Understanding Urban Farming as Food Security for Community Resilience A Study in Malang City

by 19023000235 ANGEL HELENA JOCOM

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Understanding Urban Farming as Food Security for Community Resilience: A Study in Malang City

Ilham Nur Hanifan Maulana [1) *], Ahmad Herlyasa Sosro Pratama [2)], Sukardi [3)], Handayani Nurhayati [4)], Della Agustina Putri [5)], Tasya Fiane Wardah [6)]
[1,2,3,4,5)] University of Merdeka Malang, Indonesia
[6)] Brawijaya University, Indonesia
[*] E-mail corresponding author: ilham.maulana@unmer.ac.id

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Abstrak - *Urban Farming atau pertanian perkotaan adalah suatu konsep dan pendekatan yang menjanjikan pembangunan berkelanjutan serta ketahanan pangan di Kota Malang, wilayah dengan kebutuhan perumahan yang tinggi dan urgensi kekurangan lahan. Penelitian ini bertujuan untuk mengidentifikasi variasi penerapan konsep urban farming sebagai upaya menjaga ketahanan pangan demi mewujudkan ketahanan masyarakat. Penelitian ini menggunakan metode kualitatif dengan pendekatan studi kasus. Penelitian dilakukan secara kualitatif dengan menggunakan alat analisis kepustakaan. Pencarian data dan sumber pustaka dilakukan dengan menggunakan alat pencarian online seperti Mendeley, Zotero, Publish or Perish, dan Google Scholar, yang berisi platform jurnal Scopus, ScienceDirect, dan jurnal pendukung lainnya. Hasil penelitian menunjukkan bahwa urban farming dapat meningkatkan ketahanan pangan keluarga. Motivasi berusaha, kapasitas sumber daya manusia, dan partisipasi masyarakat merupakan faktor penting dalam meningkatkan pemberdayaan ekonomi swadaya masyarakat secara signifikan. Urban farming dapat dilakukan baik dalam skala kecil atau besar. Superblok hidroponik vertikal telah populer menjadi salah satu metode tanam dalam konsep urban farming karena dapat menawarkan berbagai manfaat, meliputi peningkatan keberlanjutan lingkungan hidup organik, pengurangan emisi pada lingkungan masyarakat, dan peningkatan kualitas hidup warga.*

Abstract - Urban farming is a promising approach that can promote sustainable development and improve food security. In Indonesia, this farming approach can be best implemented in Malang City, a region with a high demand for housing and a shortage of land. This study aims to identify the variations of implementing urban farming to improve food safety and achieve community resilience. This research used a qualitative method with a case study approach. The research was conducted qualitatively using library analysis tools. Searches for data and library sources were conducted using online search tools such as Mendeley, Zotero, Publish or Perish, and Google Scholar. These tools contained the journal indexing platforms, such as Scopus, ScienceDirect, and other supporting journals. The results of this research showed that urban agriculture could improve family food security. Further, this research indicated that business motivation, human resource capacity, and community participation were critical factors that could significantly increase economic empowerment. The research also found that urban agriculture could be implemented on a small or large scale. One of the implementations, for instance, is through the vertical hydroponic superblocks that can offer various benefits, including increased sustainability, reduced environmental impact, and improved quality of life for residents.

Keywords: Community Resilience; Food Security; Urban Farming

INTRODUCTION

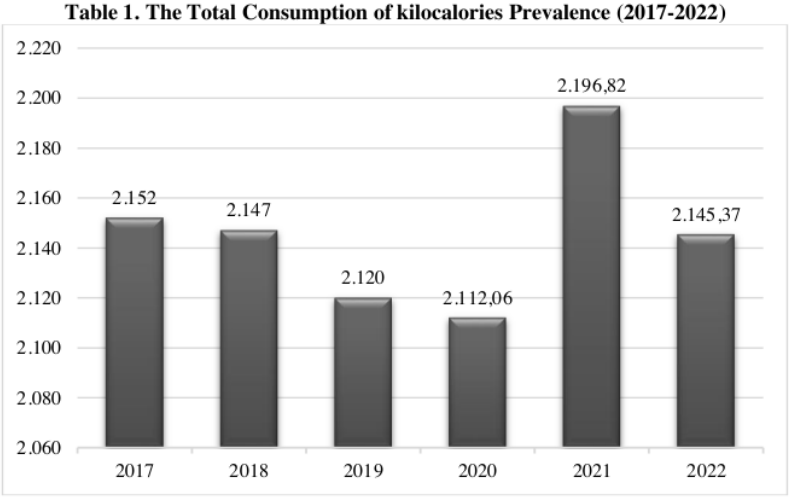
Urbanization and urban development governance significantly affect the stability of environmental ecosystems and the ecology of people living in urban areas. Urbanization and development have reduced green open space due to urban development, which has impacted the erosion of micro-agriculture land for

self-help local communities (Rosdiana et al., 2023). This problem requires the existence of a sustainable food security scheme that is needed to meet the food needs of urban residents (Septya et al., 2022). The threat to food security for urban residents due to urbanization and development is compounded by the activities of some people who are increasingly degrading the quality of the environment and most of the existing land (Rini et al., 2022). Given the growing urban population and increasing demand for food, this is an urgent need to be addressed immediately.

