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The role and potential of urban agriculture: Exploratory research

This project seeks to understand the challenges and opportunities of urban agriculture in and around Ethiopian cities, using Addis Ababa as an example.

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The Role and Potential of Urban Agriculture: Exploratory Research

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Brief Summary

Urban agricalture practices (UAP) plays a significant role in diversifying urban diets, expaning job opportunities, landscape management and improving urban ecosystem services . With the exception of some conflicting anecdotal literature as well as micro-level case-studies of small sub-samples, there is little to no quantitative research documenting the extent and contribution of urban agriculture in Ethiopia. Descriptive, let alone causal, research on the subject are scanty. The major objective of this study is to improve our knowledge on the role and potential of urban agriculture in and around Ethiopian cities, by taking Addis Ababa as an experiment. We collected and examine a number of existing secondary data as well as primary sources and conducted key informant interviews (KIIs) with purposefully selected key informants. Because this is an exploratory study, as there is no available data and a thorough study on urban agriculture, we analyse the data using descriptive statistics and present it in the form of tables and graphs.

The findings show that there are many stakeholders in urban agriculture practices in Addis Ababa and their respective roles also vary depending on their stake. Poor coordination and interaction among the stakeholders is observed. Similarly, there are different practitioners of urban agriculture in the City and they are categorized as farmers, enterprises/cooperatives, households and institutional practitioners. Depending on the practitioners, the nature of urban agricultural activities performed varies between vegetable, dairy and poultry production. The results further indicate the role of UA in the city by highlighting its contribution to food security, employment opportunities and environmental management which includes issues such as urban greenery, contribution to urban aesthetics, and proper waster utilization. Despite the contributions and its immense potential, urban agriculture in Addis Ababa, like most cities in developing countries, still faces many challenges including competitive demand for land, lack of water and water pollution, warehouse and limited market linkage, mismanagement of solid and liquid wastes, and poor coordination among stakeholders. Though the number and type of challenges are diverse, the study highlighted the recent better recognition and institutional structure, the presence of complementary initiatives, high demand for practicing urban agriculture, and demand for urban agriculture products can be considered as potential opportunities. Finally, the study suggests a rigorous and more focused analysis on the impacts of urban agriculture is pertinent in light of the debate over whether urban agriculture could be considered as a long-term sustainable approach or a transitory strategy.

1. Introduction

Urban agriculture is defined as the production of food within urban areas (FAO, 2018a) and is increasingly recognized for its multiple social and ecological benefits by city governments around the world (FAO, 2020a; Morgan, 2014; Skar et al., 2020). It is an important green infrastructure that has been embedded into the urban and suburban fabric for many years. Integration of urban agriculture in proximity to residential locations and within built environments can provide multiple benefits (Ghosh, 2023). Multifunctionality of urban agriculture can make cities more sustianable, enable cities to mitigate urban challenges, and enahnce urban food security (Wadumestrige Dona et al., 2021). Urban agriculture could help the resilience of cities to a wide ragnge of pressure and shocks by improving food security and public health, creating urban green spaces, building social capital, and promoting circular economies (Gulyas & Edmondson, 2021). However, comprehensive assessments of its potential are still lacking and influenced by urban policies and plans due to competing demand for land and water resources. Municipal governments across developing countries have increasingly focused on the potential of urban or peri-urban agriculture (UPA) as a means to ensure food security and livelihoods, including through the United Nations New Urban Agenda (2016) and initiatives by the Food and Agriculture Organization (FAO) (FAO, 2020b, 2022). Urban economists typically think of agriculture as an inefficient use of urban land, with the theoretical literature instead emphasizing agricultural mechanization, as well as improving rural-urban linkages through reducing the cost of transit. In addition, urban and peri-urban agricultural landscapes around the world are undergoing rapid transformation due to urban expansion and population growth (La Rosa et al., 2014).

In 2014, people residing in urban areas have reached 53 percent and expected to grow further to 66 percent by 2050 (UNDESA, 2015). Urbanization rate is higher in developing countries, including those in Africa despite their low level of urban population. Africa is urbanizing faster and will become 56 percent urban by the year 2050 compared to its 40 percent in 2014. The urban population growth in Africa will demand more access to dairy and meat products, as well as to cereals, vegetables, and fruits than the previous generation did, which resided largely in rural areas. As a result, feeding Africa's cities, and providing access to good quality food, presents a major challenge. However, urban agriculture has been an important economic activity in many African cities for many decades, recently the practice has expanded in many cities, especially in developing countries (Hampwaye, 2013). For example, about 30percent of households in Nairobi benefits from urban and peri-urban agriculture products; in Kampala during COVID lockdown 65percent of vegetable supplied from urban agriculture practices; and in Dar-es-Salaam, urban agriculture compromise at least 60percent of the informal economic sector and the second largest urban employer (Ruhweza, 2020). In Addis Ababa, it contributed close to 1.3percent of the total GDP of the city (Yalew, 2020). Therefore, a systematic review and synthesis of the results are important to reveal the knowledge gaps related to institutional and policy support as well as to understand the potential of urban agriculture in developing cities.

Urban agricalture practices plays a significant role in diversifying urban diets, expaning job opportunities, landscape management and improving urban ecosystem services (Poulsen et al., 2015). It also plays an important role in the furture of the global food systems (Jagganath, 2021); in creating employment opportunity (Geleta et al., 2015). In light of increased food insecurity following COVID, the oil crisis, high inflation, and the Ukraine-Russia conflict, many governments are considering promoting urban agriculture as a second-best, fast and temporary solution that function alongside

different policies. The government of Ethiopia has also demonstrated immense interest in promoting urban agriculture, evidenced through the formation of the Farmers and Urban Agriculture Commission under the Addis Ababa City Administration and the country's Prime Minister has also emphasized the importance of promoting urban agriculture in the contemporary context. Urban agriculture contributes to the economy importantly to the urban food system, especially for the livelihoods of the urban poor though it faces several challenges from urban encroachment, environmental pollution and flooding, as well as with limited policy enforcement mechanisms to ensure its sustainability (Mulugeta, 2013; UNEP, 2014). In addition, many of the farmers in and around the city depend on the use of wastewater for irrigation; this demands policies and strategies to ensure farmers apply safe production without negative externalities both for the health of consumers and the environment (Weldesilassie et al., 2009).

With the exception of some conflicting anecdotal literature as well as micro-level case-studies of small sub-samples, there is little to no quantitative research documenting the extent and contribution of urban agriculture in Ethiopia (Yalew, 2020). Descriptive, let alone causal, research on the subject are scanty. A primary purpose of this research was to improve our knowledge on the role and potential of urban agriculture in and around Ethiopian cities, by taking Addis Ababa as an example. It aimed at investigating the stakeholders in urban agricultre and the respective roles; nature and practice of urban agriculture among its practitioners; the role of urban agriculture in terms of food security, job creation and enviornmental management; and challenges and opportunities for promoting and practicing urban agriculture. The information and the findings of the study are also used to develop a bigger research proposal that aims to delve deeper into the impacts of urban agriculture. Such investigation is critical in light of the debate over whether urban agriculture is a long-term sustainable strategy or a transitory approach. The detail investiation also attemps to explore approaches, if any, that can make urban agriculture sustainable in the long-term.

2. The Experience of other Countries in Urban Agriculture

2.1. Urban Agriculture in Cuba

Urban agriculture in Cuba emerged as a pivotal response to food security challenges during the sever crisis of 1989 when the country faced serious food shortages due to US-imposed trade embargoes and the collapse of the Soviet Union (Rosset, M. Bourque, 1999). The Cuban government, in recognition of the value of urban agricultural initiatives, has actively promoted and facilitated these efforts (FAO, 2014). Several key measures have been instrumental in fostering the growth of urban agriculture in the country.

Firstly, the government introduced measures to grant easier access to land for urban farmers. The land reform of 2008 was a milestone, enabling individuals and cooperatives to lease idle state land for a period of up to 25 years. This reform was further strengthened by the revised Law Decree 300 in 2012, which expanded the rights of lessees to include construction and cultivation of various types of land (Leitgeb et al., 2016). Secondly, the government has provided crucial support through training and subsidies (M González Novo et al, 2008). Thirdly, furthermore, the inclusion of urban agriculture as a policy priority in Cuba's five-year plans, released in 2011 and 2016, underscored the government's commitment to advancing this vital sector (Fernandez, 2017).

The impact of urban agriculture on the socio-economic landscape of Cuba has been significant. Over 50percent of the fresh produce consumed in the country's cities is now locally produced, surpassing a remarkable one million tons in 2014. The urban agriculture movement has generated more than 300,000 jobs and has provided training in agro-ecological techniques to tens of thousands of farmers, technicians, and government officials through a variety of formal and informal programs and exchanges. Additionally, the use of locally-produced items has helped avoid $50 million worth of imported inputs annually (Fernandez, 2017).

