone planning tomatoes on a plot of 50x100 meters. Those who can get some funding are the ones who for example have a cow for zero grazing, or a sizable poultry farm. Such farmers'*

can even get a small loan from the bank of SACCO because a cow can act as security to determine if the bank or SACOO should give you a small loan" (Key informant 2023).

Supportive infrastructure in urban farming. Urban infrastructure is typically not designed with farming in mind. Issues such as inadequate water supply, lack of space for composting and waste management, and insufficient sunlight due to tall buildings can all impact the viability of urban farming operations (Al-Kodmany, 2018).

"We the urban farmers in Mbarara city, we do not have any infrastructural support to our gardens. If you want to grow tomatoes in the dry season, you can irrigate them if you have water. If you do not have water, you just wait to get poor harvest. Those who plant on the dusty roads sides their crops can be coved by duct which definitely affects the quality of the harvest" (Key informant 2023).

About cultural perceptions put against urban farmer. Cultural perceptions of farming can also pose challenges. In some urban areas, urban agriculture may be viewed as a rural activity, leading to a lack of interest or support from urban residents and policymakers. Changing these perceptions and demonstrating the benefits of urban farming is crucial for gaining broader acceptance and support (Smit et al., 2001).

"*Some people especially the city developers can destroy urban farmers' gardens and tell them to go back to the village where farming is perceived to be practice. They do not even care when they destroy the garden because most people think that farming is best practiced in rural areas rather than in the towns. This is just a mentality of many people in towns"* (Key informant 2023).

Addressing these challenges requires coordinated efforts from urban planners, policymakers, community organizations, and urban farmers themselves. Developing supportive policies, providing education and technical assistance, and fostering community engagement, cities can overcome these obstacles and realize the full potential of urban farming.

3.5 Evaluation of How Urban Infrastructural Development has Impacted on Sustainable Livelihood Strategies for Households and Individuals Living in Mbarara City

Urban infrastructural development significantly impacts sustainable livelihood strategies for households and individuals living in cities. This manifests both positively and negatively. Hence participants were asked to balance the discussion by providing both positive and negative impact of infrastructural development on the sustainable livelihoods strategies for people living in urban setting.

Participants were contacted to provide their views based on what they have experienced with the infrastructural expansion of Mbarara city in the recent year. One of the city authority leaders wrapped up the positive and negative outcomes of the infrastructural development on the sustainable livelihood's strategies for urban households.

"*According to the current situation of city development I can mention the good things that this process brings to people and the bad ones as well. I will talk about one by one in relation to improved access to services. Let me start with healthcare; I can assure you better infrastructure often means improved access to healthcare facilities, contributing to better overall health and increased productivity. This means that our people will be able to access cheaper health services nearer to their locations if the exemption of the city is done. Another one definitely is enhanced educational infrastructure, including schools and libraries, helps in skill development and lifelong learning, leading to better employment opportunities. Still I can talk about efficient transport systems after working on the all the feeder roads this can reduce travel time and costs, enabling individuals to access employment opportunities more easily including using boda-boda, private, public cars, and even pedestrians*".

Let me talk about the economic opportunities because infrastructure projects create jobs both during construction and in the long term through the operation and maintenance of these facilities like hospitals, roads, schools. These entities create jobs for people living in cities.

We can also look at Business Growth since improved roads, internet connectivity, and utilities attract businesses, boosting local economies and providing more employment opportunities. We also have benefits related to environmental aspects like the planned green areas which will provide spaces for parks and recreational areas to improve air quality, provide recreational opportunities, and enhance mental wellness.

On the side of Social Inclusion, we are planning to affordable housing: to reduce homelessness and provide stable living conditions for low-income families who live in the city. Finally I can talk about community development since infrastructure can foster community engagement and cohesion by providing communal spaces and facilities where people met to hold meetings and dialogues. All these things have planned for the expansion of Mbarara infrastructural development. Let the counselor talk about negatives things about city infrastructural development. (Key informant 2023).

The infrastructural development is good on one hand but on the other hand it can also have negative impact to people, the city authorities expressed their

views both on the positive and negative impact it has to people.

"*I am the counselor of this division, and I have something to say about the negative impact of infrastructural development to people who live in the city. Many people have been forced to relocate to give space for infrastructure development and this disrupts social networks and livelihoods because of moving away from the normal place of residence. Also it increases cost of living because people who are affected are pushed out lower-income residents and reducing their access to affordable housing and services which they are used to. We lost a lot of green environment because of expanding the city and this can lead to the loss of green spaces and agricultural land, impacting local food production and biodiversity. The construction and increased vehicular traffic can contribute to air and water pollution, affecting health and quality of life for sure. I think because of development the marginalized groups like people with disabilities may still lack access to essential services and economic opportunities* (Key informant, 2023).

3.6. Data Presentation from Focus Group Discussions (FGDs)

Data Presentation out of Analysis of Focus Group Discussions (FGDs)

Raw data collected from the field was initially transcribed to convert it from audio form to written text. The transcribed data was then analyzed using thematic analysis, a suitable method for analyzing qualitative data. After applying thematic analysis, several themes emerged, which the investigator used to structure and organize the data presentation. The themes were generated from data gathered through two focus group discussions (FGDs))) conducted in Nyamitanga in City South Division and Biharwe in City North Division.

3.6.1 Types of Urban Farming according to data from the FGDs

Through data analysis, one of the themes which emerged from data includes 'types of urban farming'. Therefore, the investigator arranged the coded data according to how it was gathered form each FGD. FGD members mentioned various urban farming types/practices in Mbarara City based on their views and opinions. The FGD members indicated the types of urban farming they know that are being practiced in Mbarara city suburbs. The investigator had an opportunity to document each member's ideas as follows;

Participant 1 from Katete: "*I am 25 years old, and I want tell you that some people are planting tomatoes, greens, and sugarcane in the swamps which have taken over by the city boundaries. So for me digging in those swamps is a form of urban farming. Let me say it is called crop growin*g".

Participant 2 from Katete: "*For me one of the urban farming type is poultry because there are many people with poultry farm not in the city Centre but in the sides like Katete here who are selling their eggs to get money. Hence according to me poultry farming is also a type of farming which people in city sides can utilize to get* money"

Participant 3 from Nyamitanga: "*People are talking about keeping poultry but for me even mushroom growing is a type of farming which I see many people are benefiting. These days, supermarkets demand fresh mushroom and the demand is higher than the supply if we are to apply economics. I think we should consider mushroom growing as a type of farming practiced in city sides".*

Participant 4 from Nyamitanga: "*Would I be wrong to say that urban farmers practice mixed farming by growing crops like tomatoes, onions, cabbages and also keeping animals like cows, and goats? To me people in areas which are outside central location but in the suburbs are doing mixed farming even though on a small scale. So it is a recognized type of farming because it generates income to people".*

Participants from the FGD provided their ideas and views about what they understand by types of urban farming. However from a broader perspective urban farming types include;

Urban farming encompasses various methods adapted to the urban environment, maximizing space and resource efficiency. This innovative approach to agriculture addresses the unique challenges and opportunities presented by city living, contributing to food security, environmental sustainability, and community well-being.

Community gardens are shared spaces where local residents cultivate individual or communal plots. These gardens foster community engagement, provide fresh produce, and create green spaces in urban areas. They serve as hubs for social interaction, education, and collective effort, enhancing the sense of community and improving local food security (Cuin & Babib 2012).

Rooftop gardens make use of building rooftops, transforming otherwise unused spaces into productive gardens. These gardens grow vegetables, herbs, and even small fruits, contributing to urban greening and cooling while providing fresh, local produce. Rooftop gardens also help mitigate the urban heat island effect and manage storm water runoff. Similarly, there is also vertical farming which involves using vertically stacked layers or wall-mounted structures to grow crops, often indoors. This method utilizes hydroponics or aeroponics in a controlled environment, allowing for high-density production and year-round cultivation.

Vertical farming maximizes space efficiency and can be integrated into buildings, reducing the distance food travels from farm to table (Cuin & Babib, 2012).

Hydroponics is a soil-free method of growing plants in nutrient-rich water solutions. Suitable for indoor setups, hydroponics maximizes space utilization and can produce high yields with limited water use. This method is ideal for urban environments where space is constrained, and traditional soil-based agriculture is not feasible (Brandenburg *et al.,* 2014)

Aquaponics combines aquaculture (raising fish) with hydroponics in a symbiotic environment. In this system, fish waste provides nutrients for the plants, and the plants help filter the water, creating a sustainable and efficient food production cycle. Aquaponics is a versatile method that can be implemented in various urban settings, providing both fresh vegetables and fish. .

Indoor farming utilizes indoor spaces with artificial lighting and climate control to grow crops year-round. Often employing hydroponic or aeroponic systems, indoor farming allows for precise control over growing conditions, resulting in consistent and high-quality produce.

This method is particularly useful in urban areas with limited outdoor space and harsh climates. Urban beekeeping involves keeping beehives on rooftops, balconies, or gardens to support pollination and produce honey. Bees play a crucial role in pollinating urban gardens and green spaces, enhancing biodiversity and contributing to healthy ecosystems. Urban beekeeping also provides an opportunity for city dwellers to engage with nature and support local food production (Brandenburg *et al.,* 2014).

Guerrilla gardening is the unauthorized planting of gardens on vacant or neglected urban land. Often a form of activism, guerrilla gardening aims to beautify spaces, grow food, and raise awareness about land use and urban sustainability. This grassroots approach empowers individuals to take direct action in improving their urban environment and creating green spaces in unexpected places. Hence, each of these urban farming methods offers unique benefits and can be adapted to various urban settings, contributing to sustainable food systems and healthier, more resilient cities. Under the types of farming, other sub themes including' benefits of urban farming emerged.