During the 2014–2019 range, it was identified that Indonesia's urban density had increased to 2.75%. That year's urban population density figure was higher than the national population growth rate, which reached 1.17%. Urbanization in Indonesia is expected to continue to increase from 56% to 70% of the total population. This overview is in line with the World Bank's projections, which predict that by 2045, there will be around 220 million people in Indonesia living in big and small cities, with the majority of 82.37% of the population living in big cities and only 20% in the suburbs of the city (Surya et al., 2020).

As an Indonesian citizen, we are familiar with the "Agrarian Country." Nonetheless, food self-sufficiency is increasingly unattainable, especially in agricultural products in urban areas. Agricultural output continues to decline every year, causing the issue of food security to become an essential problem for urban areas, incredibly densely populated areas, even though the need for food derived from agricultural products continues to increase (Bo'do, 2019; Kamil & Romadhan, 2020; Surya et al., 2020; Yamauchi & Larson, 2019). One obstacle to meeting urban communities' food needs is limited land. Most urban communities do not have land that can be cultivated, so raising awareness of household food security becomes difficult in cities. To accommodate the issue of limited productive land for agriculture in urban areas, urban farming methods have recently become widely discussed to minimize the impact of food deficits (Hodges, 2022).

Table 1. The Total Consumption of kilocalories Prevalence (2017-2022)



Sources: Central Bureau of Statistics / B.P.S (2018-2022), 2023.

Several past challenges, including climate change, population increase, shortage of natural resources, energy crisis, urbanization, and even the COVID-19 pandemic (Ahmad & Setyowati, 2021; Oh & Lu, 2023), have placed Indonesia's food security in significant danger. Energy consumption per capita per day in Indonesia by calculating the total consumption of kilocalories per day has decreased over the past three years, dropping from 2,152 kcal in 2017 to 2,147 kcal in 2018 and again falling to 2,120 kcal in 2019 (B.P.S., 2020). Meanwhile, after the COVID-19 pandemic, per-capita energy consumption gradually increased from 2,112.06 kcal (2020) to 2,196.82 kcal (2021), 2,145.37 kcal (2022), B.P.S. 2022. Despite the improvement, post-COVID-19, the food security index in Indonesia (62.2%) is still low, below the average for Asia-Pacific countries (63.4%) on a scale of 100%. The data is measured through standard food security indicators by the Global Food Security Index (G.F.S.I.), including affordability, availability, quality and safety, and sustainability and adaptation.

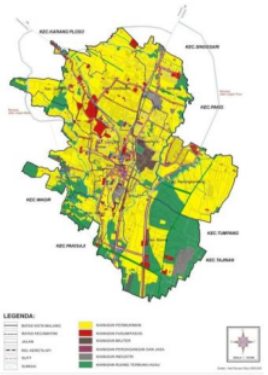


Figure 1. Malang City Land use map

Sources: Malang City Government, 2023.

Malang City is the second largest city in East Java after Surabaya, famous for its cold air and relatively fertile soil conditions. Over time, Malang City experienced rapid urbanization, which decreased the use of urban green land, causing the food demand for the growing population of Malang City. The dynamics of these conditions resulted in the erosion of green open space in the city of Malang. Law Number 26 of 2007 concerning Spatial Planning states that a town's ideal green open space is 30% of the total area. Currently, the condition of green open space in the city of Malang since 2019 is 1,303,192 hectares or 14.71%; in 2022, it reach 1,950 hectares or 17.73%, which is still below the ideal area of urban green open space, which is 30% of the total area of the Malang city of 110.06 Km^2.

To increase and put pressure on the food availability system as one of the metropolitan cities in East Java, the city of Malang must develop the concept of a sustainable city by focusing on economic, social, and environmental sustainability. Urban agriculture can be studied further for metropolis cities like Malang with limited agricultural land. Apart from helping take advantage of the limited availability of land, it is inseparable from other facts where agricultural land conservation for industrial or residential purposes has influenced how rural communities release their land for urban development (Rosyad et al., 2020; Taher et al., 2023).

Urban farming uses land intensification to meet the daily needs of fresh fruit and vegetables for housing and urban settlements (Lytovchenko & Nekhaienko, 2023). Alternative farming in urban areas includes a wide range of types, from small-scale home farming to modern agriculture equipped with technology capable of producing sufficient products to meet urban communities' food needs (Grebitus et al., 2020; Loy & Ssemakula, 2020; Muetia et al., 2022). Urban farming is a solution for managing green land in a busy city (Acquah et al., 2020). Urban farming is a solution to the limited land for farming; urban farming is an effort to overcome this problem (Fathihin & Mursyidah, 2023; Pertiwi & Lusianingrum, 2022). Median roads or yards belonging to residents can be used for urban farming activities (Sundari et al., 2021).

Overall, urban farming is essential for building a sustainable Malang city. Several previous studies have demonstrated the benefits of urban agriculture in increasing urban resilience by promoting natural and socially sustainable potential. The case study tries to identify the available areas for implementing urban agriculture in Malang City. For example, a preliminary study found that urban agriculture can improve food access and distribution in low-income communities (Atasa & Nugroho, 2021; Giriwati et al., 2018; Kamil & Romadhan, 2020; Nasuiton, 2020; Okuputra et al., 2022). Additional studies have investigated the role of urban agriculture in increasing equity of access to healthy food, examined the economic life of smallholder farmers, and addressed challenges in sustainable agriculture (Arifah & Poerbaningtyas, 2023.; Artandio et al., 2019; Ilham Pradana; & Wandari, 2023; Murwani et al., 2022; Setiyo et al., 2023). Moreover, poverty is a complex problem requiring a deeper understanding of exploitation and exploration to meet community needs. It can be concluded that urban agriculture has the potential to help sustainable development and community welfare (Alynda & Kusumo, 2021; Wardah & Niswah, 2021; Carolan, 2020). However, more research and policymaking are needed to take advantage of it.