2.2. Urban Agriculture in Singapore

The emphasis on vertical farming has increased in Singapore, especially after the outbreak of COVID-19. Prior to the pandemic, Singapore relied on imports for around 90 percent of its food, which posed a significant crisis during COVID-19. In March 2019, the Environment and Water Resources Minister announced the ambitious "30x30" goal, aiming to locally produce 30 percent of Singapore's nutritional needs by 2030 (Wood et al., 2020). This goal involves investing in local urban farms to increase their production capabilities (Nicholas et al., 2023).

The implementation of these plans requires harmonious collaboration between the private and public sectors. To this end, the government has allocated SGD $144 million for its Research, Innovation, and Enterprise 2020 plan to intensify research and development in the agri-food industry. Moreover, as of December 31, 2021, over $50 million has been committed to supporting 132 companies, demonstrating a dedicated investment in the sector. These substantial investments have resulted in significant growth in vertical and rooftop farming (Wood et al., 2020). Successful operations like Oh Chin Huat and Sky Greens have enabled Singapore to produce 13 percent of locally consumed leafy greens from 2020 to 2021, reaching a total value of $185.2 million in 2021 (Singapore Food Agency, 2021).

Currently, there are approximately 260 licensed firms in Singapore, with the local agri-food sector predominantly comprising hen, shell eggs, vegetables, and seafood farms. Notably, the sector accounts for 30.5percent (643.4 million eggs), 4.3percent (23.5 thousand tons) of vegetables, and 0.8percent (4.9 thousand tons) of fish (Singapore Food Agency, 2021).

Regarding land allocation for urban agriculture, the draft master plan proposed in 2019 outlined the allocation of approximately 0.78percent (784.7 square kilometers) of urban land for agricultural purpose. Urban agricultural land has been incorporated in the city's 2008, 2014, and draft 2019 master plans (Diehl et al., 2020).

2.3. Kampala's Experience in Urban Agriculture

In Kampala, urban agriculture has a long history. The vibrant urban and peri-urban agriculture sector in Kampala dates back to the Idi Amin regime (1971-1979) when the formal economy was severely damaged. In Kampala, the most commonly grown plants include cassava, cereals, vegetables, spices, cocoyam, sugarcane, mushrooms, and fruits (Development Consultants International Ltd, 1997). In 2023, about 50 percent of the city's food originated from within a 120 km proximity to Kampala, including 10% from within the city itself (Hemerijckx et al., 2023).

The government of Kampala has incorporated the significance of urban agriculture by implementing several supportive measures. For instance, it institutionalized urban agriculture to support livelihood activities, introduced ordinances for safety and sanitation (KUFSALCC and Urban Harvest, 2005), established a licensing and regulatory system, and recognized the pivotal role of urban agriculture for food security in the Draft National Urban Policy of 2013 (Gore, 2018). This comprehensive support extends to the provision of extension services to urban farmers through the agriculture department under the Kampala City Council (Lee-Smith, 2013).

2.4. Urban Agriculture in Tanzania

In Tanzania, the government has issued policy statements since the 1970s that support urban agriculture. These policy statements aimed to encourage Tanzanians to achieve food self-sufficiency, particularly during challenging economic times (Mlozi, 2003). The Ministry of Agriculture and Food Security offered informal extension services to urban farmers, and in the 1970s, an urban agriculture extension service was established. During the 1980s, municipal bylaws were reviewed to address negative impacts on waste disposal. The bylaws defined where urban farming could or could not be practiced and set punishments for non-compliance, including fines, imprisonment, and destruction of crops. In 2000, the Ministry of Lands and Human Settlement incorporated urban agriculture as a land use that required zoning, making urban agriculture legal in the country (McLees, 2011).

Urban farming is practiced in open spaces and marginal locations, such as along valleys with easy access to water and along the roadsides which, in the absence of road expansion, are considered no man's land (Mwajombe & Mlozi, 2015). This practice makes farmers vulnerable as they can be deserted at anytime, regardless of the stage of farming. As a result, they end up farming in a small scale (Katera, 2021).

2.5. Nairobi's Experience in Urban Agriculture

In 2015, the Nairobi City County government developed and implemented the Urban Agriculture Promotion and Regulation Act, acknowledging the potential of urban agriculture for food and nutrition security. The Act provides regulation on land and water access, food safety, environment conservation and organic waste management; and includes standards for urban agriculture (FAO, 2018b). This Act mandates various activities including promoting best practices and regulations, ensuring inclusive planning processes, providing training and capacity-building programs, and fostering collaboration among key stakeholders (Nairobi City County, 2015). The City has also a Food Systems Directorate within its Food and Agriculture Sector. Using a systems approach to urban agriculture, rather than acting as disjointed independent sectors, has created effective synergies among key stakeholders in the sector. Producers coordinate with processors who then give their produce to distributors for sale, while waste managers recycle the waste which is used as inputs by producers. Nairobi has also an agricultural extension officer in every sub-county that are available for phone consultations and regularly visit farmers on the farm for guidance on technical issues (Ikua, 2020).

The importance of urban agriculture in Nairobi is demonstrated by the significant number of residents relying on urban farming for a regular supply of food – from keeping dairy goats in the backyard and producing vegetables in public spaces to rearing chickens along a shared corridor between informal settlements, all contributing food to the Nairobi's food basket. In the city, about 200,000 households were engaged in farming for various reasons (Ikua, 2020; Mwaura et al., 2021). Although, various types

of urban agricultural practices have been implemented, cattle rearing, chicken rearing, and mushroom production, are the top three most profitable practices (Kurgat et al., 2018).

3. Methodology

3.1. Description of the study Area

Addis Ababa is located at the geographical centre and in the central highlands of Ethiopia (Figure 1) between 8,048' and 906' North latitudes and 38,038' and 38,054' East longitudes. The current land area is 527 square kilometres (City Government of Addis Ababa, 2024; Davis, 2020; Worku, 2022). Addis Ababa with a current population of about 5.7 million (Mayor Office of Addis Ababa, 2024) is the largest city in the country both in size and population. It is the political and economic capital of the country while it is also considered as the political capital and diplomatic hub of the African continent (Gezahegn et al., 2017; Urban Age, 2021). The city is organised into 11 sub-city administrations responsible for planning, implementation and budget allocation for socio-economic development and municipal services provision. The third-tier administration is the district administration, responsible for public mobilisation and executing delegated municipal functions.

The altitude of the city ranges from the highest peak at Mount Entoto, which is 3,100 metres above sea level (m.a.s.l) to 2,200 m.a.s.l at the lower part of the Akaki plain. Elevation and slope generally decrease from north to south (Worku, 2022). Addis Ababa lies along the upper part of the Awash Basin. The City is endowed with three major rivers, Kebena, Little Akaki and Big Akaki, rivers as well as numerous streams, which originate in the north, northwest and north-eastern parts of Addis Ababa, flow towards the south, and drain to the Awash River. However, the City's river's and river beds highly polluted and underutilized as a result (Urban Age, 2021; Worku, 2022).

The city has been characterised by fast economic growth, in recent years, particularly with regard to growth in the industrial sector (about 20percent per annum on average) (Worku, 2022). This obviously created huge demand and stress on the natural resources including water and is prone to climate change impacts requiring proper planning and implementation on these issues. However, most of Addis Ababa's development challenges can be attributed to its unplanned growth, infeasible development strategies, lack of implementation capacity, and widespread poverty that has resulted in chronic problems in almost every aspect of the urban life (Gezahegn et al., 2017; Weldeghebrael, 2021).

Addis Ababa is located in a unique natural environment, embedded in grasslands and urban forests with rivers and creeks. Urban green spaces in the City include public and private green areas or belts which include urban forest, urban agriculture, gardens, squares, roadside and road median tree plantation, trees and gardens within individual households, shade trees, windbreaks and shelterbelts, churchyards and buffer zones (to provide separation between conflicting land uses or to protect vulnerable areas), natural reserves (protected areas), etc. Yet, the city suffers from a deficit of open green spaces (Urban Age, 2021; Worku, 2022). Addis Ababa has one square meter of open space per person which is well below the World Health Organization's standard of nine square metres per person (Urban Age, 2021). While urban agriculture is a common practice in many parts of the city, it has not been formally incorporated into urban development strategy (Urban Age, 2021; Worku, 2022).

Addis Ababa gets most of its water supply from reservoirs that are located some 20 km northwest and 10 km northeast of the city and from groundwater around the southern part of the city boundary.

Significant urban growth has driven land-use change, accelerating water demand and causing unprecedented water shortages over the last two decades. Rapid land cover changes in the Akaki Watershed have seen forested areas reduced by half since 1985. The Akaki is now covered primarily by cultivated land and built-up areas, and much of the watershed is degraded due to unsound land-use practices (Alemu & Dioha, 2020; Battistelli et al., 2022; Pegasys, 2021). Addis Ababa needs to manage the problems of green area, water resource depletion, water pollution, and flooding associated with growing population, urbanization, industrialization, and development.