3.6.2 Benefits of Urban Farming out of FGD data

In their FGD participants acknowledge the benefits of urban farming, such as access to fresh produce, improved food security, income generation, and environmental benefits.

Participant 3 "*According to me, urban farming has many benefits, you see people who dealing in urban farming cannot get stuck with money and food. So it is a source of income as well as a source of food. And many people have benefited in that way especially those with poultry farming who sale eggs to traders and real hens to dealers who roast and those in supermarkets. That is how I see it*" (FGD members 2023)

Other members of the FGD had similar ideas about the benefits of urban farming and the views are very interesting. One of the members talked about getting knowledge to grow crops and add value later.

Particpant 2: *For me, urban farming is as important as rural farming except that rural farming is don on a big space as compared to urban farming where the land is limited. However, those women who are growing mushrooms in sucks, and those who are keeping poultry and those having pigs are very rich. They get money on a daily basis and are able to solve their personal needs like paying rent, buying clothes, taking children to school and treating themselves when they are sick. This is very true because NAADS officials trained women to get knowledge in doing farming in towns and they have benefited for being active because of the knowledge they acquired*.

Participant 6: *Urban farming creates jobs to some youths and other people in two ways. The owners of the poultry farm my colleague has talked about needs workers because the owner cannot work alone, the owner also has a job because poultry farming is a full time job if you want to benefit. So I believe that this urban farming is a source of employment.*

Particpant 2: *Urban farming is very important for food security, people who grow some crops lie vegetables, beans, maize and others, even if on a small scale they get food to eat and spend less as compared to those who buy everything including greens. Hence urban farming is very good because it is a source of cheap food which can be grown o s small space. If the season is good, you can harvest much food for feeding the family and even sell the surplus for money.*

After discussing the views about benefits of urban farming, FGD members also discussed another sub theme which is about the support given by the 'government and other NGOs' to urban farmers to supplement the sustainable livelihood.

In Uganda, both the government and NGOs provide significant support to urban farmers through various initiatives aimed at promoting urban agriculture, enhancing food security, and improving livelihoods. Here are some specific ways they support urban farmers in Uganda:

3.6.3 Data about Government Support derived for FGDs

About the policy and legislation, the Ugandan government has been developing policies that support urban agriculture, recognizing its role in food security and poverty alleviation. These policies aim to integrate urban farming into urban planning and development strategies. On the same note, efforts are being made to include urban agriculture in land use planning, allowing urban farmers to access land for cultivation within city boundaries. This will be facilitated by training education through Agricultural Extension Services in which the government provides extension services through the Ministry of Agriculture, Animal Industry, and Fisheries (MAAIF). These services offer training and technical assistance to urban farmers on sustainable farming practices, pest management, and crop selection. The government also offers regular workshops and demonstration plots which are organized to educate urban farmers about modern agricultural techniques and innovations.

It is imperative to note that the government, through agencies like the Uganda Development Bank and the Agricultural Credit Facility, offers grants and low-interest loans to urban farmers to help them purchase inputs and equipment. In addition, government-funded research institutions, such as the National Agricultural Research Organization (NARO), conduct research on urban agriculture to develop new technologies and practices that urban farmers can adopt.

3.6.4 Data about Support by NGOs derived for FGDs

On Capacity Building and Training, NGOs such as the Uganda National Farmers Federation (UNFFE) and the Hunger Project Uganda provide training programs that focus on sustainable farming practices, organic farming, and business skills for urban farmers. They also offer technical assistance to help urban farmers improve productivity and adopt environmentally friendly practices. Similarly, NGOs provide microloans and grants to urban farmers, helping them to invest in necessary inputs, such as seeds, fertilizers, and tools. Organizations like BRAC Uganda have microfinance programs specifically targeting urban and peri-urban farmers.

Some NGOs distribute farming inputs, including seeds, seedlings, and compost, to urban farmers to boost their productivity. Furthermore, they facilitate the establishment of community gardens where urban residents can grow food collectively. These gardens promote community engagement and provide fresh produce to urban communities. Also, NGOs help urban farmers connect with markets by organizing farmers' markets and creating networks with local retailers and restaurants. This helps farmers sell their produce more effectively. This also involves training on marketing and value addition is provided to urban farmers, enabling them to increase their income by improving the quality and presentation of their products.

Examples of Initiatives include, The Kampala Urban Agriculture Livelihoods Programme (KUALP): An initiative aimed at enhancing food security and income generation for urban poor households in Kampala through urban agriculture. The Urban Farming Project by the Food and Agriculture Organization (FAO): This project focuses on improving the capacity of urban farmers in Kampala to produce food sustainably and improve their livelihoods. The Sustainable Urban Farming in the Kampala Metropolitan Area: An initiative supported by NGOs like Urban Harvest that works towards integrating urban agriculture into urban planning and improving food security. Both the Ugandan government and NGOs play vital roles in supporting urban farmers by providing financial assistance, training, technical support, and market access, thereby enhancing the sustainability and productivity of urban agriculture in Uganda

Focus group Discussions (FGDs), members expressed their based on what they know about the government support to urban farmers. According to information shared, by two group members, a big section of the public is aware about the support given to urban farmers to increase skills in urban farming and be able to sustain their livelihoods.

Participant 7*: "I remember around 2017, the government sent trainers from Kampala to train community members how to grow crops in urban setting if someone had a small piece of land. The training also included planting simple crops in old buckets, polyphone bags, and even broken pots which some one can just put on the veranda or behind the house and the crops grow. In this training the trainers emphasized source of light, irrigation with water which has no soap, and also making composed manure to add to the crops to grow well. Very many people who got the skills are still growing crops and getting food and money*" (FGD member 2023).

Participant 2 "For *me I will not differ much from Florence, but I can mention another type of training she has not mentioned. I am one of the people who were trained in mushroom growing which is done in sucks. Were trained to prepare a dark room, then go to the market and buy heaps of mushrooms to grow. I started with three and by following the instructions given by the trainer; I was able to learn more from my own sucks. The mushrooms grow within one week; the most important thing is to add water all the time. From experience in continued growing mushrooms and the market is very ready. Mushroom growing is a project that does not need a lot of investment. People need to have skills and the rest is just harvesting money*" (FGD member 2023).

As some members mentioned that the government and NGOs support urban farming some group members said they are not aware of such support based on the nature of their daily work. This was revealed by some members in the same FGD. The information shared was documented below

Participant 3: "They called me in this meeting and it seems it is for those people who are dealing in farming like growing crops in the city. It is true I see some crops in the community like here in Katete but I have no idea that the government has a hand in this. I am even very surprised to see that the government can put money in people who have no big land to train them in farming. For me I am a business man working in central market, I deal in produce and my knowledge about urban farming is very little to the extent that I do not know that government helps people in towns to get farming skills. I though most farmers are in the rural areas where there is big land for farming. Do not get me wrong members; this is also what I think" (FGD member 2023).

Even if the government and some NGOs provide support to urban farmers to build their capacity through training, participants expressed some challenges they face in the process of maintain good standard of urban farming.

Participants expressed difficulty finding land for urban farming due to the city's expansion and rising demand for space for commercial and public infrastructure including water and sewerage extension, electricity extension, commercial buildings, schools, and road construction.

Within FGDs, members commented on some of the challenges that hinder urban farming due infrastructural development as the city is getting expanded from the original boundaries.

Participant 4: "*We would like to participate in agriculture even though we are in the city but the land is getting smaller and smaller every day. If you have a small garden in this season or this month, they will tell you that nest season you cannot plant here because the place is already planned for construction. This is a very big problem because people in the city suburbs are willing to grow crops but the land is almost not there"*. (FGD member 2023)

Participant 1*:" From my side, I can say that road expansion is almost being done in every division. This has caused a lot of challenges to people who grow crops alongside the roads. If you have crops and it is time for construction of the road, you will rose them and even the dust is too much it also contributes in poor growing of crops. Much as we need the city to look good, we also need to eat so our crops should not be destroyed, people who construct roads should wait for us to harvest our crops because first of all they are not the ones who feed our families. Remember we buy seeds, spray and incur labor costs then someone just comes anytime and destroys your crops. I think that is not good*" (FGD member 2023)

Participant 4: "*For me I have been here for a long time because I grew up here and we used to dig, when the city expanded land reduced, people became more than the available land and farming stopped. They only grow these crops that you see that cannot be of help to a person and the entire family to depend on for food and for income"* (FGD member 2023).

Participant 3: "*For me I am from this place, but I try by all means with the little land I have to plant bananas, but because of the city conditions they do not grow well. When someone has chicken, they will uncover/scratch around it, because it is not fenced, they collapse or I cut banana fibers for cooking and that's it, I do keep birds as well, I keep chicken but space is not enough and we do not have good training on how to keep the chicken we have whether it's one or two. But we try to keep them, you find that you can get an egg from them, you eat it and the children eat as well, you may not get one to sell but the family will have something to eat. So the city expansion has affected some us who are willing to keep chicken and grow some crops for food*" (FGD member 2023).

Participant: 4 "*For me I am now forty-nine years old, to understand well I start from around thirty-nine years because at ten years I was still a very young child I knew less. By the time I grew up, we have been farming; we had banana plantations we generally cultivated like rural people. But because of the city in about twenty years back, farming reduced. What used to be a banana plantation was bought as plot, s they are now people's homes and buildings. So, they are no longer the gardens we used to have long time ago. Now the way we practice farming is let's say I have a neighbor up there with two hens or one, when it lays eggs, you will not sell any because it will lay thirteen or fifteen eggs, out of fifteen you will eat ten eggs, if it has remained with five it will hatch those ones only that is the way we are farming these days. We do not farm to sell or what no, I do not know if that's what His Excellence talks about, 'farming for the stomach only/subsistence farming'. So, as you see we are practicing subsistence farming only*" (FGD member 2023).