A series of previous studies show that the city of Malang has adopted the concept of urban farming. Urban agriculture is considered a promising approach to promote sustainable development and improve food security in Malang City, a region with a high demand for housing and a shortage of land. Urban farming allows residents to carry out agricultural activities in urban areas, especially in their environment

(Carolan, 2020; Purwanto et al., 2021; Saputro et al., 2020). By analyzing the literature on urban farming for food security and its various opportunities, advantages, and challenges, this study aims to assess how Malang City can utilize urban farming to improve food security. The results of this study are expected to provide practical academic contributions to the development of urban farming in Malang City.

LITERATURE REVIEW

Food Security

Food and nutrition security includes three subsystems that must function adequately: availability, affordability, and use or consumption (Yamauchi & Larson, 2019). Providing healthy food is one of the advantages of urban agriculture. People can buy seeds and grow farm vegetables independently. Urban farming can produce various types of vegetables. First, plants whose leaves are harvested are called leaf vegetables. Examples include spinach, kale, basil, celery, mustard greens, cabbage, and lettuce. Fruit vegetables include eggplant, chili, cucumber, bitter gourd, chayote, winged, long, and green beans (Murwani et al., 2022). Meanwhile, tubers are whose roots are used (Rosdiana et al., 2023). All kinds of vegetables, such as potatoes, carrots, onions, garlic, and radishes, potatoes, carrots, onions, garlic, and radishes grown to harvest their tubers can produce healthy food.

Given the critical role of vegetables in food consumption, urban communities have an essential role in determining the quality of public health standards. The types of plants that can be planted in the garden include vegetables, fruits, medicines, and ornamental plants. Generally, the types of vegetables grown through various landless cultivation concepts have a short harvest time. It is hoped that they can be harvested every month, maintain food security independently, and help support the community's economy. Organic farming management also sustainably utilizes natural resources, producing healthy and energy-efficient food. This can improve food quality and variety while addressing local food consumer preferences.

Referring to the Law of the Republic of Indonesia No. 18 of 2012, food security is defined as a condition in which food is available to everyone in the country in adequate quantity and quality, safe, diverse, nutritious, and affordable. It does not conflict with religion, beliefs, or community culture. Food security at the household level is the basis that will later become a pillar of regional and even national food security. The main focus of developing food security is to empower the community to be able to deal with their food problems independently and to be able to achieve household food security sustainably (Clark-Ginsberg et al., 2020; McClintock, 2014; F.A.O, 2017; Yamauchi & Larson, 2019). Urban farming, as an essential concept for people's welfare, can help increase people's income and purchasing power to meet their daily needs. Several previous studies have explored the benefits of urban agriculture, including its potential to improve food security, empower communities, and promote sustainable development.

Urban Farming

Urban agriculture and plantations can improve food security for urban communities. Given that many urban communities are located far from food sources with inadequate access(Kinseng et al., 2019). The unavailability of food sources can increase food insecurity. Urban agriculture can reduce the costs of providing and distributing food produced in rural areas, boost local economies, and reduce urban unemployment through job creation and social inclusion (Iqbal Usman et al., 2023). When urban farms are famous, they serve as direct farms for nearby urban communities to receive healthy food options.

Food And Agriculture Organization (F.A.O.) define urban agriculture is an industrial chain that produces, processes, and markets biofuels and products to meet urban customers' daily needs and demands (F.A.O, 2017). This industry uses intensive production methods through resource utilization and recycling of available fuel. The type of agriculture Urban farming includes industrial and traditional, which includes production patterns, processing, and marketing of products. Urban farming demands the involvement of knowledge, expertise, and innovation in the cultivation and processing of food using intensive production methods, utilization and recycling of resources, and utilization of urban waste (Siegner et al., 2018). So that urban farming can meet the food needs of all micro-community lines of society, including personal consumption, institutions, education, profits, and so on. This can be seen from food availability because households can prepare food sources(Rapsomanikis, 2015). This happens because urban farming includes production, processing, and distribution, so the dynamics of this activity have many advantages.

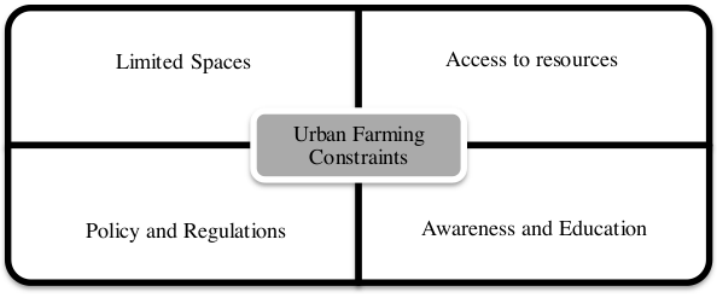
Urban farming is an essential strategic resource in many ways, including economically, socially, and environmentally. By producing a healthier and environmentally friendly lifestyle and contributing to food security, urban farming focusing on food development (Oriented Development) is an urban development idea that can make cities sustainable food providers for their citizens (Megawanti et al., 2021). Urban farming is not only for obtaining additional food and financial benefits but also for controlling the organic quality of the food they consume, restoring damaged urban soils, and addressing micronutrient deficiencies.