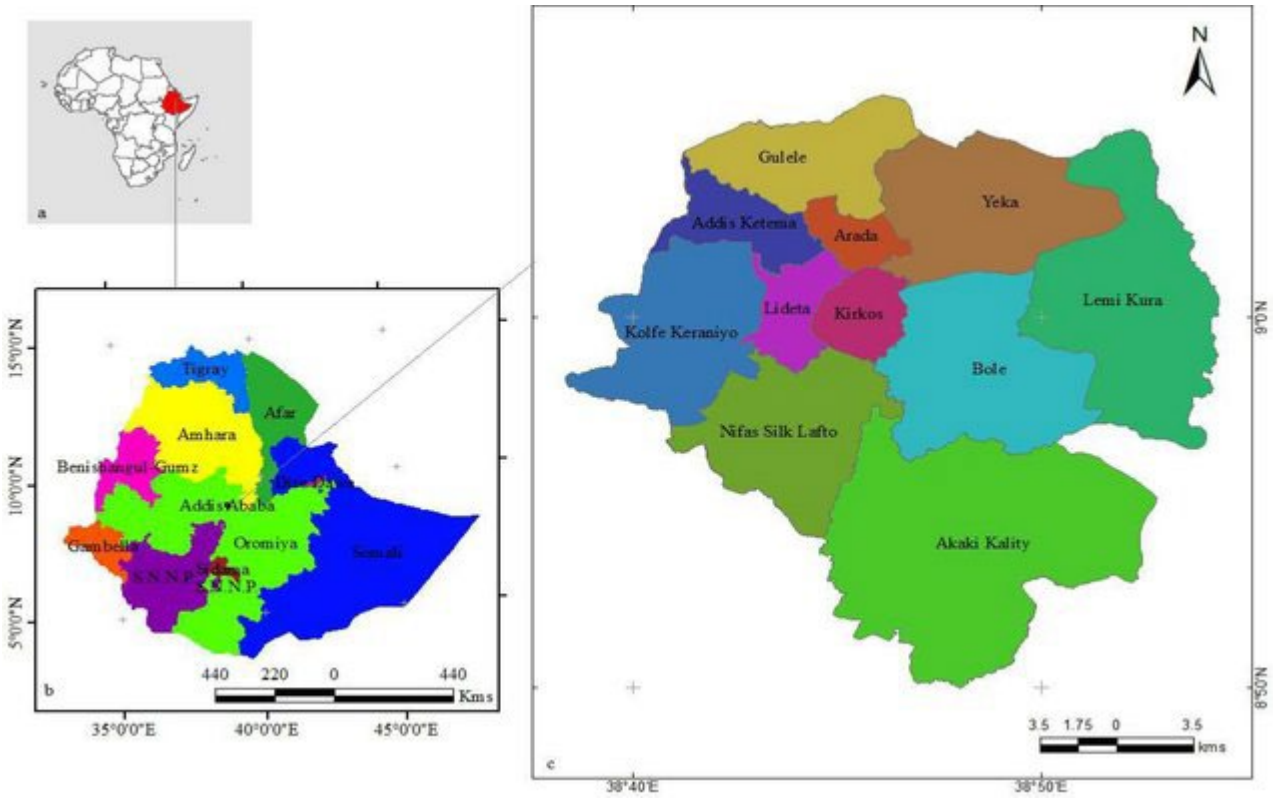

Figure 1: Map of Addis Ababa and its Sub-Cities

Source: (Ayele et al., 2022)

3.2. Data

The study consulted both primary and secondary sources of data to solicit the relevant information in addressing the objectives posed. A number of key informant interviews were conducted with experts working at the key stakeholder institutions related to urban agriculture. Specifically interviews with experts at Addis Ababa City Farmers and Urban Agriculture Development Commission (FUADC), Ministry of Agriculture, Ministry of Water and Energy, Addis Ababa Urban Agriculture Enterprise Office, USAID, Dejazmach Wendirad School, and other stakeholders (see appendix 1 for the full list). Key informant interview guide was developed and used in order to interview the experts in the respective institutions. Field visits to urban agricultural sites were also conducted to learn the practice as well as interact with practitioners of urban agriculture. Field visits to urban agriculture demonstration sites, Dejazmach Wendirad School, and Addis Ababa City Environmental Protection Authority were conducted.

The secondary sources are mainly published and unpublished documents on urban agriculture and related issues in the city and elsewhere. Some of the offices also shared their periodical reports especially on issues related to role of urban agriculture in the city. Specifically, reports on cereal, oil seeds, pulses, and vegetable production as well as production data on poultry, meat, milk and honey were obtained from FUADC. The urban employment and unemployment surveys covering different periods were also utilized to analyze the role of urban agriculture on creating employment opportunities. Project documents on urban agricultural activities of development partners such as USAID and Farm African are also consulted to solicit information on their involvement on urban agriculture in the city.

3.3. Method of Data Analysis

As this study is an exploratory one, the methods of analysis employed are descriptive. Even if much information and data is collected during the data collection process, only data relevant for the objectives of the study are used. For the quantitative data, descriptive statistics are computed and presented in the form of tables, figures and graphs. While for reports and published documents, content analysis was mainly conducted to analyze the text in the context of this study.

4. Results and Discussion

4.1. Introduction

This section discusses the findings of the study based on the information generated using the approaches in section 3 as well as the literature review. It has different sub-sections owing to the objectives of the study as well as the information gathered for the same purpose. It first presents the stakeholders in urban agriculture in Addis Ababa and their respective roles followed by a discussion on the nature of activities performed by practitioners of urban agriculture. It then discusses the role of UA in the city by highlighting its contribution to food security, employment opportunities as well as it contribution to environmental management which includes issues such as urban greenery, contribution to urban aesthetics, and proper waster utilization.

4.2. Stakeholders in Urban Agriculture

Stakeholders are defined as the people and organizations who are involved in or affected by an action or policy and can be directly or indirectly included in the decision making process (Freeman, 2010; Hesselink et al., 2007; Sterling et al., 2017). By its nature urban agriculture involves many stakeholders and this is also the case in Addis Ababa. Understanding and engaging stakeholders can bring many benefits to urban agriculture in the city. They can get involved in the decision-making process and influence the actions in a way that is helpful to the different actors. Fostering good relationships among the stakeholders is necessary and engaging with influential groups increases the chances of success. The involvement of different stakeholders is essential as it captures different views while at the same time promoting inclusive process which is important for pragmatic and democratic reasons (Sterling et al., 2017; Vogler D, Macey S, 2017).

Farmers and Urban Agriculture Development Commission (FUADC): Several actors have a stake in urban agriculture in the City even if the primary responsibility rests on Farmer and Urban Agriculture Commission of the City Administration. The City administration has established the FUADC which exclusively promotes urban farming and supports displaced farmers to successfully resettle and

rehabilitate. The Commission also promotes urban agriculture as a strategy to boost urban food security and nutrition in Addis Ababa and it supports such as trainings and resources including land, agricultural inputs, and financial support. The FUADC has established its structure upto *Woreda* level. The major roles and activities performed by the Commission include:

- Distribute input such as fertilizer, seedlings, water pumps, and chicken;
- Offer technical support at the grassroots level, understanding the strengths and weaknesses of urban agriculture practitioners;
- Provide technical support for small-scale farmers and organized micro-enterprises on how to handle pests using biological methods;
- Conduct training sessions for urban agriculture participants;
- Facilitate experience sharing among practitioners;
- Identify suitable lands for irrigation and provide pumps to UA participants;
- Reduce water scarcity issues by supplying urban agriculture participants with water tankers;
- Provide animal healthcare services for the livestock and there are two veterinarians per Sub-city; and
- Monitor the accomplishment of sub-city and *woreda* level experts on weekly basis.

Furthermore, the City government intends to expand urban agriculture by allocating most of the vacant land for this purpose and the long-term goal is to cover at least 25 percent of the food demand by the residents of the city. The City administration, besides to encouraging every household to produce food on their available small land or even of rooftops, plans to transition people who currently rely on urban productive safety net program in the city to urban farming practices (Tura, 2020). The Commission believes urban farming creates more job opportunities, generate incomes, enhance food and nutrition security, and green the city.

Ministry of Agriculture (MoA): Prior 2011, urban agriculture was under the Ministry of Urban Development and Construction and its major emphasis has been on animal husbandry. However, in 2011, the mandate has shifted to the MoA and the Ministry has established Urban Agriculture Desk in 2014 under the Urban and Commercial Agriculture Investment Support Executive. The Desk has three focus areas and hence experts in crop and horticulture, livestock, and natural resources management. The major tasks of the Ministry with regard to urban agriculture include:

i. Formulate policies, strategies, and implementation manuals, in collaboration with the concerned organs, in order to make urban farming effective and establish implementation mechanisms;
ii. Monitoring the implementation of policy documents and urban agriculture practices; and
iii. Providing technical and material support to urban agriculture practitioners' especially vertical farming.