Participant 5;" *Farming in my own land, I came here in 2013, I would go there cultivate in town and plant sweet potatoes and beans because I was staying in a rented house, I used to sell them there, sometimes I would get bananas and sell as well. I used to keep chicken but because of thieves and inadequate land, they would steal them and the eggs, so for me I plant crops so that I can sell and eat some as well. …but they are not always a lot for one to get a lot of money because of scarcity of land you plant very few so that when you harvest you sell some*

to get money for salt. We always grow very few because of limited land and lack of someone to support us" (FGD member, 2023)

4. DISCUSSION

4.0 Introduction

This chapter discusses the study outcomes on urban farming and sustainable livelihood in Uganda with a special focus on Mbarara City. By employing interpretive phenomenology, the study aimed to understand the subjective lived experiences of urban dwellers. It explored how infrastructural development impacts urban farming, which is perceived as a source of sustainable livelihood.

The study was conducted to meet both the general and specific objectives. The general objective was to investigate the contribution of urban farming to the sustainable livelihoods of households and individuals living in cities, despite the fast-growing infrastructural development, with a focus on Mbarara City. The specific objectives included:

Investigating the contribution of urban farming to the sustainable livelihoods of households and individuals living in Mbarara City;

Evaluating how urban infrastructural development has impacted sustainable livelihood strategies for households and individuals living in Mbarara City;

Identifying key constraints faced by urban households and individuals in achieving sustainable livelihoods in Mbarara City and suggesting mechanisms of addressing the above gaps.

4.1 Outcomes for Research Questions in Chapter One

The first research question was derived from objective one as indicated: "What is the contribution of urban farming to sustainable livelihood of households living in Mbarara City?

To address this question, the research followed specific themes which emerged out of data analysis presented in chapter four.

4.1.1 Types of Urban Farming

After analysis data from the field, participants expressed their understanding of the term "Urban farming", they split it into smaller interpretable units beginning with discussing the types of urban farming which in essence contribute to the livelihoods of people who live in urban setting. The investigator discussed a broader view about urban farming. However in the current study and specifically with the participants' views, types of urban farming were discussed reflecting basically on the local context. Evidence from the participants revealed that, growing crops, vegetables in small spaces available in the city, as well as keeping animals in the backyard on a small pace in the city refer to urban farming. In essence, findings indicate that people in urban setting are very much aware of the urban farming types and their contribution to livelihoods. They were however not in position to mention the agricultural terms as they ought not to be experts in farming. Still the fact is that they know and practice urban farming. Therefore, according to farming practices, they practice "subsistence" farming which is a type of agriculture where farmers grow food primarily to feed themselves and their families". The primary goal is self-sufficiency and source of livelihood, with little or no surplus for trade or sale.

Subsistence farming typically involves a range of crops and animals needed by the family to sustain their needs throughout the year. It is possible that subsistence farming is still prevalent in many parts of the world, particularly in developing countries, where it supports the livelihoods of millions of people. In this particular study, subsistence farming is understood in the context of providing livelihood opportunities for the people who practice urban agriculture in cities like Mbarara where the study was conducted.

The outcomes of this study are further explained reflecting on the views of the participants regarding the meaning of urban farming types. Examples are drawn from the participants' views. One of the participants explained that:

"*According to me, we grow beans, and cabbages; sometimes their prices are high and sometimes they are low, and Mbarara is now a city, we no longer practice farming" cabbage is grown by those in swampy areas. All the beans we grow beans and cabbages we grow are for consumption but sometimes we also sale the surplus to get money to but other necessities*" (Key Informant, 2023).

Another distinct finding mentioned during data collection is about "Zero grazing" as a type of urban farming. Even though it falls under subsistence farming, it is a finding that cannot be undermined as specific category. The actual meaning of zero grazing refers to an agricultural practice where livestock are kept in a confined area and are not allowed to graze freely in pastures.

Instead, farmers provide all the feed for the animals, which is typically cut and brought to them. This method is often is used to maximize the efficiency of land use, control the diet of the livestock, and minimize the environmental impact of grazing. Zero grazing is associated with certain features that make it suitable for urban setting as chosen by the urban farmers to meet their livelihood needs. These include; keeping animals in a confined area, such as a stable, shed, or pen, where they have limited movement. This controlled environment allows for more efficient use of space and resources.

Farmers are responsible for cutting grass, forage, or other types of feed and bringing it to the animals. The feed can include fresh grass, silage, hay, and concentrates, ensuring that livestock receive a consistent and balanced diet. Manure management is another critical aspect, as manure can be collected and used more efficiently, often as fertilizer for crops. The confined location also enables improved monitoring of the health and productivity of livestock, allowing for timely interventions and better disease control.

This type of farming has benefits which include among others; land use efficiently by not needing pastures, this method maximizes the use of available land, which is particularly advantageous in areas like city setting with limited arable land. A controlled diet ensures that animals receive the necessary nutrients, leading to higher productivity in terms of milk or meat yield. Environmental protection is another significant benefit, as zero grazing reduces soil erosion and degradation caused by overgrazing. Additionally, the confined setting makes it easier to monitor and manage the health of the livestock, leading to better disease control and overall improved animal welfare.

Once participants mentioned zero grazing as urban farming practice during data collection, it was an assurance that it suits the context of the city as reliable source of livelihood. This is because, if an animal (cow) is well catered for in term of feeding, health and monitoring, it can give milk for domestic consumption and sale for income. Hence zero grazing was a vital finding to have contribution to the livelihoods of the people who live and practice farming in urban setting, specifically Mbarara city where the study was conducted.

According to one of the participants, zero grazing refers to keeping a cow or a pig in a small fenced place in the back yard of a household. In his words, he revealed that "*Let me tell you.*

I have lived in this place for more than 30 years and some people here who have small pieces of land keep cows, pigs, and even goats in a very small space. For example my immediate neighbor has two cows which he feeds in a small fence at his home; he gets banana peels from the neighbors to feed his cows. He also gives water to his cows from a trough made at home. Another farmer had more than 10 goats which just feed on peoples' meals left overs and they look healthy. Some are also keeping pigs just feeding them on food left overs. That man who keeps the cows and he is able to sale milk for income to educate his children" (Key Informant, 2023). The information gathered from the above key informant indicates that urban farming is real and people know it as 'zero grazing' More finding indicate that urban farmers are even aware of mixed farming on small spaces.

One of the participants mentioned it in his narrative. Mixed farming refers to a type of agricultural practice that involves the simultaneous cultivation of crops and the raising of livestock on the same farm. This integrated system aims to optimize the use of resources by diversifying agricultural activities, which can lead to increased efficiency, productivity, and sustainability. This is line with food Agriculture Organization definition (FAO, 2021).

In this type of farming, farmers grow various crops while also raising animals such as cattle, sheep, goats, chickens, or pigs. This combination allows for a balanced use of land and resources. Hence integrating crops and livestock, farmers can achieve a more efficient use of available resources and land (IFAD, 2019). This is one way of sustaining the livelihoods in a city setting. Similarly, manure from livestock is often used to fertilize crops, enhancing soil fertility and reducing the need for chemical fertilizers. Similarly, crop residues can be used as animal feed, creating a cycle of resource utilization that benefits both crops and animals (FAO, 2021). This cyclical use of resources helps maintain soil health and fertility over time.

It is also important to note that this finding about mixed farming includes an aspect of diversification in farming activities which helps spread risk. If one type of crop fails or market prices drop, the farmer still has other sources of income from livestock or different crops (FAO, 2021). This diversification provides a buffer against economic shocks and ensures a more stable income stream for the farmer. We can also consider economic benefits in which mixed farming can lead to better economic stability by providing multiple streams of income which also allows farmers to make better use of labor throughout the year, as different tasks are required for crop cultivation and livestock management (IFAD, 2019). This efficiency will result in higher overall productivity and profitability.

Findings indicate some of the benefits of mixed farming and these include; Sustainability in which sustainable agricultural practices by maintaining soil health and reducing dependence on external inputs like chemical fertilizers and pesticides (FAO, 2021). Using natural processes and recycling resources, mixed farming can contribute to long-term agricultural sustainability. This is actually a useful finding because this study is also focusing on sustainability of livelihoods.

Findings indicate that mixed farming enhanced productivity through integration of crop and livestock production which can lead to higher overall productivity. Nutrient cycling between crops and animals improves soil fertility, which in turn supports better crop yields (IFAD, 2019). This synergistic effect can significantly boost farm output. In addition, mixed farming is associated with environmental protection component because this method helps in conserving biodiversity and reducing the environmental impact of farming. Hence

using natural processes and recycling resources, mixed farming can lower greenhouse gas emissions and protect water quality as pointed out by (FAO, 2021). The integration of different farming activities can create a more resilient and eco-friendly agricultural system.

According to participants, a mixed farming method is a source of food security where by producing a variety of food products, mixed farming contributes to local food security and reduces the vulnerability of the farm to market fluctuations (IFAD, 2019). This diversity ensures a stable food supply for the farm household and the local community.

The participants revealed different views about mixed farming and their short stories were captured by the investigator. "According to me, urban farming involves keeping animals and birds but not only growing crops. I know some homes which have rabbits, and poultry and they are getting good money by selling eggs, off-layers, broilers, and even the rabbits have a high market here in Mbarara. Most Foreigners like Chinese usually look for rabbit meat in supermarkets which is an indication that they on high demand. *For me I think poultry and rabbit keeping is also a type of urban farming that helps people for get out of poverty*" (Key Informant, 2023).