METHOD

This research uses a qualitative method with a case study approach. The research was conducted qualitatively using library analysis tools. Searches for data and library sources were conducted using online search tools such as Mendeley, Zotero, Publish or Perish, and Google Scholar, which contains the journal platforms Scopus, ScienceDirect, and other supporting journals. This literature review with a specific case study in Malang City wants to analyze the relevant article about urban farming and the importance of food security to actualize community resilience. So that researcher can interpret the data obtained and to explore and understand the meaning of individuals or groups related to a social phenomenon (Creswell & Creswell, 2018). Data collection is carried out through a compilation of the latest written sources such as scientific publications, reports, news, and documents to help analyze the potential of urban farming as food security to realize community resilience in Malang City. The data collection and analysis led by (Schwade & Schubert, 2018) studied the design of a literature survey in a continuous and interrelated process. First, define the scope of the assessment based on your research objectives as a phase that helps narrow the focus. The second step is to design priority topics and relate previous findings. The third step is identifying the current relevant information and sources. Furthermore, as the final step, a literature analysis was carried out. It should be noted that identifying and analyzing literature is an iterative task, given the need for consistent data and information. Then, this paper tries to rethink the relationship between the importance of urban agriculture and for food security system in Malang City to actualize community resilience.

RESULT AND DISCUSSION

Table 2. Constraints of Urban Farming in Urban Areas



Sources: Author's compilation, 2023.

These obstacles and obstacles are very influential in determining the development of urban farming ideas and the dynamics of their implementation. To make it easy for readers to understand, the researcher describes the findings in the following points:

Limited Spaces

The future of urban food will be significantly influenced by planners, particularly regarding zoning, land use, and governance (Bo'do, 2019; Carolan, 2020). The conversion of urban land into urban farming media needs to involve dedication, such as removing weeds and pests from gardens and providing fertilizer to ensure plants develop as they should. Like many cities worldwide, Malang City has experienced significant land use changes over the last few decades. Land use change in Malang City reflects the general shift from agricultural land and plantations to broader urban development. Amid rapid population growth and ongoing urbanization, some agricultural land and plantations around Malang City have turned into residential areas, world centers, and other urban infrastructure. Development policies that encourage and stimulate the economy and demand for land for housing and commercial have triggered the conversion of this function. As a result, large amounts of land previously used for agriculture and plantations are now an integral part of the urban landscape.

However, this land conversion raises essential questions about food security and environmental poverty. In this context, several attempts have been made to maintain agricultural land in urban farms, community gardens, or productive green areas. These are essential steps to ensure that Malang City can provide sufficient local agricultural resources to meet the food needs of its population (Atmaja et al., 2020). With increasing attention to environmental issues and desirability, there is hope that land use change in Malang City will become more thoughtful and planned. In the face of continued urban growth, a balance must be struck between necessary urban development and protecting remaining agricultural land (Giriwati et al., 2018). The government and the local community must wisely face this challenge so that the City of Malang can grow sustainably and still maintain access to critical agricultural resources.

Access to Resources

There are many obstacles to starting an urban farm. For example, excessive use of animal fertilizers will affect the quality of fertile soil (Salim et al., 2019). In addition, it is also necessary to pay attention to the layout of the location of urban agriculture; for example, areas close to railroads, motorways, and industrial regions have high levels of heavy metal contamination, such as lead, sulfur, and nitrates. Farms close to the area will be exposed to toxic materials and diseases. In addition, hazardous organic waste will hurt urban agriculture, causing damage to food crops and making them unsafe for consumption.

With the growth of cities, the exploitation of natural resources has increased, and patterns of land use and land cover have changed (Acquah et al., 2020). However, many poor and urban smallholder farmers may not meet this standard because they do not have access to resources, including information and funding (Mthuli, 2022). The government needs to pay attention to access to credit that can help farmers build vital infrastructure such as water reservoirs and agricultural inputs that can help develop urban agriculture (Saputro et al., 2020). Governments should create effective credit schemes for farmers to borrow funds to increase crop and animal production (Loy & Ssemakula, 2020).

Policy Regulations

The Republic of Indonesia's Ministry of Agriculture optimizes yards for family food sources. This idea can become a source of family food amid the threat of a food crisis due to the Covid-19 pandemic. The Sustainable Food Home Area program was developed by the Food Security Agency from 2010 to 2019. To expand beneficiaries and land use, activities changed to Sustainable Food Farms, starting in 2020. Sustainable Food Farms policy activities are implemented to support government programs for handling priority areas for stunting intervention and regions vulnerable to food insecurity or strengthening food secure areas (Kurniawan et al., 2018). This activity is carried out through yard land, unproductive vacant land, and land around houses/residential buildings/public facilities, as well as other environments with clear ownership boundaries such as dormitories, Islamic boarding schools, flats, places of worship, and others. There are two aims and objectives of Sustainable Food Farms activities (Fathihin & Mursyidah, 2023; Purwami et al., 2018; Tamara et al., 2020). First, to increase the availability, accessibility, and utilization of food for households by the need for diverse, nutritionally balanced, and safe food. The second is to increase household income through the provision of market-oriented food. Sustainable Food Farms activities are carried out through approaches to sustainable agricultural development, utilization of local resources, community empowerment, and marketing orientation to achieve these goals. Sustainable Food Farms activities in 2020 are carried out through the Growth, Development, and Development Stage.