The Ministry plans to intensify the urban agriculture at the national level by providing necessary technical and financial support to those who will engage in the sector to improve household food security and sustain livelihoods of many urban residents. This is so in light of the limited progress in the productivity of rural farming which often fails to meet the urban food demand. The Ministry also encourages urban residents to produce food not only on any plot of land available at their backyard but also on buildings (Tura, 2020). The Ministry has also developed a document that details the system

of urban agriculture extension services provision and a discussion on the same has been held in the presence of different stakeholders (FBC, 2022).

Addis Ababa Micro and Small Enterprises Development Bureau (AAMSEDB): The main role of the Bureau is to support unemployed youth, women, and individuals with disabilities and organized them as enterprises. The Bureau has an urban agriculture Desk and its primary responsibilities are overseeing the implementation of urban agriculture on the ground, providing trainings for sub-city experts and enterprises, monitoring outcomes of the urban agriculture, offering various supports as well as proving on the job trainings. The Bureau also provides technical advice for urban agriculture enterprises and when possible it connects them with financial institutions. In additions, the Bureau has developed different regulations – on accessing market, MSE working promises and sales display centres administration - and procedures to create conducive environment for SME including enterprises involved in urban agriculture practices. The bureau provides services such as local market assessment and direct market linkages as well as organizing trade fairs and exhibitions (Debela, 2011).

Ministry of Water and Energy: In the context of urban agriculture, the Ministry's efforts are directed towards changing urban decomposed wastes into organic fertilizer. The compost preparation is done by unemployed organized youths and the City's Micro and Small Enterprise Office is in charge of organizing the youth. These activities have created employment opportunities as well as contributed to lesser pollution of rivers in the City. The Ministry has also demonstration sites in Jimma and Assela while it also conducts research on heavy metal content of urban agriculture products, mainly vegetables.

Addis Ababa Urban Agriculture Demonstration and Input Multiplication Centres (UADIMC): The centres demonstrating integrated urban agriculture components and practices in confined areas through demo plots is an effective way to showcase the different components and improved practices to groups interested in replicating the approach. The demonstration and input multiplication sites have become a learning centre vital for facilitating the development of urban agriculture in the city (Farm Africa, 2022). The main duties and accomplishment of the UADIMC include:

i. Maintaining demonstration sites where various urban agriculture practices are showcased to provide practical knowledge and guidance for urban agriculture practitioners and other interested stakeholders;
ii. Multiplication of seedlings; both fruit, trees and vegetables;
iii. Providing training programs for experts at the sub-city and *Woreda* levels;
iv. Seedling quality control activities – before distributing the seedlings, quality control measures are taken.
v. Offer seedlings at reasonable prices, and when necessary provide the seedlings for free - vegetable seedling are sold for 50 cents each and includes tomatoes, chillies, onions, garlic, and cucumbers among others. Annually, the Centres distribute approximately 2 million vegetable seedlings and 65 thousand fruit seedlings. It also distributes seedlings of animal fodder such as elephant grass, triticale, and alfalfa. The seedlings are sold at a price of 10 cents per seedling for individuals interested in planting animal feed crops.
vi. Warehouse services for animal feeds – when necessary and applicable, the warehouses are built in collaboration with private investors and the Centres offer high quality animal feeds at a fair price.

The number of stakeholders involved is many and it is not practical to list all and discuss their roles. Table 1 provides the list of the stakeholders and the respective brief roles.

Table 1: Stakeholders in urban agriculture and respective roles

Name of the organization	Role related to urban agriculture
Farmers and Urban Agriculture Development Commission	• Distribute inputs • Offer technical support and training • Monitor the accomplishment of sub-city and *woreda* experts on weekly basis
Ministry of Agriculture – Urban Agriculture Desk	• Draw strategy, and follow the implementation of the strategy. • Support urban agriculture practices
Ministry of Water and Energy	• Produced organic fertiliser from decomposed waste • Control the water pollution
Addis Ababa Environmental Protection Authority	• Monitor the proper implementation of urban agriculture in forests • Monitor soil and water pollution
Addis Ababa Land Development and Administration Bureau	• Provide land for urban agriculture practices
Addis Ababa City Administration Livestock Development and Excellency Center	• Demonstration and research center for livestock and poultry • Organize urban farmers and engage them in livestock production
Addis Ababa Beautification and Green Development Bureau	• Ensure the well-being of forests where urban agriculture practitioners practice urban agriculture in forests • Provide seedlings for urban agriculture practitioners
Ministry of Urban and Infrastructure Development	• Decide on issues of land allocation • Promote urban agriculture as a component of urban safety net
Addis Credit and Savings Institution (ADCSI)	• Provide loan for urban agriculture practitioners
Addis Ababa Education Bureau	• Allow the practice of urban agriculture in schools
Addis Ababa Health Bureau	• Research on health benefits of urban agriculture
Addis Ababa Technical and Vocational Education and Training Agency	• Short-term training on urban agriculture at its own demonstration canter • Offer urban agriculture education • Research on urban agriculture
Addis Ababa Micro and Small Enterprises Development Bureau	• Providing advice and linking with banks • Monitor the status of urban agriculture practitioners • Reconcile conflicts
Addis Ababa Water and Sewerage Services Authority	• Provide water for urban agriculture practices • Provide sludge for compost production

Development partners (NGOs such as Farm Africa and USAID)	• Provide training and capacity building • Design and implement project on urban agriculture

4.3. Activities and Actors in Urban Agriculture

Urban agriculture is diversified by its nature and often can be characterized by different dimensions. A study by Kuhns et al. (2019) identifies relevant dimensions recognizing the diversity of urban agriculture such as market orientation, single or multiple products and services, degree of dedication (involvement), location, technology level, public and private, financing modes, and use of inputs among others. The type of urban agriculture practiced also dictates which indicators may of value when conducting an analysis (Kuhns et al., 2019). Similarly, the actors of urban agriculture and the activities performed by the same are diverse in the Ethiopian context. The practitioners are also drawn from different segments of the society some of them having formal education while others are organized under the urban safety net program often not educated. They can be categorized into four major performers of urban agriculture.

Farm households: These are households that still on farming as their major source of livelihood. Most of the farmers inherited the land from their families. According to the information from the FUADC, there still are thousands of farm households within the City that mainly cultivate cereals during the rainy season and some of them, especially those close to rivers and water sources, cultivate vegetables during the off-season period. The FUADC provides them with different inputs such as fertilizer and improved seed varieties. Some of them also practice animal husbandry and poultry production in their premises. Urban agriculture is a supplemental source of income for the farm households.

Organized groups – Cooperatives/Enterprises: Urban agriculture practitioners organize themselves into cooperatives/enterprises that often include a diverse range of individuals. Some members are farmers whose land was acquired for city development, while others are unemployed youth, women, people with disabilities, and people living with HIV. The cooperatives/enterprises are supported by NGOs and the government, and their land is typically provided by the government while some enterprises may use rented land or houses. Cooperatives/enterprises engaged in animal production utilize government-provided sheds with five years contract period, while those involved in vegetable production work in various locations such as riversides, open spaces, and open spaces in government institutions. According to the Addis Ababa Micro and Small Enterprises Development Bureau, there were about 1670 enterprises in 2021/22 and 1136 in 2022/2023 alone (Appendix 2a and 2b). The city administration supports youth, women and other vulnerable groups' involvement in urban agriculture by providing unused sites for agricultural production. Some urban agriculture participants are also incorporated into safety net programs to support their initiatives. Urban agriculture serves as main source of income for the organized groups. Relatively organized data is available on these actors than the other ones.

Households: These are residents of the city that practice urban agriculture on their backyards or homesteads. Thousands of residents practice vegetables mainly for home consumption but some of them also provide their product to the market. In addition to vegetable production, some of them are involved in dairy and poultry production. Some of the activities of recent initiatives such as '*Yelemat Tirufat*', which is a four year development program which aims to boost productivity and production of dairy, eggs, chicken meat, and honey and related hive products, directly target households (Dessie

et al., 2023). Hence the involvement of households in urban agricultural practices deemed under the program is expected to increase in the coming years. Urban agriculture is a supplemental source of income.

Institutional practitioners: Currently it is common to observe the practice of urban agriculture in the compounds of different governmental institutions including the prime minister's office, schools, hospitals, Ministries, and Authorities. Most of the institutional practitioners are involved in vegetable production and while few of them practice dairy production in addition to the vegetable production. The figure below shows vertical vegetable production in the garden of the Addis Ababa Environmental Protection Agency.

