URBAN FARMING WITHIN THE FRAMEWORK OF FOOD SECURITY AND SUSTAINABLE ECONOMY IN INDONESIA CITIES

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Abstract

Urbanization has transformed urban population patterns, impacting composition, distribution, and growth. Urban farming, now widely adopted in cities globally, including in Indonesia, involves various methods of food production, from home gardens to using public spaces like rooftops. This study analyzes urban farming's role in supporting food security and sustainable economics through a descriptive, qualitative approach, utilizing literature reviews of secondary data from journals, research reports, and official websites. Findings reveal that urban farming offers efficient, eco-friendly food production, providing a strategic path for urban food security in Indonesia. Integrating Internet of Things (IoT) technology further optimizes urban farming, making it a practical and sustainable aspect of urban life.

Keywords*: food security, sustainable economy, urban farming*

A. Introduction

A United Nations (UN) study shows that in recent decades, the urban population has increased significantly. The UN estimates that by 2050th, 68% of the global population will reside in urban areas, with the fastest urbanization occurring in low- and middle-income countries (UN, 2018 in Nicholls et al., 2020). In Indonesia, as a developing country, urbanization is also on the rise, with the Central Statistics Agency (BPS) estimating that 56.7% of Indonesia's population was already residing in urban areas in 2020, and this figure is projected to increase to 66.6% by 2035 th (BPS, 2018).

Population growth alongside rapid urbanization has led to various issues, including challenges in food security and sustainable urban economies. One of the primary challenges is providing food amid limited agricultural land in cities. Urbanization has transformed land that was once used for agriculture into areas for housing, infrastructure, and industry. As a result, cities' capacity to produce local food has declined, increasing dependence on external supplies. The limitations of land in meeting urban food needs have spurred the emergence of an innovative modern farming concept, which is urban farming.

Urban farming refers to the management of integrated primary sectors (such as agriculture, horticulture, fisheries, and livestock), even extending to integrated waste management (Armansyah et al., 2024). According to the Ministry of Environment and Forestry (KLHK), urban farming is a development of conventional agriculture into urban agriculture, which encompasses the cultivation, processing, and distribution of food in urban areas (KLHK, 2018). Urban farming offers a solution for meeting food needs and strengthening urban household food security through plant cultivation and livestock in limited spaces. As supported by the FAO (2020), urban farming involves growing crops and raising livestock in small urban spaces, such as yards, balconies, or containers, the produce can be consumed or sold, thus providing food and income to urban communities and creating household and city-level food security. Food security itself is a condition where everyone has sufficient physical, social, and economic access to safe and nutritious food for a healthy life and supports a sustainable economy.

Currently, there is a trend of urban farming practices in urban areas in Indonesia, which has positively impacted addressing food, economic, and social issues. Urban farming has the potential to boost business development, such as small enterprises, create new job opportunities, and encourage women to contribute to family income (Alynda and Kusumo, 2021). This phenomenon demonstrates that urban agriculture has great potential in supporting the achievement of food security and a sustainable economy. This study aims to analyze the impact of urban farming within a framework that supports food security and sustainable economics.

In Indonesia, the implementation of urban farming in urban areas has shown positive effects in addressing food, economic, and social issues. Urban farming has the potential to promote small businesses, create new job opportunities, and enable women to contribute to family income (Alynda and Kusumo, 2021). This demonstrates that urban farming has great potential to support food security and a sustainable economy. This study aims to analyze the impact of urban farming within a framework that supports food security and sustainable economics.

B. Literature Review and Hypothesis Development

Literature Review

Urban farming or urban agriculture is the practice of growing crops and raising livestock in urban areas. Urban farming offers a solution for meeting the food needs of urban communities by utilizing limited spaces, such as yards, rooftops, and public spaces (Badami and Ramankutty, 2015). The goal of urban farming is to efficiently use urban land to produce fresh food and

support food self-sufficiency for urban communities. Additionally, urban farming helps reduce the carbon footprint by shortening the food distribution chain.

According to Law No. 18 of 2012th, food security is a condition in which food needs are met at the national to individual levels, reflected in the availability of sufficient, safe, diverse, nutritious, equitable, and affordable food that does not conflict with religious beliefs, values, or cultural norms, allowing people to live healthy, active, and productive lives sustainably (Salasa, 2021). This concept is based on four main pillars food availability, accessibility, utilization, and stability.

A sustainable economy is an economic system that aims to meet the needs of the current generation without compromising the ability of future generations to meet their own needs. In the context of urban farming, this concept includes food production that is resource-efficient and environmentally friendly. Urban farming supported by technology, such as the Internet of Things (IoT), can strengthen a sustainable economy by continuously enhancing efficiency and productivity (D'Amato et al., 2017).

Hypothesis Development

Effectively implemented urban farming can enhance urban food security through efficient and environmentally friendly food production. Urban farming has the potential to increase income, access to healthy food, women's empowerment, and job creation, thereby supporting food security and a sustainable economy. Good management and risk mitigation in urban farming can ensure safe products and support a sustainable economy through resource efficiency. Digital technologies, such as IoT, can improve the efficiency and productivity of urban farming, making it increasingly integrated into urban lifestyles.