In line with the regulations from the central government, the local government of Malang City has elaborated the policy at the regional level through Regional Regulation 4 of 2011 concerning spatial and regional planning in Malang City. Expressly, the urgency of the ideal green open space ratio is contained in article 16, which explains that at least 30 percent of the total area of Malang City, 20% is public green open space, and 10% is private green open space. Planners should further consider the points of convergence and divergence between these urban farms when contemplating future potential (Atmaja et al., 2020; Giriwati et al., 2018). Ultimately, the government determines whether urban farming mechanisms will be quickly developed or hindered. This is because society needs transparency, accountability, and government responsiveness (Surya et al., 2020). A primary focus should be on how citizen-led accountability strategies can improve services for the poor and marginalized. Urban planners must develop adequate planning strategies to monitor and control land use that is not well coordinated, such as the development of built-up areas into agricultural land and nature reserves.

This study shows that understanding the characteristics of urban agriculture is an essential step in making appropriate government policies and development plans to integrate urban agriculture into urban systems. Urban agriculture practitioners (farmers), urban food consumers, governments, and researchers have so far generated misunderstandings and differences in knowledge among stakeholders, even though urban agriculture has the potential to contribute to food security. Through programs, the government can help farmers with agricultural inputs to increase productivity. Farmers who switch from traditional to modern farming can increase their agricultural productivity. This shift in farming methods opens opportunities for farmers to access renewable technologies in agriculture, for example, using the best seed varieties, organic fertilizers, chemical fertilizers, insecticides, better equipment, and better animal power (Carolan, 2020; Loy & Ssemakula, 2020). Suburban agriculture significantly contributes to residents' food supply in urban slums (Acquah et al., 2020; Chandra & Diehl, 2019). Still, many challenges and obstacles make it necessary for policies to be incorporated into the Urban Development Plan. Sustainable urban food production can be achieved through incorporation into Urban Development Plans so that the urban poor can achieve greater food security.

Awareness and Education

In 2021, thematic training for special allocation funds Non-Physical Sustainable Food Yard for Sustainable Food Farms activities. The Malang City Food Security Service organized this activity. The special allocation funds for Sustainable Food Farms are included in the community empowerment activity scheme in diversifying food consumption based on local resources(Arifah & Poerbaningtyas, 2023; Artandio et al., 2019; Kamil & Romadhan, 2020; Nasuiton, 2020) . The main objective of this Sustainable Food Farms is the government's integrative efforts to overcome the problem of stunting. This Sustainable Food Farms is a concern amid the urban farming trend for community group activities in Malang City—running until this year. In detail, 98 urban parks and eight urban forests are scattered at several points in each sub-district in Malang City. Concept mapping provides an in-depth description of the participant's semantic network. It is an essential and theoretically motivated tool for demonstrating people's thinking and the relationships between concepts (Anggraini, 2020; Zuraiyah et al., 2019). Researchers can determine whether the area under study, such as urban agriculture, is considered reasonable by evaluating positive and negative associations (Grebitus et al., 2020; Subangkit et al., 2020). In other words, complex knowledge structures and topic analyses that yield multiple correlations, both positive and negative, can quickly become computationally intensive with larger sample sizes.

Family Welfare Programme members and other community members have acquired better knowledge and skills thanks to training in vegetable cultivation. This motivates mothers to try to apply it in their own homes. Therefore, gardening activities depicting urban or urban agriculture are validated in ecological, economic, and educational discussions (Bo'do, 2019; Pertiwi & Lusianingrum, 2022; Wachdijono et al., 2019) on various Indonesian gardening social media accounts. Apart from avoiding utterances of hatred in public spaces, people can concentrate on rational discourse accompanied by claims and validations. Caring for a garden doesn't always mean taking good care of public spaces. It is still necessary for this community to balance the swing of the hoe by uploading it to social media via their smart devices and motivating the community through counseling and mentoring to educate (Loy & Ssemakula, 2020; McDermott, 2020). The more significant economic benefits for the community of increasing urban agricultural production on a larger scale and educating young people about the more important economic benefits to society of increasing urban agrarian output to a larger scale. Institution-Supported Agriculture with Buckeye I.S.A. project increases the ability of families to meet personal and family food security by providing education, material support, and guidance on local food production. It is recommended that farmers be trained in pest and disease control, the use of manure from household organic waste, the use of superior varieties, irrigation, and how to market crops commercially, especially vegetables. To improve suburban farming around Mbarara region in Uganda, more farmers' training is needed on disease and pest prevention, household organic waste as manure, improved varieties, irrigation, and commercially market crops, especially vegetables.

Based on the description that has been explained, it can be concluded that the struggle to increase the ability of the community to produce added value to the economy is known as community economic empowerment. This is achieved in four ways, namely, 1) access to resources, 2) access to technology, 3) access to markets, and 4) access to requests (Surya et al., 2020) .Then there are four main things mentioned in the concept of economic empowerment (Indah et al., 2020; Karim et al., 2023; Surya et al., 2020), consisting of 1) the concentration of power over the factors of production is the process; 2) the concentration of power will produce a society of marginal workers and entrepreneurs; 3) the concentration of power will strengthen and legitimize the superstructure or system of manipulative knowledge, politics, law, and ideology; and 4) the coop will emerge as a result of the concentration of power over the factors of production.