Findings brought out more views about the types of urban farming. One urban farmer (woman 36 years old) revealed that according to her growing crops in broken pots, buckets and even in sacks is also a form of urban farming. In her own words, she explained to the interviewer that:

"*According to your question, I am a woman leader here in our cell and I know how to plant vegetables in broken pots and buckets including polyp thane bags. The NAADS people when they were training us the said that this type of farming is called 'back yard farming' which is commonly practiced in urban areas where people have little land" (Key Informant, 2023).*

Broader research findings indicate that "Backyard farming", also known as urban farming or micro-farming, involves cultivating food-producing gardens in residential yards or small plots of land within urban and suburban areas. This practice allows individuals and families to grow their own fruits, vegetables, and herbs, and sometimes raise small livestock like chickens or rabbits. Backyard farming can contribute to food security, sustainability, and self-sufficiency, and it has gained popularity as more people become interested in local and organic food production.

Important to note is that backyard farming makes use of available space in residential areas, whether it is a small yard, rooftop, balcony, or community garden plot. Techniques such as vertical gardening, container gardening, and raised beds are often employed to maximize space efficiency (Benedict, 2021).

Findings further indicate that backyard farming is associated with a problem of space limitation, because urban and suburban areas may have limited space, which requires innovative solutions to maximize growing areas. Techniques like vertical gardening and container gardening are often necessary (Benedict, 2021). Findings show that, if farmers can acquire knowledge, backyard farming is a sustainable and practical way to grow food at home, offering numerous benefits in terms of food security, health, and environmental impact. With proper planning and effort, even small urban spaces can be transformed into productive agricultural plots. This is a way of maintain sustainable livelihoods for the people who live in cities and most especially those target by this study (Mbarara city). The types of urban farming are many but according to the findings, the participants were able to mention a few as discussed above.

Nature of urban farming. Data analysis revealed that participants talked about nature of farming by specifically mentioning commercial and subsistence farming. Data revealed that urban farmers were able to categories urban farming into both commercial and subsidence. Whereas majority believe that urban farming is just for subsistence, others take it as real commercial activity. A key informant noted that:

"*Just because we are overcrowded there is nowhere to graze animals from, so most urban farmers prefer to grow fast growing crops like beans, cabbages, because when you grow a lot you can sale some and remain with the rest. The crops grown within the city are mainly to provide food at home but if a farmer gets a better harvest, he/she can sale some but mainly in town we grow crops to facilitate food in the homes*" (Key Informant, 2023).

Findings indicate that the major reason for urban farmers to deal in subsistence farming is due to limited space for large scale production.

Land for farming. Since Mbarara city is growing at a very fast rate, the land for farming is also getting scarce at the same rate. Hence urban farmers depend on hiring small plots where they can grow few crop mostly for domestic use. Therefore, findings revealed that majority of the urban farmers do not own land so most of them rent out small plots where they plant fast growing crops. Some respondents stated:

"*Many people who grow crops do not have much land of their own; they actually have smaller plots, so majority rent from those with land which they are not fully using. Farmers pay rent of Sh. 50,000 on a plot of land of (20x60) in size. A season is usually three to four month to harvest beans to cabbage which are common plants grown in city of Mbarara. However, land lords do*

not allow crops like bananas, coffee, and others which take a very long time to grow. This is because any time the land lords may want to develop their land or sale it. Because" (Key Informant, 2023).

A good example of city farming is located at Rwenjeru agro tourism farm in Biharwe, Mbarara city. The farm ha agriculture activities ranging from solar powered agricultural system, mechanized agriculture, irrigation schemes, crop rotation, organic fertilizer application, bio-gas production and use, cross-breeding, brooding, fish farming, value addition, silage and hay production, weeding, mulching and water management.

4.1.2 Benefits of Urban Farming

Urban farming as a source of livelihood has benefits which were captured during the field study and data analysis as revealed by the following.

Income Generation. Findings revealed that urban farming is a source of income generation according to the data which was collected from the field. When asked the participants to give their views as to whether urban farming is an income generating practice, they gave their views on how they realistically experience the practice. Findings from a broader perspective indeed indicate that urban farming can make a suitable source of income. This is evidenced from different sources. It involves growing and selling produce, herbs, and sometimes raising small livestock within urban areas. With proper planning and management, urban farming can generate revenue through various channels.

Urban farmers can sell their produce directly to consumers through farm markets, roadside stands, or Community-Supported Agriculture (CSA) programs. This allows for higher profit margins as it eliminates the middleman (Mok, 2014). Additionally, many urban farms establish partnerships with local restaurants and grocery stores, supplying them with fresh, locally-grown produce. This can be a consistent and lucrative revenue stream (Thomaier *et al.,* 2015). Also, urban farmers can create and sell value-added products like jams, pickles, herbal teas, and other processed goods. These products often have a higher market value than raw produce (Rogus & Dimitri, 2015). Furthermore, urban farming offers educational workshops, farm tours, and agri-tourism activities which can provide additional income.

Urban farms can attract visitors interested in learning about sustainable agriculture and urban farming practices (Jordan, & Brelsford, 2012).

The above benefits are in line with the Sustainable Development Goals adopted by the United Nations under SDGs in 2015. In 2015, the United Nations launched the Agenda for Sustainable Development to end poverty and set the world on a path of zero hunger, good-health and wellbeing, clean water and sanitation, partnerships for the goals and opportunity for all on a healthy planet. According to *The Sustainable Development Goals Report 2020* by the UN, achieving this agenda (the 17 SGDs) will demand nothing short of the transformation of the financial, economic, political and social systems that govern our world today. This calls for a deliberate actions and ambitious action across all communities.

To achieve goal 2 to end hunger, achieve food security and improved nutrition and promote sustainable urban farming means doing things such as promoting sustainable agriculture and supporting small farmers. For the sake of the nearly 1 out of every 9 people on earth who go to bed hungry every night, the importance of community-led interventions cannot be understated. To realise the goal of everyone having access to sufficient and nutritious food all year round by 2030, Africa which is anticipated to benefit from a demographic dividend must be empowered to lift its vulnerable communities.

From the local perspective, findings revealed that urban farming is viable source of income. This is evidenced from the participants.

"*As a leader I am aware that some people plat some egg plants and tomatoes around their homes because when I am moving around the community I see those things.*

"First of all they are nutritious because they are foods and some farmers sale them for a good income. These days for example one egg by a local hen is at Sh. 1000, now imagine, if a farmer had 10 hens all laying and is able to sells eggs. How much do you thing she can earn. I am very sure if people are not lazy, they can get good money from urban farming" (Key Informant 2023)

Another participant also provided his story about the importance of urban farming as a source of income. His story was well captured as indicated below.

"*I have lived in this community for about 27 years and one of my major incomes generating activity is piggery. I have four female pigs and one male pig. Every year a pig produce twice, I take good care of them because each pig can produce between 8- 19 piglets. Once a pig produces, I normally sale the piglets at 3 month each for Sh. 100,000 and other farmers book them in advance. Once a mother pig produces 6 times I sale it but I already have one to replace for regular productivity. This project helps me to get money to buy food, pay rent and even contribute on school fees because I have five children who still go school*" (ref. Key Informant 2023)

Food Security. Data from the field revealed more benefits of urban farming including food security. This was an important finding because it is one way to

facilitate sustainable livelihood in cities like Mbarara. Some urban farmers take urban farming very seriously and revealed its importance in the addressing food security issues. It is indeed vital note that some urban farmers have benefitted from urban farming by having for consumption and even to the extent of selling the surplus. This was revealed in places where some households still have pieces of land where they can carry out farming. Such place for example includes Biharwe which was mentioned during data collection. *"The city has been expanded to include areas which have some space to grow food like bananas, maize, and greens. Even some people keep animals like goats, cows and pigs and birds (poultry). When you consider people who doing all this, they get food to feed their families. Here in Biharwe, almost every home has a banana plantation and some land for grazing animals, so we get food from our gardens. I think the challenge will come when construction of commercial houses reach here. It will be hard to continue having our banana plantations and land for grazing*" (Key informant 2023).

This is true because the city infrastructural development has not yet covered all the areas like some parts of Biharwe where people are having their banana plantations which give them food security and the land for keeping their livestock.

Improved Standards of Living. Findings revealed that another benefit of urban farming is the improved standards of living resulting from a combination of economic development, social progress, and environmental sustainability. In the context of this study, improved standards of living lead to a more prosperous, healthy, and fulfilling life for individuals and communities. Participants noted that urban farming makes a significant contribution towards this, as evidenced by data from the field. Evidence from the field is revealed from the stories of the participants as indicated below.

"*For people who are serious, they can benefit from urban farming if they follow in guidance given during training. For example, NAADS which is the government strategy targeting improving standards of people through agriculture has offered trainings and provided seeds, and animals to people both in urban setting and rural areas to improve their standards of living. This government cares about the lower people to get out of poverty through many programs including PDAM which has a component of supporting people to work in groups to improve their standards of living. There is nobody who can stop a hard working person be in it in the city or urban areas. So for me, urban farming contributes much to peoples standards of living when they are serious*" (Key informant 2023).

A woman in the community who grows some crops specifically greens and mushrooms explained explicitly the benefits she has achieved from urban farming. The investigator documented her story as follows:

"*We were trained how to grow mushrooms and plant greens in the backyard by NAADS. Some people put the training in practice and grow mushrooms in sucks, we are a group of eight women and we all have structures where we grow mushrooms. We harvest after every four days and pack our mushrooms. The market for mushrooms is amazing because the buyers just find us at home, we sell each kilo of fresh mushrooms at (Sh.12, 000) and in each week I harvest twice. I am able to sale between 18-20 kilograms of mushrooms. If you multiply, you can also find out how much I get just by growing mushrooms. I was able to but a plot of (Sh. 16,000,000) from the project of mushrooms, and I also get money to pay for rent, school fees, clothes, and even buying food. I also get money to pay the workers at the farm in the village* (Key informant 2023).