Figure 2: Vegetable production in the compound of the Addis Ababa City Environmental Protection Authority

4.4. The Role of Urban Agriculture

Urban agriculture provides diverse benefits to both the practitioners and users of its products. The role of urban agriculture can be described in different ways. Different scholars describe its role in different ways. Some of the major roles of urban agriculture described in the literature include local food production, biodiversity, compost (waste management), social bonds, local climate regulation, water cycle, and job creation (Battersby & Watson, 2019; Campbell & Rampold, 2021; Delbridge & Ngoga, 2021; Dorr et al., 2021; Farm Africa, 2022; Ilieva et al., 2022; Nero et al., 2019; Orsini et al., 2020; Yalew, 2020). This study focused on its contribution to food security, employment creation, and environmental management.

4.4.1. Food Security

The prevalence of food and nutrition insecurity in urban communities requires multifaceted national and community-level strategies to promote healthy food access and consumption. Urban agriculture is one of the ways to increase access and consumption of healthy foods (Papanek et al., 2023). Urban agriculture participants in the City produce mainly for private consumption and profit (Girma et al., 2019) directly or indirectly contributing to the food security situation of the City. In addition to food

security, urban agriculture improves social equity by improving the health and productivity of poorer populations and providing an opportunity to earn additional income (Gonfa, 2019; Smit & Bailkey, 2006).

According to the information from FUADC, the urban agricultural products in the City include cereals, pulses, oil seeds, vegetables, dairy, meat, and poultry. Table 2 shows the crop and vegetables production in the City. It shows that cereals and oil seeds production increased from 2018 to 2021 while pulses production declined during the same period. The production of each vegetable as well as the total vegetables production increased from 2018 to 2021 with the exception of beans snap, pumpkins, and cauliflower which have registered reduction in production during the same period. A study by Serbessa et al., citing the FUADC (2021), reported that in 2021, there were around 106,280 registered urban vegetable producers in Addis Ababa providing roughly 60percent of the city's vegetable consumption, especially leafy vegetables (Serbessa et al., 2023b). This is indeed a significant contribution to the City's food and nutrition security.

The dairy, poultry, and meat production (in tons) level of urban agriculture in the City is presented in Figure 3. Egg production has increased throughout the reporting period (2019 to 2022) while meat production after slightly declining from 2019 to 2020 shows increasing trend from 2020 to 2022. On the other hand, chicken meat and milk production, after increasing for three consecutive years, declined in 2022. Except honey production, all products have shown significant increment in quantity of production between 2019 and 2022. With the introduction of initiatives such as '*yelemat tirufat*', dairy, poultry, and meat production are expected to increase in the coming few years further enhancing the food security situation of City.

Table 2: Crop and vegetable production in Addis Ababa

Crop Type /vegetable/ Fruits/ Plantation type	Production in Quintals	
	2018	*2021*
Cereals	**81,137**	**142,246**
Pulses	**10,375**	**5,590**
Oil Seeds	**435**	**666**
Vegetable/roots		
Potato	5,702	6,912
Tomato	8,250	10,450
Carrot	7,250	7,250
Onions	4,620	6,532
Garlic	1,275	1,445
Pepper (Green)	938	1,563
Beet root	2,310	2,750
Head Cabbage (ጥቅል ጎመን)	3,928	4,870
Cabbage (የሃበሻ ጎመን)	14,898	15,280
Lettuce	16,634	11,568
Swisschard	14,460	25,875
Onion(Baro)	420	452
beans snap (ፎሶሊያ)	827	496
Pumpkins	3,465	1,250
Cauliflower	906	600
Total vegetables	**85,882**	**97,292**

Source: FUADC (2023)

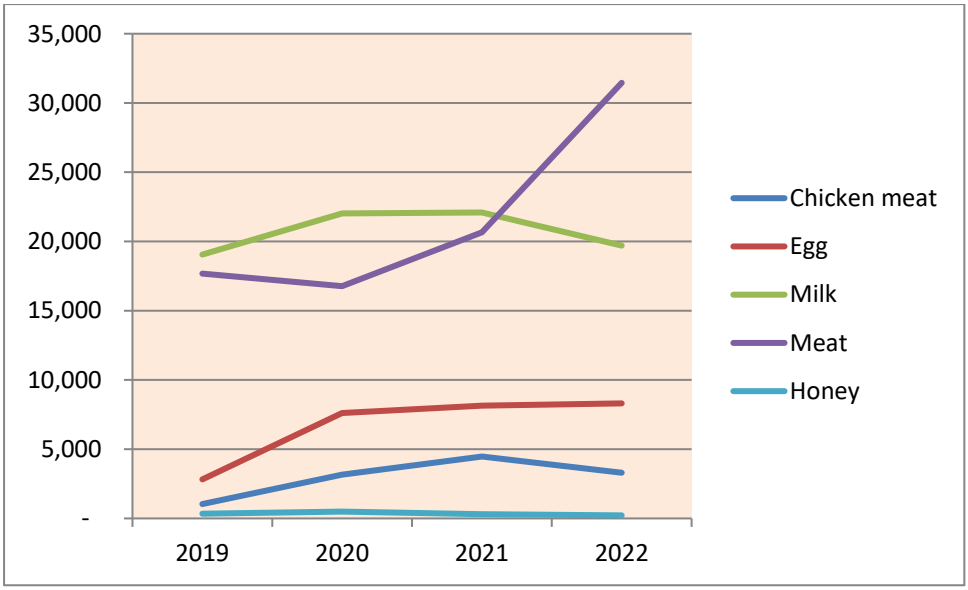

Figure 3: Dairy, poultry and meat production (in tons)

Source: Drawn using the information obtained from the FUADC (2023)

4.4.2. Employment Creation

Ethiopia is one of the countries where its youth population constitutes a significant share from the total population. Approximately 60 percent of the country's population is under the age of 25 implying huge challenge for employment creation (Siraw, 2022). In Addis Ababa about 25 percent of the youth are unemployed (Central Statistical Agency, 2020a). The World Bank Youth Employment in Sub-Saharan Africa report explains that, overall, young women and youth already living in poverty, or those coming from poorer households are at a greater disadvantage in finding employment because they often have fewer connections and networks (Filmer et al., 2014). On the other hand, a youth population, with proper policy and strategy in place, presents an opportunity for accelerated economic growth on a per capital basis (Wilmoth et al., 2022). Some cities opted to urban agriculture as a strategy to address the increasing urban unemployment, poverty and food security. This is because it supports food security and nutrition, provides employment and generates income for the urban poor in general and the disadvantaged groups such as women, the disabled, the elderly and the unemployed youth (Gonfa, 2019). Employment creation has been at the fore front of the justifications for promoting urban agriculture in different parts of the world including in Ethiopia.

The available information regarding the employment contribution is limited and scattered. According to the last five urban employment and unemployment survey reports, the share of urban agriculture at country level declined during the first consecutive surveys (declined from 2014 to 2015 and then to 2016) and then dramatically increased in the last two surveys (2018 and 2020). The increase in the last survey is not only dramatic but also results in the highest share of urban agriculture from all survey period with 14.8 percent contribution to urban employment (Figure 4). In the last survey, the share of the urban agriculture is even higher than the share of the industrial sector (Central Statistical Agency, 2020a).

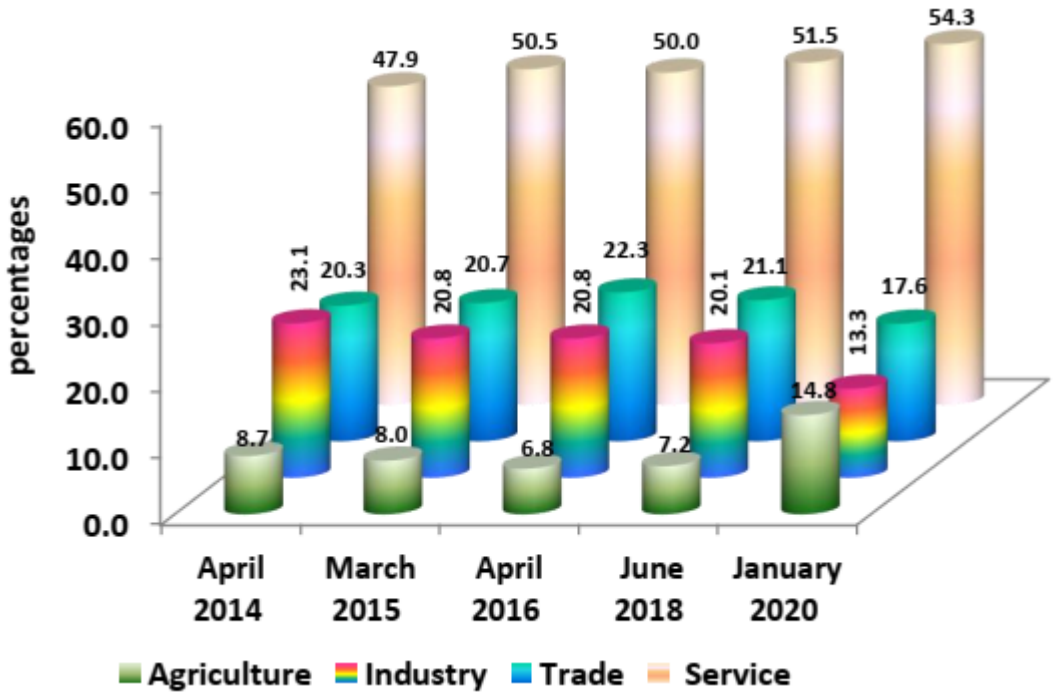

Figure 4: Percentage Share of Employed Population of Urban Areas by Main Economic Sectors during the Five Survey Periods, Country - Urban Total