Therefore, empowering the people's economy based on urban agriculture will increase the productivity of economic enterprises, encouraging the sustainability of the people's economy (Kinseng et al., 2019). The five ideal main action principles for increasing community productivity include 1) Empowerment and integration of underprivileged communities; 2) Promotion of environmentally friendly agricultural practices; 3) Protection of landscapes, natural resources, and culture; 4) Support for local communities, and 5) Education for sustainable development. To support the arrangement of the village more attractively while at the same time supporting food security, urban farming can be driven by the potential of creative residents combined with good entrepreneurship (Firmansyah, 2022; Setiyo et al., 2023).

Depending on socio-economic conditions, climate, availability of infrastructure, and other facilities, urban farming methods vary by region (Rapsomanikis, 2015). Management of urban green spaces will reduce crime, crises, and food security problems. Urban farming can improve public health if applied

on a micro-scale in development plans and urban planning(Carolan, 2020). Especially now, after the pandemic. Regarding area management, it is also determined by the desire of the landowner to participate in ongoing activities. The demographic bonus is an excellent opportunity to realize urban planning that works with human food needs (Nasuiton, 2020). Green open agricultural space can be a solution to support health policies for the elderly population (Yamauchi & Larson, 2019). The government can provide general assistance such as transportation, farmer training, and location and area.

Urban agriculture can be carried out through household and community farming with various cultivation methods (Zezza & Tasciotti, 2010). Social capital in the development of urban agriculture can be described in 3 ways, namely bonds of trust, social institutions, and social networks (McClintock, 2014). Urban agriculture, which initially started to improve food quality, then developed to give a domino effect to the community, especially entrepreneurship and particular community movements such as movement. Urban farming is a sustainable practice with social, economic, and environmental benefits. Urban agriculture includes benefits such as providing food to urban residents and increasing the income of urban families. To encourage urban agricultural communities to achieve food security, empowerment should be highlighted, including how to increase the capacity of another indicator, namely authority.

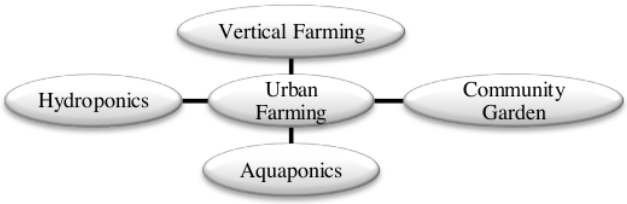


Figure 3. Types of Urban Farming
Source: Author's compilation, 2023

In line with that, based on previous research studies, here are some examples of practical urban farming options in micro-areas.

Vertical Farming

By 2050, vertical farming cities will become a popular concept (Abdelfatah & El-Arnaouty, 2023). In the coming decades, many cities want to become greener by making sensible choices regarding their layout to make better choices. Vertical farming is an option that can be considered to take advantage of the limited availability of land. Vertical farming can improve residents' quality of life and bring a new image to cities. Vertical farming can make cities more inclined to futuristic concepts because of its characteristics and advantages. Producing food through layers that are stacked vertically, tilted vertically, or fed into other structures is known as vertical farming. It is part of urban agriculture (Septya et al., 2022). Urbanism should conduct additional questionnaires to settled customers and companies to discuss this issue of "vertical farming." A more detailed questionnaire will address people's thoughts on different product concepts and production systems. This will increase understanding of people's minds and draw a general picture of what needs to change.

A stand-alone vertical farm building will require the cooperation of multiple engineering disciplines, such as architects, structural engineers, and mechanics. Farm buildings must consider architectural elements such as durability, utility, and beauty to become green landmarks supporting future food security. To comply with architectural principles, architects and engineers must establish design guidelines. Elements in vertical farming, such as viticulture or polybags, can utilize land that is not too large of urban agriculture (Septya et al., 2022). Vertical farming technology can maintain urban food production for the next few years (Okuputra et al., 2022). If implemented correctly, Viticulture urban farming can overcome problems such as food self-sufficiency, air pollution, and green open spaces (Luthan et al., 2019). Of course, this application must be supported by adequate technology and human resources. This happens when there is support from the government, research institutions, universities, communities, and other related institutions that are expected to make a valuable contribution.

Apart from trying to take advantage of the limited availability of land with the various utilities offered, this vertical farming has begun to invite entrepreneurs and investors to invest in modern agriculture (Oh & Lu, 2023). This shows that urban agriculture, apart from having economic value, also has the opportunity to leverage the development of renewable agricultural techniques and technologies. The results of research on vertical farming globally are known to be able to help increase food security around the world (Listiana et al., 2021). This research shows that vertical farming is an effective tool for supplying

food to cities sustainably and helping cities survive food overpopulation. It also depends on the location that has been determined and the area to be used for the research design. Vertical farming saves space, reduces water usage, shorter growing times, reduces the need for pesticides and herbicides, and provides protection from extreme weather.

Community Garden

All parties must play a significant role in empowering their citizens, especially by encouraging or motivating everyone to have the ability or courage to make their own life choices (Rini et al., 2022). Backyard gardens, public or community gardens, and commercial farming are the three main categories of urban farming (Okuputra et al., 2022). Consequently, participants in both urban farming categories reported significant improvements in self-assessment rate health (S.R.H.) and mental health (M.H.) compared to nonparticipants after controlling for changes in physical activity (P.A.) (Harada et al., 2021), although participants in the rations did not report significant increases in S.R.H. and M.H., those in the experience farms reported that the increase in P.A. was also due to social interaction among participants."