It was further established that urban farming is part of agro-tourism and sustainable development as it was evidenced in Biharwe, Mbarara City North Division. Animals and Livestock images often feature the prized Ankole longhorn cattle (white herds), exotic dairy cattle breeds, goats, sheep, rabbits, poultry, and apiary activities, creating a vivid farm life atmosphere. Birdlife and Nature has created an environment for birdwatching opportunities, over 310 bird species including acacia-dwelling birds like bare-faced go-away and white-headed barbet are common photographic subjects. Farm Activities encourage visitors to witness or participate in crop cultivation, carry out fish pond fishing, and traditional farming techniques. Photographs and videos show visitors engaging hands-on with agriculture.

4.1.3 Government Policies that Impact on Urban Farming

The study found that while government policies on the establishment of public utilities can promote urban livelihoods, they may also negatively impact urban farming. For example, sustainable livelihoods in cities are facilitated by utilities such as telecommunications for connectivity, transportation networks, water supply and sewerage facilities, and energy grids for domestic and industrial use, all of which fall under government responsibility. The findings indicate that although these government programs support sustainable urban livelihoods, they can encroach on space needed for urban farming, as the establishment of these utilities often requires land that could otherwise be used for farming. Participants shared experiences about the impact of government policies on utilities concerning urban farming.

They acknowledged that while these utilities are crucial for sustaining urban livelihoods, they also affect urban farming. Participants expressed their views on government policies for establishing utilities in growing cities like Mbarara and their feelings about the impact on

urban farming. From his own words, a participant explained that:

"*Sometimes you find when you do not have where to graze from, if you do not have where to graze, there is no way you can keep the livestock. This is because the city is growing and there is a lot of construction which reduces the space for grazing animals and yet these animals give us mil, sometime we can sale them when we have a problem. Therefore according to your question, I feel development is good but those with authority should also consider how people are supposed to survive*" (Key Informant, 2023).

Participants provided additional insights into government policies and their impact on urban farming. The findings reveal complaints about losses incurred by urban farmers due to development activities. For instance, those who utilize roadside spaces for grazing often suffer losses when their animals are struck by cars and motorcycles, with no compensation provided.

"*You are not allowed to graze or tie a goat near the road; if you do you will be accused. If you are rearing chicken it's not supposed to go to the neighbor. If it goes there and spoils their garden, then it is also a big problem. Sometimes, our animals and chicken are knocked by boda-boda, and cars and there is no body who cares about such losses because many people mind about business and not people's property. Those are some of the problems we find in city development*" (Key Informant, 2023).

"First of all, we buy seeds for sawing on credit once our small gardens have been prepared but you have to pay the money you will have promised, if you fail to get it you will be apprehended or they take them away from you. Growing crops in the city is not easy even if the land belongs to you. Any time the city authorities can come and they want to expand the road, they then destroy your crops saying that development cannot wait for the crop to grow. This happened to my sister in law when they were expanding the roads in Nkokonjeru, the tractor just cut part of her maize garden on the road side and she was not compensated. Can you imagine all the effort and loss which she made?" (Key Informant, 2023).

This is a critical finding because there are laws in place to protect urban farmers in situations like those mentioned by the participants. It is also important to recognize that urban farming is a significant source of livelihood. Therefore, when development takes precedence, urban farmers need protection. This implies that government policies on the provision of utilities such as electricity, water, and telecommunications, which facilitate sustainable livelihoods, should not compromise urban farming. Protecting urban farmers is essential, as their survival depends on their efforts to grow crops and raise animals in limited urban spaces, such as in Mbarara city. Despite the rapid expansion of Mbarara city, which has impacted urban farming, participants claimed that some existing laws or policies do not favor urban farmers. However, the investigator did not draw any conclusions about the adequacy of laws protecting urban farmers, focusing instead on sustainable livelihood strategies.

"*When you keep/rear animals, plan for them so that they do not inconvenience the town. This is what the city council authorities tell the urban farmers. If the car or a goat is knocked by the car, they say it is the farmers' problem and loss because all farmers must tie their animals and not just let them move anyhow. One a car or boda- boda knocks your animals, you have nowhere to report you just bear the loss. Sometimes not even able to eat based on the magnitude of the damage cause to the knocked animal*" (Key informant 2023).

While government policies and regulations, particularly those related to establishing utilities, can hinder development. A surprising finding emerged regarding government and NGO support for urban farming.

Data analysis revealed that the City Council Authority and NGOs have consistently played an oversight role in promoting urban farming as a livelihood source. This support manifests in capacity-building training sessions, provision of seeds and seedlings, extension services, and even assistance with value addition within the food chain. Some participants' views were documented as indicate below:

"From my side, I know the government is aware of the people who are helpless and needy within the city, so, sometimes we are given maize seeds for planting. This is because those who have some small plots of land can afford to grow maize, beans, tomatoes for consumption and even the surplus is sold. Once we get money we can buy other necessities which we use in daily life. However, the land is very small; the expansion of the city is affecting people every day because the road construction, building hotels, and commercial building and factories are taking away land which city farmers have been using to grow crops" (ref. Key Informant, 2023).

Several NGOs, including UGADEC (Uganda Decent Living Association), Caritas Uganda, the Food Rights Alliance (FRA), Voluntary Service Overseas (VSO), Environmental Alert, ActionAid Uganda, SNV Netherlands Development Organization, and MBADIFA in Mbarara. play a crucial role in supporting urban and peri-urban farming Their efforts aim to enhance food security and income generation for these communities. These organizations provide training and resources to urban farmers, promoting sustainable agricultural practices and the use of organic waste for composting. Their activities include capacity-building training sessions, seed distribution, and establishing markets for

the farmer's produce. This information was revealed during data collection and confirmed through subsequent analysis. Participants provided narratives about the support given by the NGOs in promoting urban farming:

"*Yes, some organization give seeds to the chairmen and the chairmen bring them to the people but for me I do not know these organizations. I think they the leaders are the ones who are connected to these organizations and the government to help urban farmers with seeds. Not sure, as for me, the seeds are given by the chairman LC1, anything beyond that we don't know. But the problem is that after giving us seeds to grow our crops sometimes are cut before harvest because of building houses for rent and constructing roads. Many people who grow crops alongside roads are victims of loss all the time because anytime a tractor comes and destroys crops. They do not even alert you are give you time like one month to harvest your crops. This is not good even though we need development but we also need food for our children and even selling to get money*" (Key informant 2023).

In addition to NGOs participant continued to mention more government programs which promote urban farming according to findings.

"*Apart from giving us seeds, I can say that the government has given us freedom to work and live in peace because the level of security is high. Since we also need the town to grow sometimes when our crops are destroyed we just keep quiet, because we know development is good for us and our children and grandchildren. For me I think if the government can stop destroying our gardens during construction of roads and houses by waiting for us to harvest, everything would be good. I can tell you the poor always suffer and the government does not help them especially here in Mbarara city, so destroying their gardens is not good at all*" (Key informant 2023).

Findings indicate that some urban farmers have been supported with start-up capital in the form of livestock, such as pigs and goats, as evidenced by a participant's participant's narrative below.

"*Some people have been given pigs, cows and they start from there. NAADS gave some people pigs and cows to keep on a small piece of land. Even when development is at a high rate some pole like in Nkokonjeru, Katete, Kakoba who have small pieces of land are keeping their animals on zero grazing and getting money to feed their families" (Key informant 2023).*

Findings also revealed that the government supports urban people with relief in time of crisis as indicated in the narrative below provided by the participant.

"During the time of famine sometimes, they bring us maize flour, beans and things like that. This provided by the government but through the chairman who know people who are needy in a given zone or location" (Key informant 2023).

4.1.4 Challenges to Urban Farming and Sustainable Livelihoods

To conclude the understanding of urban farming, data analysis has revealed several challenges faced by urban farmers in sustaining their livelihoods. While numerous challenges exist, only a few were highlighted by the participants, which may effectively represent the broader issues. The challenges identified in this study are fundamental for assessing the extent of the phenomenon. Participants mentioned challenges such as infertile soils in the city, which lack nutrients due to overplanting, pollution that affects crop quality, and contaminated soils resulting from the presence of broken glass. One participant further elaborated on the issue of infertile soils and its possible causes. This was documented from their own narrative, as detailed below:

"*According to me, the land in the city areas is not very fertile for planting crops and even grazing is not very suitable. This is because the owners of the plots sometimes they grade them to make them ready for construction and they remove the top soil with manure. Also land in the cities is dusty or full of garbage from market collection and planting on such land with broken glasses and full of broken glasses can be challenging. However, there are some urban people who protect their land from such contaminations*" (Key informant 2023).

Participants mentioned economic challenges as key issues faced by people living in urban settings when trying to sustain their livelihoods. These challenges include a lack of sufficient capital to start a farming project, which can be very costly. Consequently, many individuals interested in urban farming are unable to proceed due to economic hardships related to securing funds for renting land, purchasing inputs, and hiring labour, as well as maintaining gardens in cities like Mbarara. An example was drawn from one of the participants who provided the perspective of economic challenges to sustain livelihoods in urban setting.

"*Urban farming is good to increase the food in the household and even some surplus products can be sold but to some extent it is costly because of lack of enough land which is even lacking nutrients. To plant well in urban areas, you have to buy fertilizes and many people do not have enough money. Sometimes you need to spray your cabbages or tomatoes to kill the insects but still you are not very sure about the expected harvest if you put in much investment*" (Key informant 2023).