Source: (Central Statistical Agency, 2020a)

Specifically, the role of urban agriculture in employment creation opportunity in Addis Ababa is shown in Figure 5. To illustrate the pattern of change, urban agriculture employment in the City is compared to the national urban agricultural jobs created as well as total jobs created in Addis Ababa. The percentage share of urban agricultural jobs created in the City both from the total national level agricultural jobs and total job opportunities created in the City have similar pattern with the exception of the period from 2016 to 2020. For the period 2016 to 2020, the share of urban agriculture in total jobs created in the City has increased while its share from the total agricultural jobs has declined. The share of urban agriculture in the city was the highest in 2014 both compared to total agricultural jobs and total jobs in Addis Ababa. The lowest share of urban agricultural jobs in the City is registered in 2020 compared to the total agricultural jobs (1.24 percent) and in 2012 compared to the total jobs created in the City (0.472 percent).

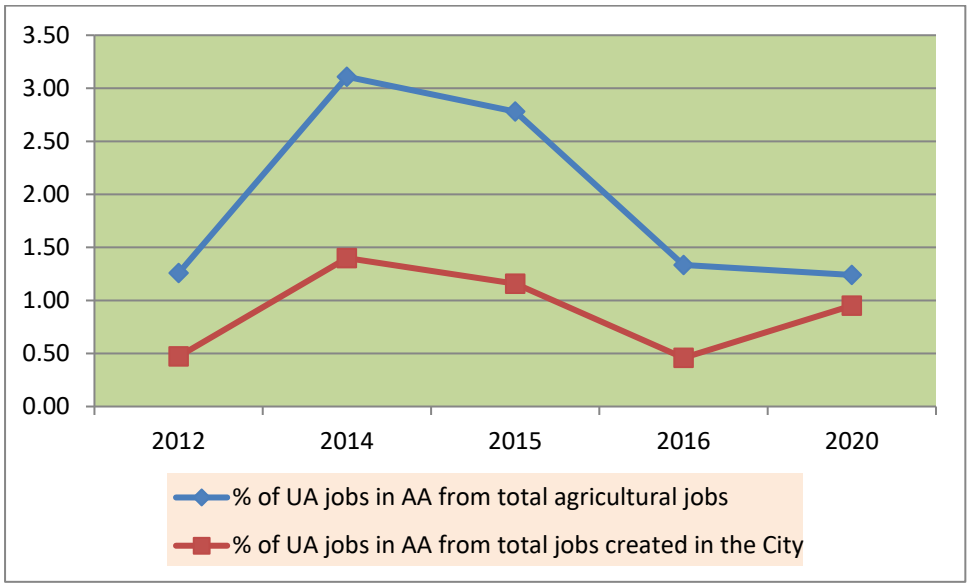

Figure 5: Role of urban agriculture in employment creation (in percent)

Source: Drawn using data extracted from the Urban Employment and Unemployment Survey Report (2012, 2014, 2015, 2016, and 2020)

The share of urban agriculture in employment creation seems lower both in comparison to the national agricultural jobs created as well as compared to the total jobs created in the City. The urban employment and unemployment survey results seem to underestimate the share of the urban agricultural employment. This has partly to do with the way the surveys define the formal/informal employed persons. According to the surveys, persons engaged in subsistence farming and those who work in private households were neither considered as formal or informal activities and were excluded from the analysis (Central Statistical Agency, 2020b). Given the nature of urban agriculture both in the City and elsewhere, this obviously underestimates the share of urban agricultural jobs. Under sub-section 5.3, it has been stated that households that practice urban agriculture in their homesteads or backyards are among the practitioners of urban agriculture in the City. Even if no compiled data about these type practitioners is not readily available, their number is expected to be significant and neglecting them in surveys obviously underestimates the role of urban agriculture in employment creation opportunities.

The information obtained from interviews and the literature reported higher contributions of urban agriculture to employment creation opportunities in the City. Serbessa et al. (2023), citing FUADC reported that there are around 106, 280 registered vegetable producers in Addis Ababa in 2021 providing roughly 60 percent of the city's vegetable consumption (Serbessa et al., 2023a). The crop development unit of the FUADC reported that the unit alone creates job opportunities for more than 22 thousand individuals per annum. The Urban Food Security and Safety Net Department of the Ministry of Urban Development and Construction reported that in the 2022/23 fiscal period alone about 45 thousand participants of the urban safety net program were engaged in urban agricultural practices. Consistent to the recent attention given to urban agriculture, the participants in urban agriculture in the city increased to about 380 thousand in 2021/22 from about 107 thousand in 2021/21. For the 2022/23 fiscal year (appendix 3), the participants in urban agriculture were about 378 thousand (FUADC, 2023). The difference in figures mainly emanates from the definition of terms, the method of counting urban jobs and related issues.

4.4.3. Environmental Management

In an increasingly urban world, urban agriculture is promoted as a lever for sustainable urban development. A sustainable city is a city that enables its citizens to meet their own needs and to enhance their well-being without damaging the natural world or endangering the living conditions of other people, now or in the future. The contribution of urban agriculture to creating sustainable and climate-friendly cities is crucial as it has the potential to integrate other resource streams such as water, urban wastes, energy (Skar et al., 2020; Tapia et al., 2021). Despite such clear potential, in most low-income countries, rapid urbanization and population growth are degrading the environment of not only the cities but also the pri-urban surrounding regions exacerbating soil, air and water pollution, diminishing biodiversity, and increasing vulnerability to disasters such as floods (Gonfa, 2019).

Urban agriculture in Addis Ababa has been contributing to waste management problems by utilizing urban wastes into productive agricultural inputs such as compost; though the scale and its impact is not known. With proper intervention it has a potential to utilize treated wastewater for irrigation purposes. Among the licensed urban agricultural enterprises in the City, 36 enterprises are licensed to prepare and distribute compost for the market (AAMSEDB, 2023). The composting activity not only contributes to waste management but also generates income for the practitioners.

In addition to waste management, urban agriculture follows other environmental and nature friendly practices. Urban agriculture is a component of urban greenery that improves the urban micro-climate, increases biological diversity, and enhances aesthetics and recreational functions of urban areas. All the key informant interviewees iterate the important role of urban agriculture for its nature-based approaches and environmental management as a result. Especially, the expert from the Ministry of Water Energy emphasized the role of their department in helping the organized youth in preparing organic fertilizer (compost) from urban solid wastes. The experience of Farm Africa shows how in just 12 months what had for decades been an urban wasteland was transformed into a beautiful and productive food landscape for low-income households as a result of its urban agriculture interventions (Farm Africa, 2022).

According to the key informants, urban agricultural practices not only creates greenery and urban beauty but also avoids soil sealing; a situation in urban areas where much of the soil is often covered by concrete or asphalt which can prevent water from being absorbed by the soil. In situations of soil

sealing, intense rains may result in flooded cities because the rainwater cannot enter the soil (Orsini & D'ostuni, 2022).

4.5. Challenges and Opportunities of Urban Agriculture

4.5.1. Challenges

Despite the contributions discussed above and its immense potential, urban agriculture in Addis Ababa, similar to most cities in developing countries, still faces many challenges. Though the number and type of challenges listed by the key informant interviewees are many, for the sake of scope and being precise, the most important challenges are presented in this sub-section.

Competitive demand for land: One of the obvious challenges to urban agriculture both in Addis Ababa and elsewhere is there is high competition for land among alternative uses. This fact has been iterated among the key formant interviewees and it has been considered as the most challenging constraint not only for expanding urban agriculture in the city but also for sustaining the present practices. Depending on the priority and focus of the city administration, the land allocated for urban agriculture also varies from time to time and this has been outlined as one of the reasons why most informal urban agriculture practitioners exercise urban agriculture on river sides and garbage disposal sites.