Aquaponics

Each plant can get more consistent and superior results if given the best combination of nutrients. In addition, it offers a simple method for managing large production areas and allows for cleaner procedures by avoiding animal waste (Abdelfatah & El-Arnaouty, 2023). With organic properties that support a healthy lifestyle, aquaponics has a decent prospect of achieving sovereignty in healthy food. The primary strategy for increasing knowledge and understanding of aquaponics as it relates to food sovereignty, production, and food from one's own home is to understand and apply the importance of healthy food and food security, then increase economic stability and capability in the field of information or digital technology, the initial cost of which is cheap, and build an innovative urban farm (Sundari et al., 2021).

Hydroponics

"Hydroponics" means growing plants in liquid nutrient mixtures, with or without artificial media (Abdelfatah & El-Arnaouty, 2023). Expanded coir, clay, perlite, wood fiber, brick chips, polystyrene packing nuts, and vermiculite are commonly used media. Hydroponics can be used successfully to grow various crops, including ornamentals such as freesias, roses, tomatoes, cucumbers, peppers, and vegetables such as tomatoes, lettuce, cucumbers, and peppers. The most widely used hydroponic growing method in vertical farming involves growing in a nutrient solution without using soil. The fertilizer solution must be checked and replaced regularly to ensure proper chemical composition. Each plant can receive the best combination of nutrients through the hydroponic method, producing more consistent and superior yields. In addition, hydroponics offers a convenient way for managing large production areas and allows for a cleaner procedure by avoiding animal waste (Zuraiyah et al., 2019).

One of the residential areas in Karangwidoro Village, Malang Regency, Villa Tidar Estate, implements urban farming (Okuputra et al., 2022). This place is difficult for agricultural activities because it is close to dense settlements. However, the hydroponic method allows for the management of small residential plots. Urban farming businesses with a hydroponic system have been operating for one year, since June 2020, to be precise. With this intelligent urban farming hydroponic model, farmers can provide nutrition and control the pH levels of their plants automatically by pressing a button on an available application. This means farmers do not need to take care of the plants manually.

Benefits of Urban Farming

Growing popular food in urban areas can bring economic, social, and environmental benefits. Mixed-use development has several advantages because it combines multiple objectives (Abdelfatah & El-Arnaouty, 2023). First, increased accessibility to food crops can be easily achieved by walking or cycling to nearby facilities and services. Second, increasing livability through combining residential units with commercial spaces increases community engagement and reduces travel time for residents working in the neighborhood. Third, efficient use of land by using buildings of various functions simultaneously to maximize the use of available land. Fourth, a wider choice of settlements. Fifth, improve environmental sustainability by reducing car reliability to reduce greenhouse gas emissions and air pollution in cities.

Many examples have shown that urban agriculture produces food crops successfully and provides other socio-economic benefits (Acquah et al., 2020; Hodges, 2022; Jalu Aji et al., 2021; Murdad et al., 2022; Putri Wenang LusiAniNgrum & Nur Bhakti PertiWi, 2022; Sundari et al., 2021; Abdelfatah & El-Arnaouty, 2023; Wijaya et al., 2022). These socio-economic benefits include environmental benefits, such as ensuring sustainability and biodiversity in urban areas, as well as socio-economic benefits, such as leisure time, education, and reduced transportation for food crops). Urban agriculture can provide help in environmental, social, and economic aspects. Urban farming has many benefits for society and the environment, including financial, health, and ecological benefits. Urban agriculture can provide food for local people, reduce dependence on imports, create jobs, and produce a more environmentally friendly

environment. Thus, urban agriculture can achieve sustainable food security for urban residents. Therefore, the approach that can be taken at the beginning of the development of urban agriculture is to identify and ensure that every household has a supply of fresh food. Urban agriculture is promoted to feed citizens and give them access to natural resources. It is an essential component of food security strategies in various countries in the world.

Figure 4. Benefits of Urban Farming
Source: Author's Compilation, 2023.

This study looks at how changes in the urban agricultural landscape impact financing the livelihoods and food security of urban farming households; however, if done correctly, it can positively impact many disastrous urban situations.

Increase food productions

The discussion on food security includes analyzing cash transfers, promoting sustainable agricultural technologies, and managing compromises in food security by balancing the benefits of nutrition with the ecological costs of production (Murdad et al., 2022). Increased household access to healthy food, increased consumption of vegetables and fruit, increased physical activity, improved mental health, and improved quality of life and general well-being are some of the health benefits associated with urban farming (Acquah et al., 2020). Accessibility to food crops certainly improves health and nutrition, especially if urban residents can implement urban farming, then the consumption of organic fruit and vegetables will increase; this encourages nutrient retention. In addition, urban agriculture in urban areas can become a destination for treatment, a diverse atmosphere in physical activity, and the application of specific aesthetic values from an appropriate arrangement.

According to F.A.O., urban agriculture is essential for providing emergency food supplies and making food cheaper(Nations, 2017). In addition, given the high levels of poverty and hunger in developing countries, it is suggested that urban dwellers participate in agricultural activities to help meet their food needs (Atasa & Nugroho, 2021; Indah et al., 2020). Policymakers should also know this reality and actively take advantage of urban agriculture's opportunities(Fathihin & Mursyidah, 2023; Nasuiton, 2020).