Findings also indicate that certain regulations impact farmers, affecting their ability to sustain their livelihoods. Participants expressed concerns about

regulations related to planting crops and grazing animals in areas designated as road reserves. It appears that the city council does not proactively create awareness about these regulations, leading to problems for farmers who use these spaces for agriculture and grazing. These farmers are affected during road expansion projects. This issue was highlighted by one urban farmer whose garden was destroyed during a road expansion before she could harvest her crops. Evidence from a participant was documented in the narrative below;

"*The city council wants urban farmers to meet the city laws like planning in the road reserve may result into a farmer losing his/her crops if the road is being constructed and expanded. Also urban farmers must grow quick growing crops like beans, tomatoes, cabbages and not those crops which take long to grow like coffee. This is because any time some the development process may affect your crops by construction of commercial houses and expansion of road. This happened when they were expanding Kakoba road; all the crops on the road side were destroyed including the stalls*" (Key informant 2023).

Another key finding regarding the challenges faced by people living in urban settings in achieving sustainable livelihoods involves logistical problems such as transportation and distribution of produce, which can significantly hinder urban farming as a viable source of income. For instance, urban farmers involved in poultry farming, who need a vehicle to transport eggs from the farm to the selling points, may face high costs that impact their projected profits. These expenses contribute to overhead costs, including transportation. Additionally, a participant highlighted logistical issues, specifically noting the costs associated with seeds and extension services. The narrative was captured as indicated below

"*Most of the urban farmers are not intensive, so they only practice farming on small plots. The only challenge is when they are not able to get the seeds to saw. On the other hand, most urban farmers work on small gardens which they can manage. I think may be those who are engaged in animals and poultry need to get vaccinations, veterinary doctors to check on their animals, taking acre of the farms. It can be more expensive to maintain if you do not have another source of income*" (Key informant 2023).

Critical findings reveal that a lack of access to credit significantly impedes urban farmers and other city dwellers from strengthening their projects and businesses. Commercial banks and financial institutions are often unwilling to provide loans due to the absence of collateral. Consequently, limited financial resources become a major barrier for urban residents trying to manage their projects and businesses effectively. Relying on money lenders is neither cost- effective nor sustainable, as they charge exorbitant interest rates that many urban dwellers, particularly farmers, cannot afford. In addition to financial constraints, urban residents also face a shortage of expertise in farming. Some individuals cultivate crops solely for subsistence and do not employ modern agricultural techniques to improve their yields.

However, there is evidence that training sessions were conducted by NAADS, and some unexpected support in the form of start-up capital was provided, as recounted by one participant.

"*According to me, urban farmers mainly do farming in small plots and not considered as big farmers. Therefore, they most of them learn farming on their gardens and not attending trainings in farming. May be I can remember the NADDS officials were training people in poultry and piggery before they gave them out to farmers. That is the only training that could have provided some education to urban farmers, but those who grow crops just grow on a small scale using their experience of traditional way of farming. Others just learn from their friends and neighbors*" (Key informant 2023).

Another participant, who is a leader, views providing funding to urban farmers as a luxury rather than a necessity. He believes that it is unrealistic to expect someone to grow enough food on a small piece of land to sustain their livelihood. Although this is a subjective opinion, the investigator documented these views as detailed below.

"*As a leader I do not find it necessary to provide funding to urban farmers because they practice farming for emergence, there is no investor or government institution which can give a gram tot someone planning tomatoes on a plot of 50x100 meters. Those who can get some funding are the ones who for example have a cow for zero grazing, or a sizable poultry farm. Such farmers' can even get a small loan from the bank of SACCO because a cow can act as security to determine if the bank or SACOO should give you a small Loan"* (Key informant 2023) Another significant finding was the lack of supportive infrastructure for urban farmers.

Participants reported issues such as inadequate water for irrigation during the dry season, which leads to poor harvests. Essential infrastructures like water supply, electricity, road networks, and safe storage facilities are crucial for enhancing the livelihoods of urban dwellers and supporting urban farming. Those living in urban settings are justified in their complaints and demands for improved infrastructure to support their projects, which are vital for their livelihoods. This issue was highlighted by one participant in the study.

"*We the urban farmers in Mbarara city, we do not have any infrastructural support to our gardens. If you want to grow tomatoes in the dry season, you can irrigate them if you have water. If you do not have water, you just wait to get poor harvest. Those who plant on the*

dusty roads sides, their crops can be covered by dust which definitely affects the quality of the harvest" (Key informant 2023).

4.2. Evaluation of Urban Infrastructural Development on Sustainable Livelihood

Strategies for Households and Individuals Living in Mbarara City.

The second objective of the current study was to evaluate the impact of infrastructural development on sustainable livelihoods in urban settings, focusing on Mbarara City. Therefore, the data collected aimed to answer the question: How has urban infrastructure development impacted sustainable livelihood strategies for households and individuals living in Mbarara City? Findings revealed several factors that affect livelihood strategies including urban farming for people living in cities, especially Mbarara city which was targeted for this study.

Participants expressed divided opinions on how infrastructural development affects livelihoods for people living in urban settings. This was evident from the reactions of both leaders and community members.

"*According to the current situation of city development I can mentions the good things that this process brings to people and the bad ones as well. I will talk about one by one in relation to improved access to services. Let me start with healthcare; I can assure you better infrastructure often means improved access to healthcare facilities, contributing to better overall health and increased productivity. This means that our people will be able to access cheaper health services nearer to their locations if the exemption of the city is done. Another one definitely is enhanced educational infrastructure, including schools and libraries, helps in skill development and lifelong learning, leading to better employment opportunities. Still I can talk about efficient transport systems after working on the all the feeder roads this can reduce travel time and costs, enabling individuals to access employment opportunities more easily including using boda-boda, private, public cars, and even pedestrians".*

"Let me talk about the economic opportunities because infrastructure projects create jobs both during construction and in the long term through the operation and maintenance of these facilities like hospitals, roads, schools. These entities create jobs for people living in cities.

We can also look at Business Growth since improved roads, internet connectivity, and utilities attract businesses, boosting local economies and providing more employment opportunities. We also have benefits related to environmental aspects like the planned green areas which will provide spaces for parks and recreational areas to improve air quality, provide recreational opportunities, and enhance mental wellness. On the side of Social Inclusion, we are planning to affordable housing: to reduce homelessness and provide stable living conditions for low-income families who live in the city. Finally I can talk about community development since infrastructure can foster community engagement and cohesion by providing communal spaces and facilities where people met to hold meetings and dialogues. All these things have planned for the expansion of Mbarara infrastructural development. Let the counselor talk about negatives things about city infrastructural development (Key informant 2023)

The study revealed mixed views among participants regarding the impact of infrastructural development on urban livelihoods. Some participants acknowledged both positive and negative consequences. On the one hand, development projects like road construction, commercial buildings, and grid expansion can disrupt existing social structures by displacing residents. On the other hand, such development can also attract rural-to-urban migration, driven by increased opportunities for employment, education, and trade. This influx of people necessitates further residential construction, further impacting the social set up. The expanding city of Mbarara exemplifies this challenge. To accommodate both residents and businesses, including schools, universities, hospitals, shops, and government offices, construction displaces existing residents. This disruption to the social setting can make it difficult for people to sustain their livelihoods. Some stories were capture to elaborate more about the view of participants.

"*I am the councilor of this division, and I have something to say about the negative impact of infrastructural development to people who live in the city. Many people have been forced to relocate to give space for infrastructure development and this disrupts social networks and livelihoods because of moving away from the normal place of residence. Also it increases cost of living because people who are affected are pushed out lower-income residents and reducing their access to affordable housing and services which they are used to. We lost a lot of green environment because of expanding the city and this can lead to the loss of green spaces and agricultural land, impacting local food production and biodiversity. The construction and increased vehicular traffic can contribute to air and water pollution, affecting health and quality of life for sure. I think because of development the marginalized groups like people with disabilities may still lack access to essential services and economic opportunities* (ref. Key informant, 2023).

4.3. Constraints Faced by Urban Households to Achieve Sustainable Livelihoods

Findings related to the third objective address the question, "What are the key constraints faced by

urban households and individuals in achieving a sustainable livelihood in Mbarara City?"

Residents of urban areas must work hard to sustain their livelihoods, as their survival relies heavily on their efforts. This means that almost everything in an urban setting incurs a cost, whether it is water, electricity, transportation, food, or housing. Consequently, living in an urban setting demands careful planning for sustainable livelihoods. Without a stable income or resources, it can be extremely challenging to maintain a decent standard of living. The study's findings highlight the various constraints faced by urban residents in their quest for sustainable livelihoods.

People living in urban settings face numerous constraints in sustaining their livelihoods. Data collected during the study revealed several challenges related to urban living. Among the most common constraints mentioned were economic factors that influence the cost of living.

It was noted that many urban residents earn their income through informal employment, which presents uncertainty in maintaining a sustainable income. For example, a significant portion of Mbarara City's population is engaged in various informal sector activities, including casual labor, market vending, boda-boda riding, transport services, and property management. This demographic constitutes a substantial percentage of the population and findings of this study indicate that it faces major challenges in sustaining their livelihoods.

Economic constraints emerged as an essential finding of this study due to their impact on individual livelihoods. Unpredictable sources of income can hinder effective planning for family needs, affecting other areas such as education, health, business, and personal investments. This discussion was derived from the participants and one of them explained;

"*You see many people here in town do not work in offices, a very big percent is of the people in Mbarara city are self-employed or working for others to meet their daily needs. The problem these days money is a big problem everybody is crying on money. Businesses are low because money is scarce. This is why I can say people living in the city of Mbarara have a big problem of money for growing their businesses. This also relates to other problems like school fees and house rent mostly*" (Key informant 2023). Financial constraints were also highlighted during the study as major issues affecting urban Resident's ability to sustain their livelihoods. In many households and among individuals, cash flow is inconsistent, as few people are employed in government offices or NGOs where salaries provide a stable income. The majority work in the informal sector, which is influenced by fluctuating forces of supply and demand. Participants mentioned the lack of adequate financing for their businesses and enterprises, which hampers their progress.