Lack of water and water pollution: Addis Ababa has shortage of water supply and let alone for urban agriculture its residents didn't get uninterrupted year-round water supply for domestic use. Addis Ababa's population has increased by more than 4 percent per year and this rate of growth is expected to continue with a significant gap in supply and demand for water. This discrepancy is in stark contrast with the current water production rates from both surface water and groundwater estimated to be at an annual average of 0.48 Million m^3/day, a coverage of only about 40percent of the daily requirement (Asefa & Moreda, 2023). Given the shortage of water supply and high demand among competitive uses, water efficient urban agricultural practices are paramount.

Lack of warehouses and poor market linkage: Among the challenges identified by urban agriculture practitioners in the city is the lack of warehouse to store their produce. This has subjected them to fetch unfair price for their produce and much of the benefit is reaped by middle men in the value chain. Since some of the products of urban agriculture are perishable nature, the practitioners are forced to sell their products at giveaway price since they don't have access to warehouse facilities and poor market linkages with the final consumers.

Mismanagement of urban solid and liquid wastes: The ever-increasing economic, social and administrative activities in the City generate various types of solid and liquid wastes that need to be properly managed. Addis Ababa generates an estimated 3,200 tonnes of solid waste per day and only 65percent of the solid waste reaches the city's open dump site indicating low level of waste management (Adefris et al., 2023; Desta, 2022). Only 5 percent of the solid waste of the City is recycled and reused while another 5 percent is used for composting (Desta, 2022). About 7 percent of the liquid waste of the city is disposed properly while the remaining disposed inappropriately into rivers and rainwater channels (Ravina et al., 2021). The waste management of the City clearly poses a serious challenge to urban agriculture activities. The poor waste management practice has been also highlighted as a challenge by the key informant interviewees.

Inadequate and inconsistent support from the government and other actors: It has been shown that the role of urban agriculture in total jobs created in Addis Ababa (Figure 5) is characterized by ups and downs on different periods owing to the focus and support provided by the City administration. This has been also emphasized by the key informant interviewees. Another indicator for the different and inconsistent emphasis by the City administration and other actors is that the institutional structure of urban agriculture has been led by different bureaus. Previously it was under the bureau of trade and industry and now it is led by its own commission. The initiatives under urban agriculture are often in the form of campaigns than in the form of well-structured programs and projects which resulted in erratic ups and downs in its role. In addition to the City administration, different development partners also follow a pilot project and short-term based interventions focusing on specific group of the society. Examples in this regard could be the pilot projects by Farm Africa aimed at improving the livelihood of low-income urban households (Farm Africa, 2022), and the United States Agency for International Development (USAID) Urban Gardens Program (UGP) for HIV/AIDS-affected Women and Children (2008-2012) which was designed to improve the nutritional status and general well-being of households affected by or living with HIV/AIDS (USAID, 2012).

Poor coordination and collaboration among different stakeholders: Under sub-section 4.2, it has been discussed that the stakeholders in urban agriculture in the city are many. However, the key informant interviewees emphasized poor coordination and collaboration among the different stakeholders resulting in disintegrated and duplication of efforts. Poor coordination is also one of the factors for lacking and/or delaying the formulation and revision as well as approval of appropriate policies and regulations related to urban agriculture which is vital for the wider applicability of urban agriculture in the City and elsewhere in the country.

Capacity issues and staff turnout: High staff turnout among key sector bureaus has been reported in the key informant interviews. This has resulted in the continuous loss of skilled staffs. Capacity gaps at lower administrative level (district) are also reported requiring continuous capacity building trainings. Given the competitive demand for land and the need for implementing innovative urban agricultural practices in the city, skilled labor that can match the context is an important element for the effective implementation of urban agriculture in Addis Ababa.

4.5.2. Opportunities

Better recognition and institutional structure: Since 2018, the issue of urban agriculture has been given a better emphasis both at the City administration level as well as at the Ministry level. The City administration has re-organized the institutional structure of urban agriculture by establishing a Commission (Farmers and Urban Agriculture Development Commission) in charge of urban agriculture in the City (AMN, 2023). Before establishing the commission, urban agriculture was led under the Bureau of Trade and Industry. Similarly, the Ministry of Agriculture has established Urban and Commercial Agricultural Investment Support Executive which enables the Ministry to address issues related to urban agriculture in the country at large (MoA, 2022). The Ministry also held stakeholder consultation discussion in the presence of different stakeholders including regional actors and the Minister himself (FBC, 2022). The Prime Minister and his Office are also trying to lead by example by exercising urban agriculture in the office compound as well as by visiting and encouraging urban agriculture practitioners. The Mayor of the City also, following the footstep of the Prime Minister, has visited different urban agricultural sites and often provided different supports for the practitioners. By providing media coverage for the visits of the officials (ENA, 2022a, 2023b; Office of the Prime

Minister, 2022), they tried to create a positive attitude among the society in general and the practitioners in particular. Following the footsteps of the Prime Minister and the Mayor different Ministries and City level Bureaus are also practicing urban agriculture in the office compounds. Despite media reports on better outcomes as a result of the better recognition and leading by example approaches, this has to be verified through a rigorous and scientific analysis by an independent researcher.

The presence of complementary initiatives: The presence of initiatives such as "*Yelemat Tirufat*" and "*Migbachin Kedejachin*" which more or less focus on activities that are practiced by urban agriculture practitioners increases the focus and importance given to urban agriculture in the City. The activities under implementation under these initiatives are the production and productivity of dairy, eggs, chicken, fish, honey and related products as well as intensify efforts to achieve food self-sufficiency and ensure nutritional opulence at the family and national levels (Dessie et al., 2023; ENA, 2022b, 2023a). These are the same activities practiced under urban agriculture in the City and elsewhere. The Green Legacy Initiative (GLI) also contributes to the promotion and practice of urban agriculture as fruit seedlings are distributed and planted in the initiative. For the 2024 round of the initiative, the Prime Minister has shared that about half a billion of the seedlings to be planted will be fruit seedlings (Office of the Prime Minister, 2024). There are also attempts to link some of the urban safety net participants to urban agriculture.

High demand for practicing urban agriculture: As per the key informants, there is high demand especially among the youth to engage in urban agriculture in the City. Due to the high demand, it was not possible to meet the demand of the organized groups. Given that urban agriculture is practiced in an area where land is at premium, applying innovative approaches that enable to produce more in less space are paramount (Kioko, 2019; Orsini, 2020; Orsini & D'ostuni, 2022; Oyuela, 2019). Since the youth are better educated and better positioned to learn new approaches and innovations quickly (FAO, 2018c; Kioko, 2019), this could be an asset for the wider and innovative way of applying urban agriculture in the City. However, it is not known whether the high demand for practicing urban agriculture is as a result of its viable return or just lack of options to work in other employment opportunities.

Demand for urban agriculture products: Owing to the imbalance between the demand and supply of agricultural products and the continuously increasing food prices (Mihret, 2022), there is high demand for products of urban agriculture in the city. This information from the key informant interviewees is not surprising, however, given the food and nutrition insecurity in the City.

5. Conclusions and Recommendations

5.1. Conclusions

This study was motivated by the absence of a comprehensive study that documents the roles and potential of urban agriculture in the country in general and Addis Ababa in particular. Hence, its main aim was to increase our knowledge on the broad aspects of urban agriculture in the country by considering Addis Ababa as a case. The information and findings are also used for developing a proposal for detailed investigation on the impacts of urban agriculture.

Urban agriculture aligns with different government initiatives such as the 'Green Legacy Initiative', '*Yelemat Tirufat*', and '*Migibachin Kedejachin*' as there is much overlap between the activities under

these initiatives and urban agriculture practices in the city. Some of the urban safety net participants are organized to practice urban agriculture. These initiatives are believed to enhance the role and importance of urban agriculture in Addis Ababa and beyond. The exact impact and contribution of these initiatives on the importance of urban agriculture in the city and beyond is yet to be investigated and to be seen.

Given the multitude of activities practiced under urban agriculture, different actors have a stake on the issue. However, there is poor coordination and interaction among the different actors and it has affected urban agriculture in many ways. Lack of coordination has resulted in disintegrated and duplication of efforts. Lack of organized data on the different aspects of urban agriculture is observed making it difficult to solicit relevant data from secondary sources. The activities performed by the practitioners of urban agriculture vary depending on the actors – farmers, cooperatives/enterprises, households, and institutions. While urban agriculture is main source of income for cooperatives/enterprises, it is a supplemental activity and hence source of income for the other actors. It is not known, however, how significant these incomes are as a source of livelihood for the practitioners of urban agriculture.