Economic opportunities

Urban farming can reduce the cost of conventional agriculture (Murdad et al., 2022; Abdelfatah & El-Arnaouty, 2023), which is known to require a large budget, as well as minimize energy consumption and even convert waste into more valuable outputs such as fuel and organic fertilizers. Apart from that, it can also create local jobs; for example, actors involved in urban agriculture need to think about hygienic food packaging without reducing the nutritional and nutritional value of the crops. From an economic perspective, urban farming contributes to commodity output and potential public benefits because it can be implemented on a small or large scale, so urban agriculture has the potential to increase food security for low-income communities. Furthermore, the economic potential of urban farming can be studied more contextually by future researchers, including Economic Resilience, reduced spending to generate more income, environmentally friendly innovation, Job creation, Promotion of local food production, Positive economic description environmental sustainability

Urban agriculture can increase environmental sustainability because this system can be helpful to in harsh urban and rural areas with insufficient land (Firmansyah, 2022). Maximum benefits can be obtained by using a hydroponic system or recirculating aquaculture. Vertical hydroponic superblocks can offer various benefits, including increased sustainability, reduced environmental impact, and improved quality of life for residents (Abdelfatah & El-Arnaouty, 2023). The design and effects of the building will depend on various factors, such as location and community needs (McClintock, 2014; McDermott, 2020). The vertical urban oasis concept combines the advantages of multifunctional development, pedestrian-friendly design, and sustainable construction practices to create a peaceful living environment.

The most promising impact of developing urban agriculture is being able to reduce carbon emissions and the impact of using fossil fuels. If pulled further, urban agriculture tends to leverage improving urban ecosystems, addressing climate change, absorbing noise, and minimizing the footprint of transportation fumes. Regarding the impact on psychology, urban agriculture has the opportunity to provide therapeutic recreation to encourage physical and mental health (Kamil & Romadhan, 2020; Nasuiton, 2020; Zezza & Tasciotti, 2010).

Community engagement and empowerment

It is said that urban agriculture has social benefits because it increases people's food security, provides educational facilities, and becomes a design inspiration. Social Improvement, Community Empowerment, Youth Formation and Development, Green education opportunities (Firmansyah, 2022), Cultural Integration and Preservation, Community Positive Interaction and Social Welfare (Hodges, 2022; Jalu Aji et al., 2021; Murdad et al., 2022; Sundari et al., 2021; Abdelfatah & El-Arnaouty, 2023; Wijaya et al., 2022). The search results show that urban agriculture can improve family food security. The crops grown are vegetables and fruits. However, some of the challenges faced regarding urban agriculture are problems of communication, knowledge, and skills.

The best results produce superior, viable, potent seeds resistant to weather and climate change. They are also becoming more adaptive, driving the development of smart cities and intelligent city agriculture and motivating the next generation to be sustainable (Abdurrohman et al., 2021; Iswoyo et al., 2018; Karim et al., 2023). In addition, urban farming workshop participants gain farming skills, which will help them get food more efficiently. Increase awareness of urban agriculture, connecting people with food systems and resources; and 2) provide opportunities for community engagement needed to support urban agriculture.

CONCLUSION

Regional development initiatives can be successful with community participation in human resources. The success of urban agricultural development does not depend on community participation through the utilization of city yards. The community may be less involved or even not involved at all in developing urban farms through the use of small yards. It is interesting to see how they participate in the development of urban agriculture by utilizing city yards. On the other hand, urban planning systems that include tax incentives for urban farmland, such as the Productive Greenland Act, have created an environment where farmers can continue growing crops even after urbanized areas. Therefore, the idea of green city planning is important, allowing people to grow crops in the middle of the city.

Community involvement in domestic food production in or near settlements and urban agriculture is an essential strategy for the survival of urban communities. Community food needs can be fulfilled independently if food self-sufficiency exists. This means there will be no food crisis during this pandemic or in the future. The research results show that business motivation, human resource capacity, and community participation are critical factors for significantly increasing economic empowerment. Additionally, the study found that urban agriculture practitioners gave the highest scores for physical and mental health and environmental motivation. It is also related to accommodating parents' health and economic problems due to retirement and reduced social opportunities. Urban farming opens vast opportunities for all ages to be productive.

However, this does not mean that the development of urban agriculture does not leave household chores. High start-up costs, lack of experience, and the need for controlled growing systems are some of the major issues hindering the adoption of vertical farming. Vertical farming, conversely, is quickly becoming more attractive to global society due to its ability to produce food reliably and sustainably. This can reduce land degradation and water consumption, reduce the use of pesticides and fertilizers, and shorten food supply chains. Therefore, we encourage more research and collaboration to improve sustainability by integrating technological practices. It is also hoped that it can enhance product quality in vertical and urban farming to gain new capabilities in the agricultural and horticultural industries.

To achieve success, community-based urban agriculture projects require significant preparation and commitment that stem from the needs of the specific community or neighborhood. Like other effective endeavors, urban agriculture and its aesthetics are on the rise as people discover goals, ideals, and potential benefits. It is hoped that urban communities will be more informed about the urban farming program because of several problems faced when implementing it. These problems cause people not to know much about urban agriculture and are not too interested in doing it.

The fervent hope of public policy makers, practitioners, and local community of urban agriculture is that by addressing these challenges head-on. We can bridge the informational void that currently separates urban communities from the world of urban farming. As we collectively tackle these issues, there is an optimistic belief that urban residents will become more informed about the immense potential of urban agriculture or urban farming, not just as a source of fresh produce but as a catalyst for positive change within their neighborhoods. In conclusion, community-based urban agriculture projects are poised to thrive and flourish, provided they receive the necessary support, understanding, and commitment from the communities they serve. As awareness grows and challenges are surmounted, the vision of vibrant,

sustainable, and self-sufficient urban communities nourished by the fruits of their labor draws ever closer to becoming a reality.

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