Commercial banks and financial institutions often require collateral, which many people do not have. Even those who can secure loans sometimes struggle to repay them due to high interest rates. When financial reinforcement is needed, individuals may have to sell property or assets to raise the necessary funds. However, not everyone possesses valuable assets or property that can generate sufficient money to sustain a business. As a result, achieving a sustainable livelihood remains a significant challenge. This issue was notably emphasized by one participant in the study.

"*According to this question, many of us people who stay in the city doing business, we have a challenge of finances because it is hard for the commercial banks and money lenders to give you a loan without a big security like land, car or house. Even when you have security, banks and money lenders charge high interest rates that the borrowers eventually fail to pay in time. Recently, a friend mine faced a problem with the family after their land was taken by centenary bank for failing to pay the loan of 40M which he borrowed for his business. To make matters worse, he put the house to the bank as security without involving other family members and when the bank people came to take the house it became a very big problem for all family members. The man is now in hiding*" (Key informant 2023).

After analyzing the data, the findings highlighted significant issues related to social, environmental, and particularly institutional constraints, which were strongly emphasized by the participants. These constraints pose considerable challenges in efforts to sustain livelihoods, both individually and collectively within families and communities.

Findings indicate that urban residents face several social constraints that impact their ability to sustain livelihoods. These include inadequate social support systems, which limit access to necessary resources and services. Issues such as limited social networks and lack of community cohesion hinder individuals from accessing information and assistance.

Additionally, the high cost of living in urban areas exacerbates social inequalities, making it difficult for some residents to afford basic necessities and achieve a stable livelihood. These issues came out during the study because indeed some community members are not in position to maintain social networks which hinders sustainable livelihood as a result.

Environmental constraints in urban settings also came out as a finding which participants mentioned that they significantly affect residents' ability to sustain their livelihoods.

Common challenges include floods in some areas of the city which limit people from crossing one community to another and even cars and motorcycles are not able to cross.

Another one is poor air quality due a lot of dust and some when people burn garbage, limited green spaces, and inadequate waste management systems. It was discovered that Mbarara city often faces problems like pollution, which can affect health and agricultural productivity. For instance, lack of access to clean water and suitable land for farming hinders urban agriculture.

These environmental issues contribute to a decreased quality of life and make it difficult for residents to manage sustainable practices. Participants mentioned about environmental constraints reflecting on lack of tress in the city of Mbarara to provide shade for the business people who work from outside. During the discussion, a member elaborated on the disadvantages of lack of trees in the city.

"*In Mbarara city center there is no tree and even those in the suburbs are being cut. For me I think there should be a big campaign about tree planting in the city to play the role of providing shade, absorbing dust and creating rain. Some people can work under the tree and conduct business, like those selling small things like handkerchiefs, pens, juices. Even boda-boda rides can use tree shades to avoid the sun during the heat season. So you should inform the city authorities to encourage tree planting like in villages*" (Key informant 2023)

Another finding is about institutional constraints which involve challenges related to the effectiveness of urban governance and support structures. Residents often encounter difficulties due to bureaucratic inefficiencies, lack of infrastructure, and inadequate regulatory frameworks. For example, the absence of supportive policies for informal sector workers and insufficient access to financial services can limit economic opportunities.

Additionally, findings indicate inadequate support for urban planning and development initiatives, which further exacerbates the challenges faced by urban dwellers in maintaining sustainable livelihoods. Hence these social, environmental, and institutional constraints collectively affect the ability of people living in urban settings to achieve and maintain sustainable livelihoods. To addressing these issues requires comprehensive strategies that incorporate improvements in social support, environmental management, and institutional effectiveness. Example can be drawn from the participants who mentioned that lack of tress in the city center is disastrous.

4.4. Findings From Focus Group Discussions (FGDs)

After analyzing the data from the FGDs, the findings closely aligned with those of the key informants. However, the FGDs provided a more integrated perspective on the discussed scenarios. The themes emerging from the FGDs data, such as types of urban farming, benefits of urban farming, and government and NGO support for urban farming, guided the discussion.

Participants in the FGDs shared their views on various types of urban farming based on their experiences. They identified several methods, including growing green vegetables, raising livestock like goats, cows, and pigs, and poultry farming. Some participants also mentioned mixed farming, where crops and animals are raised on the same piece of land, regardless of its size. Regarding the benefits of urban farming, the findings indicate that it provides several advantages, including a source of food, income, and employment. Urban farming can create job opportunities, such as requiring casual laborers for tasks related to poultry farms, which need workers, extension services, and transportation.

These findings outlines various types of urban farming practices observed in the city peripheries, based on firsthand observations and individual who were grouped in FGDs. The focus is on understanding the scope and impact of different urban farming methods, including crop cultivation, poultry farming, mushroom growing, and mixed farming.

Crop Cultivation in Swamps. One prevalent form of urban farming observed is the cultivation of crops in swamps that have been encroached upon by city expansion. This practice involves planting tomatoes, greens, and sugarcane in these swampy areas. For many, digging and farming in these swamps is considered a form of urban agriculture, often referred to as crop growing. This method allows residents to utilize available land in the city peripheries effectively, contributing to local food supply.

Poultry Farming. Another significant type of urban farming identified is poultry farming. This practice is commonly found in the outskirts of the city, such as in areas like Katete. Residents in these suburban areas engage in poultry farming to produce eggs, which are then sold to generate income. Poultry farming provides an additional revenue stream for those living outside the city center and demonstrates the potential for urban agriculture to support local economies.

Mushroom Growing. Mushroom cultivation is also recognized as an important urban farming practice. There is a growing demand for fresh mushrooms in supermarkets, and the demand currently exceeds the supply. Many people in the city peripheries have turned to mushroom growing as a profitable farming activity. The potential for economic gain from mushroom cultivation underscores its value as a viable urban farming option.

Mixed Farming. Mixed farming, which involves the simultaneous cultivation of crops and the rearing of animals, is another recognized urban farming practice. In the suburbs, individuals engage in growing various crops, such as tomatoes, onions, and cabbages, alongside keeping livestock like cows and goats. Although mixed farming is typically practiced on a small scale in these areas, it remains an important method for income generation and contributes to the diversity of urban farming practices. Therefore, data from the FGD clearly highlights that urban farming in city peripheries includes a range of practices, including crop cultivation in swamps, poultry farming, mushroom growing, and mixed farming. Each of these methods plays a crucial role in supporting local food supplies and generating income for residents. The diverse approaches to urban farming reflect the adaptability and resourcefulness of individuals living on the outskirts of the city, highlighting the importance of these practices in enhancing urban sustainability.

4.4.1 Benefits of Urban Farming According to Data from FGDS

The findings from the FGDs indicate multiple benefits, which were documented as evidence from the field. According to the information shared during the FGDs, participants highlighted that one of the key benefits of urban farming is its potential to provide both income and food.

They noted that with a good harvest, farmers are less likely to face shortages of money or food. This is a significant finding, as both money and food are essential for sustaining livelihoods. Participants particularly pointed out poultry farming as an excellent example of urban farming. They discussed various benefits associated with poultry farming, including selling eggs, selling chickens, and using chickens for food. As this was a discussion, all group members' views were considered seriously and respectfully, reflecting each member's interpretation of the scenario. Some participants believed that farming is more suitable for rural areas with ample land for largescale operations. They felt that practicing farming in the city is a waste of time and resources due to the limited land available. However, this perspective indicated a lack of awareness about the potential of farming on small spaces using modern technology. This finding highlights the need for city authorities to promote awareness and education about urban farming as a viable source of livelihood.

Another finding was about the comparison of rural areas and urban areas in terms of farming practices and benefits. Members made echoed on the previous trainings conducted by NAADS to the urban farmers to equip them with skills to plant using appropriate technology to produce food. This finding is very important promoting urban farming for sustainable livelihood.

Participant 2: *for me, urban farming is as important as rural farming except that rural farming is done on a big space as compared to urban farming where the land is limited. However, those women who are growing mushrooms in sucks, and those who are keeping poultry and those having pigs are very rich. They get money on a daily basis and are able to solve their personal needs like paying rent, buying clothes, taking children to school and treating themselves when they are sick. This is very true because NAADS officials trained women to get knowledge in doing farming in towns and they have benefited for being active because of the knowledge they acquired.*

4.4.2 Findings on Government and NGO Support for Urban Farming according to FGDs data

The research on government and NGO support for urban farming presents a complex picture, highlighting both positive impacts and significant challenges. These findings, derived from participants' experiences and perceptions, reflect the broader context of urban agriculture and its dynamics.

Government and NGO Support

The findings indicated the impact of government and NGO support on urban farming practices and examines the challenges that persist despite this assistance. Participants in FGDs acknowledge the Support from government and NGOs which has significantly enhanced urban farming practices. For instance, a government-led training initiative in 2017, conducted by experts from Kampala, introduced innovative techniques such as using old buckets, poly bags, and broken pots for planting. This method is suitable for limited spaces like verandas or behind houses. The training focused on key practices including ensuring adequate light, using clean water for irrigation, and creating compost.

Many individuals who participated in these sessions have successfully continued growing crops, benefiting from increased food supply and additional income.

Additionally, specialized training in mushroom cultivation has proven effective. This method involves growing mushrooms in sacks within a dark room, which requires minimal investment and provides quick returns. The skills acquired from this training have allowed individuals to expand their production, demonstrating the value of targeted agricultural training. However, despite the availability of training and resources, some individuals remain unaware of the government and NGO initiatives. For instance, a businessman with limited knowledge of urban agriculture was surprised to learn about the extent of government involvement. This lack of awareness highlights a significant communication gap and underscores the need for improved outreach and information dissemination to ensure that urban farmers can access available support.