The findings indicate that urban agriculture is contributing to food and nutrition security, price stability, job creation, and environmental management. In addition, high demand among the youth to practice urban agriculture as well as for the products of urban agriculture is reported. The preliminary assessment shows that there is no clear pattern on the contribution of urban agriculture. The food production (cereals and other vegetables) shows that while it dramatically increased for cereals and major vegetables, it has reduced for others between 2018 and 2021. Similar pattern is observed in job creation. While the share of urban agriculture in total jobs created in Addis Ababa has increased in the last urban employment and unemployment survey (2020), it declined for the two surveys preceding the last survey. Owing to the definition of formal and informal employment by the surveys, the surveys seem to underestimate the job creation contribution of urban agriculture. Higher figures are reported by the key informants and the media than these surveys. In light of the conflicting data on the indicators as well as the preliminary nature of the results, a deep dive on these issues is paramount.

Major challenges still remain that deter urban agriculture from revealing its full potential. Competitive demand for land with other sectors is not uncommon in the Addis Ababa and elsewhere. Even if the city has still large vacant land that has not been properly allocated and utilized and the competition is not as such sever compared to other major cities in the high income countries, the competition is expected to grow by the time. Lack of clean and reliable water sources is another challenge and this has forced the practitioners of urban agriculture to utilize unsafe water sources posing questions on the contentious health impacts of such water sources. Inconsistent and inadequate support from different actors, poor market linkage and lack of warehouse storage, capacity issues and high staff turnout are also among the major challenges observed in the city.

5.2. Recommendations

Based on the findings, the following recommendations are forwarded:

- Since urban agriculture is practiced where land is at premium, innovative approaches that could make urban agricultural practices more productive and competitive should be explored

and applied. The high interest among the youth to practice urban agriculture could be vital in this regard as they have the potential to easily learn and adapt new and innovative approaches.

- Stakeholder knowledge sharing and coordination platform should be established to better coordinate urban agricultural initiatives as well as avoid duplication of efforts. Data is also at the heart of good planning and coordination endeavors and hence data repository and sharing mechanism should be established.
- Integrating urban agriculture with urban planning and other new and ongoing initiatives could help to mitigate most of the challenges such as land allocation issues, water availability and pollution, and the contentious health impacts of the urban agricultural products.
- Strengthening urban agricultural institutions by providing continuous on the job training, approving the draft policy documents on urban agriculture, and incentivizing the experts to maintain skilled labor force, creating stable institutional structure could enhance the role and impact of urban agriculture.
- A rigorous and more focused analysis on the impact of urban agriculture is pertinent in light of the debate whether it could be considered as a long-term sustainable and competitive approach or a transitory strategy.

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Appendixes

Appendix 1: List of experts interviewed and their respective institutions

Name	Institution and role
Zelalem Tamrate	Addis Ababa City Farmers and Urban Agriculture Commission, livestock expert and team leader
Aberham	Addis Ababa City Farmers and Urban Agriculture Commission, crop expert and team leader
Wondoson	Ministry of Water and Energy
Shumeta Nigusa	Addis Ababa Micro and Small Enterprise Development Bureau, urban agriculture group leader
Gethun Bezu	Addis Ababa Urban Beautification and Green Development Bureau, greenery areas control expert
Samson	Addis Ababa city Environmental Protection Authority
Abdita Demaia	Urban Agriculture Demonstration and Input Multiplication Centre, Director
Samson Adefrese	Dejazmach Wendirad Secondary School, Director
Kassahun Abate	Ministry of Agriculture, urban agriculture expert
Worknesh Tadesse	Ministry of Agriculture, urban agriculture expert
Anteneh Wondimu	USAID, urban agriculture expert
Tadess Tesfay	Addis Ababa Livestock Development and Excellency Centre
Sentayehu	Sentayehu and Hermo poultry micro-enterprise at Addis Ababa Livestock Development and Excellency Centre
Micheal Tesfaye	Ministry of Agriculture, National CIM coordinator
Rukiya Seid	Ministry of Urban Development and Construction, head of Urban Sanitation and Greenery Management Desk
Muluken Ademasu	Ministry of Urban Development and Construction, Land and Cadastre Executive Leader

Cheru G/Giworgise	Ministry of Urban Development and Construction, head of Urban Food Security and Safety net Department
Abebaw Bizuneh	Ministry of Urban Development and Construction, Urban safety net expert
Hussane Ebriahim	General Winget Poly technical college, Urban Agriculture Lecturer

Appendix 2a: Urban Agriculture Enterprises - 2021/2022

Sub-city	Dairy	Honey	Poultry	Meat	Vegetables	Mushroom	Compost	Seedlings	Total
Adis Ketema	9	11	13	6	10	0	4	14	67
Akaki-Kaliti	26	12	54	47	36	0	9	118	302
Arada	1	2	14	0	3	1	0	9	30
Bole	40	14	21	3	7	0	0	22	107
Gullele	28	22	35	10	27	0	3	11	136
Kirkos	9	1	15	7	16	1	0	94	143
Kolfe	19	15	45	11	34	3	0	8	135
Lideta	11	11	10	0	19	1	1	5	58
Lemi-Kura	16	0	34	36	16	0	0	92	194
Nifas Silk	53	7	68	18	13	0	1	47	207
Yeka	34	60	107	15	11	0	6	58	291
Total	**246**	**155**	**416**	**153**	**192**	**6**	**24**	**478**	**1670**

Source: Addis Ababa Micro and Small Enterprise Development Bureau

Appendix 2b: Urban Agriculture Enterprises - 2022/2023

Sub-city	Dairy	Honey	Poultry	Meat	Small scale livestock production	Vegetables	Mushroom	Compost	Seedlings	Total
Adis Ketema	6	7	8	5	2	3	0	2	7	**40**
Akaki-Kaliti	30	5	32	15	0	31	0	3	51	**167**
Arada	1	1	12	0	0	5	0	0	7	**26**
Bole	31	2	13	3	0	3	0	0	18	**70**
Gullele	32	20	30	5	0	29	0	2	8	**126**
Kirkos	9	1	14	5	0	20	1	0	87	**137**
Kolfe	33	4	37	2	0	6	1	0	3	**86**
Lideta	12	15	11	0	0	0	0	0	22	**60**
Lemi-Kura	20	0	52	23	0	4	0	0	37	**136**
Nifas Silk	54	7	52	9	0	18	0	1	27	**168**
Yeka	19	13	48	6	0	3	0	4	27	**120**
Total	**247**	**75**	**309**	**73**	**2**	**122**	**2**	**12**	**294**	**1136**

Source: Addis Ababa Micro and Small Enterprise Development Bureau

Appendix 3: Participants of Urban Agriculture by Sub-City (2021/22-2022/23)

Sub-city	Type of employment	Year		
		2020/21	2021/22	2022/23
Arada	Old beneficiary	5,164	6,064	14,812
	Job creation	167	394	435
	New beneficiary	2,028	16,203	6,826
	Total	**7,359**	**22,661**	**22,073**
Lideta	Old beneficiary	3,209	5,629	19,896
	Job creation	287	698	460
	New beneficiary	2,067	17,688	8,233
	Total	**5,563**	**24,015**	**28,589**
Bole	Old beneficiary	4,132	5,879	30,266
	Job creation	408	901	953
	New beneficiary	1,268	21,670	10,046
	Total	**5,808**	**28,450**	**41,265**
Addis Ketema	Old beneficiary	6,594	7,051	34,869
	Job creation	212	384	869
	New beneficiary	812	38,123	17,343
	Total	**7,618**	**45,558**	**53,081**
Yeka	Old beneficiary	4,554	4,527	22,715
	Job creation	1,062	523	470
	New beneficiary	1,373	22,102	9,316
	Total	**6,989**	**27,152**	**32,501**
Lemi-Kura	Old beneficiary	-	2,424	11,599
	Job creation	-	400	408
	New beneficiary	-	23,205	28,442
	Total	**-**	**26,029**	**40,449**
Kolfe	Old beneficiary	9,694	7,910	15,666

	Job creation	749	327	551
	New beneficiary	2,655	33,121	8,962
	Total	**13,098**	**41,358**	**25,179**
Kirkos	Old beneficiary	17,941	7,452	20,496
	Job creation	196	247	493
	New beneficiary	2,858	25,201	7,271
	Total	**20,995**	**32,900**	**28,260**
Nefas Silk Lafto	Old beneficiary	8,002	9,215	33,282
	Job creation	1,680	625	687
	New beneficiary	2,861	49,705	16,195
	Total	**12,543**	**59,545**	**50,164**
Gullele	Old beneficiary	7,119	5,637	13,308
	Job creation	502	512	558
	New beneficiary	477	15,728	6,155
	Total	**8,098**	**21,877**	**20,021**
Akaki-Kaliti	Old beneficiary	12,604	5,853	22,836
	Job creation	3,074	1,077	901
	New beneficiary	3,364	43,254	12,999
	Total	19,042	**50,184**	**36,736**
Total		**107,113**	**379,729**	**378,318**

Source: Addis Ababa Farmers and Urban Agriculture Development Commission

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