In addition to government and NGO initiative to promote urban farming some challenges were still identified by FGD participants in this study. Hence findings indicate several challenges which continue to hinder effective urban farming, even with the provided support acknowledged.

Urban expansion has led to the encroachment on small garden spaces, which are often repurposed for construction. This trend has left urban farmers with increasingly limited land for cultivation. Furthermore, infrastructural development for road expansion frequently results in the destruction of crops and contributes to poor growth due to dust. Ongoing construction disrupts farming activities and exacerbates the difficulties faced by urban farmers. Also historical changes in Farming Practices show that urban expansion has converted previously available agricultural land into residential and commercial properties.

This shift has led to a move towards subsistence farming, reflecting the broader impact of urbanization on agricultural practices. The issue of space constraints and theft issues also came out in which limited space and exposure to theft present challenges in growing crops and keeping livestock, compromising the sustainability and productivity of urban farming efforts. Finally, limited investment and support was an important finding in which FGD members complained of inadequate support and restricted land which have affected the ability to sustain farming activities. Despite efforts to grow and sell produce, challenges such as limited space and theft impact income and the overall viability of urban farming.

In conclusion, the findings reveal that while government and NGO support has provided valuable training and resources for urban farming, significant challenges remain. Issues such as land scarcity, infrastructural development, and limited awareness of support programs hinder the effectiveness and sustainability of urban farming. Addressing these challenges will require improved communication about available resources and strategies to mitigate the negative impacts of urban expansion on agricultural practices. Ensuring that urban farmers are well-informed and supported is crucial for the continued success and growth of urban farming initiatives.

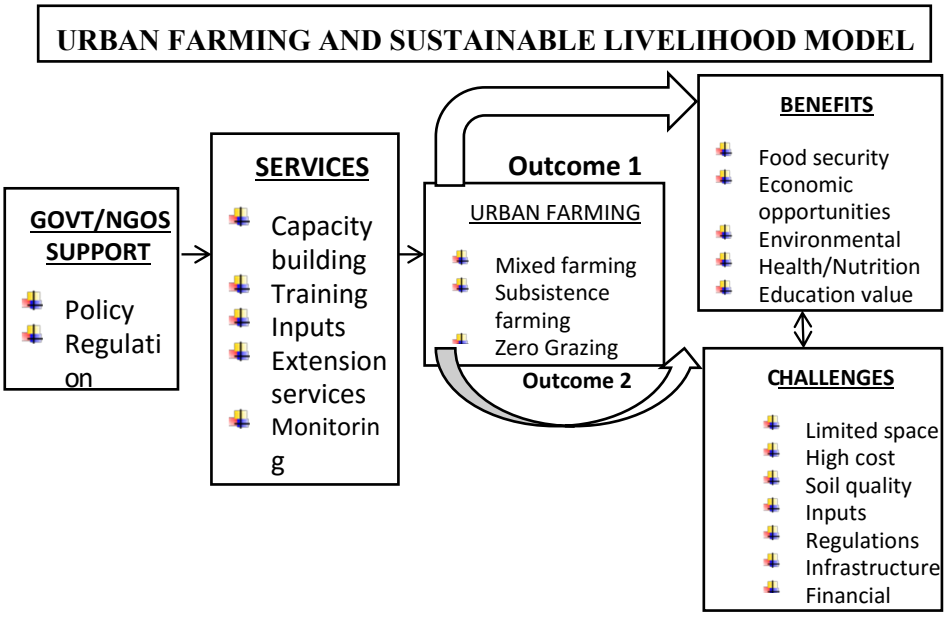
4.5. Urban Farming and Sustainable Livelihood Model

Based on the data collection, analysis, and discussion, the investigator has developed a model for urban farmers to sustain their livelihoods. This model has been named the Urban Farming and Sustainable Livelihood Model.

4.5.1 Assumptions of the model

Government and NGO Support for Urban Farming. Government Support. Governments play a crucial role in fostering urban farming by developing and implementing supportive policies. This includes crafting zoning laws that permit and encourage agriculture:
Challenges: Limited space, High cost, Soil quality
Inputs: Regulations, Infrastructure, Financial, Climate,
Urban farming: Mixed farming, Subsistence farming, Zero Grazing, Backyard farming

Government /NGOs support: Policy, Regulation
Services: Capacity building, Training, Extension Services, Monitoring
Benefits: Food security, Economic opportunities, Environmental, Health/Nutrition, Education value, Efficient resource us.



Source: Researcher constructivism 2024

Policy and regulatory activities within urban areas, ensuring that urban farming can thrive legally and sustainably.

Financial assistance is another key area where government support is vital. By offering grants, subsidies, or low-interest loans, governments can help urban farmers with the initial capital needed to start and sustain their operations.

Infrastructure investment also plays a significant role; developing essential facilities such as community gardens, farmers, markets, and irrigation systems provides the necessary support for urban farming initiatives to flourish.

Additionally, governments can enhance the skills and productivity of urban farmers by providing technical training and resources. This training ensures that farmers are equipped with the latest knowledge and techniques for successful urban agriculture.

Furthermore, supporting research and innovation in urban farming techniques and technologies is crucial for addressing challenges and improving practices, ensuring that urban farming remains effective and resilient.

NGO Support

Non-governmental organizations (NGOs) complement government efforts by running community programs that provide direct support to urban farmers. These programs often include resources, training, and mentorship, helping farmers to enhance their practices and achieve their goals. NGOs also play a vital role in resource distribution, supplying seeds, tools, and compost to urban farming initiatives, which helps to reduce the initial costs and barriers to entry for new farmers. Advocacy and awareness are other important contributions of NGOs; they work to raise public awareness about the benefits of urban farming and advocate for policies that support this sector. By facilitating partnerships and networking opportunities, NGOs help urban farmers connect with businesses and local communities, creating avenues for collaboration and market access. Additionally, NGOs may focus on sustainability projects, implementing practices such as water conservation and waste management to promote environmentally friendly urban farming. Together, the combined efforts of government and NGOs significantly enhance the viability and impact of urban farming initiatives. Their support contributes to building more resilient and selfsufficient urban communities, ensuring that urban farming can effectively address food security and sustainability challenges in cities.

5. Limitations of the Study

The study was limited to only one city of Uganda yet there are other cities. The study applied cross sectional research design which had its limitations also. It lacked temporal information. Cross sectional studies provided a snap short in time and could not track changes over time. This limited the ability to assess trends or the impact of interventions. There were difficulties in generalizing findings due to limited cross sectional study. They were also susceptible to biases such as recall bias where participants could not accurately remember past exposures or events; selection bias whereby the sample selected was not enough representative of the population of interest; and the response bias whereby the participants could not provide accurate or socially desirable answers to survey questions.

6. CONCLUSION

Conclusions on Key Constraints to Achieving Sustainable Livelihoods in Mbarara City include the following as highlighted by the investigator. The study aimed to identify the primary constraints faced by urban households and individuals in achieving sustainable livelihoods in Mbarara City. The findings reveal a complex interplay of economic, financial, social, environmental, and institutional constraints that collectively hinder residents; ability to sustain their livelihoods. The following conclusions are drawn from the data:

Economic Constraints. Urban residents in Mbarara face significant economic challenges due to the high cost of essential services such as water, electricity, transportation, food, and housing. These costs necessitate careful financial planning, which can be difficult without a stable income.

A large portion of the city's population relies on informal employment, which often results in inconsistent and unpredictable income. This lack of financial stability complicates effective planning for family needs and investment in areas such as education, health, and business.

Financial Constraints. Many residents struggle with financial constraints due to difficulties in accessing adequate funding. The informal sector's reliance on unpredictable incomes makes it challenging to secure loans from commercial banks, which often require collateral and impose high interest rates. High-interest rates and stringent collateral requirements can lead to situations where individuals are forced to sell property or assets to repay loans. This financial strain can result in significant personal and familial hardships, as exemplified by the experiences shared by study participants.

Social Constraints. Urban residents often experience limited social support and weak community networks. This lack of social cohesion can hinder access to essential resources and services, exacerbating difficulties in maintaining a stable livelihood. The high cost of living exacerbates social inequalities, making it harder for some residents to afford basic necessities and

achieve a stable livelihood. Limited social networks further restrict access to opportunities and support.

Environmental Constraints. Environmental challenges such as poor air quality, inadequate waste management, and limited green spaces significantly impact urban resident's quality of life. Pollution affects health and productivity, while insufficient green spaces and infrastructure degradation, including the loss of green spaces and inadequate waste management systems, contribute to decreased agricultural productivity and overall lower quality of life.

Institutional Constraints. Inefficiencies in urban governance and regulatory frameworks limit support for informal sector workers and undermine economic opportunities. Inadequate policies and support structures further exacerbate the challenges faced by urban dwellers. In addition, the absence of effective policies for informal sector workers and insufficient infrastructure for urban planning and development hinder efforts to achieve sustainable livelihoods.

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Ethical Approval and Consent

The research study was approved by Bishop Stuart University Research Ethics Committee (BSU-REC 2023-79). The study was also cleared and registered by National Council for Science and Technology-NS641ES, a national body mandated by the Ugandan Government to approve any research study. The field data collection letter was recommended by the Deputy City Clerk of Mbarara City.

Authors Contributions

All authors contributed from the beginning up the end, that is at conceptualization of the study topic, problem formulation, methodology, analysis, findings, interpretation, discussion and conclusions. They have participated in drafting and reviewing this work and take responsibility of whatever is published in the journal.

Competing Interests

All authors declare that they have no any conflicting interests of any form.

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