C. Research Method

This research was conducted using a descriptive method with a qualitative approach. Data collection was carried out using a literature review technique, analyzing findings and references relevant to the research topic. The data used consists of secondary data obtained from literature sources such as scientific journals, research reports, official websites, and other supporting documents related to urban farming in supporting food security and a sustainable economy.

D. Discussion

Urban Farming in a Framework to Support Food Security

According to research by Rumawas et al. (2021), food security plays a crucial role in the sustainability of a region or country as it provides essential goods for the community. Meeting food needs is vital to maintaining a balance of health and economy. Therefore, the development of urban farming can help meet household food needs, such as vegetables, fruits, and meat, and has the potential to become an additional source of income. With the additional income at the household level, the likelihood of improving household food security also increases (Abu and Soom, 2016).

According to the Global Food Security Index (2021), Indonesia experienced a decline in its food security index in 2020th, from 61,4 to 59,2, placing the country at 69th out of 113 countries. This decline was influenced by the low diversity of staple foods and vulnerability to disasters caused by climate change, extreme weather, and pollution (Pangan, 2021). The decline in the food security index, lack of staple food diversity, and climate change threats highlight the importance of efforts to strengthen food security. Urban farming can be a strategy to improve food security in urban areas by utilizing limited land to grow vegetables, raise livestock, and produce food independently.

Urban farming can enhance food availability, reduce dependence on external supplies, and be more effective in addressing climate change. Food security is a condition where food is available in sufficient quantity, quality, and is safe, affordable, and equitable. The concept of urban farming supports food security and is strongly supported by recent studies. Urban farming is seen as a potential solution to improve food access in urban areas, which faces distribution and access challenges due to dense populations and limited land. Furthermore, urban farming can reduce reliance on global food supply chains, which are vulnerable to disruptions, especially amid climate change and economic instability (Goldstein et al., 2016; Artiaga and Kremer, 2020).

Some literature suggests that food security should not always focus solely on national food self-sufficiency, but rather on sustainability and equitable access to food. Countries that focus on food self-sufficiency without considering resource efficiency may face difficulties in ensuring food availability for vulnerable groups due to suboptimal resource allocation and dependence on climate factors and domestic conditions (Clapp, 2017). In contrast, countries that adopt strategies of diversification and international trade are better able to provide affordable and high-quality food for all their populations (FAO, 2019).

Urban farming has great potential to support food security in urban areas, but there are several challenges that need to be addressed. First, the limitation of land in urban areas. Second,

the shortage of skilled labor, limited water resources, and the need for organic fertilizers. Third, urban pollution can hinder the implementation of urban farming. The development of urban farming requires close collaboration between the government, private sector, and communities. Recent research shows that synergy among stakeholders is crucial for creating policies that support sustainable urban agriculture. Cohen and Reynolds (2015), emphasize that government policies are vital in supporting urban agriculture, such as providing land in cities. In large cities with limited land, policies that allow the use of vacant land for farming can support the sustainability of this sector and increase community participation in urban farming, thus strengthening local food security.

Goldstein and Huang (2018), highlight the importance of collaboration between the government, private sector, and communities in building an efficient urban agriculture system. The private sector can play a role in providing technology, funding, and developing markets for local agricultural products. Several studies indicate that policies for sustainable urban agriculture should include incentives for environmentally friendly techniques, efficient water management, and technologies that enhance production without harming the environment.

Policies that support technological innovation are crucial in urban farming. Specht et al. (2016), emphasize that policies that facilitate technological innovation in urban agriculture can accelerate the transition to more productive and sustainable systems. The government can support the adoption of new technologies through subsidies or easier permitting for technology-based farming initiatives that improve food production efficiency in urban areas. Technologies such as adaptive urban farming, including vertical farming, hydroponics, and aeroponics, offer solutions to land limitations in cities. The implementation of digital technologies, such as the Internet of Things (IoT), can enhance the efficiency and productivity of urban farming, making it a way of life for urban communities.

Several pieces of literature suggest that urban farming requires cross-sector support to develop optimally. Government policies that provide land and financial incentives are crucial to expanding community access to urban farming and enhancing sustainable agricultural practices. In addition, collaboration with the private sector can provide technology and additional resources, while community involvement ensures the long-term sustainability of urban farming in urban areas.

Urban Farming in a Sustainable Economy Framework

The concept of sustainable development has faced various criticisms and different interpretations over time and is often referenced in various literatures. The essence of sustainable development is based on the triple bottom line principle, which emphasizes a balance between three main aspects are economic profit, social responsibility, and environmental sustainability. This principle aims to meet the needs of the present without compromising the ability of future generations to meet their own needs (Latifah, 2016). Holistic sustainable development can only be achieved if these three elements function harmoniously (Klarin, 2018).

Sustainable economy focuses on resource management while considering the balance between the interconnected economic, environmental, and social aspects, as supported by research by Hapsoro and Bangun (2020). Urban farming supports this concept by prioritizing efficient and environmentally friendly food production, thus contributing to food security and the economic improvement of communities. Through a community-based approach, urban farming helps strengthen the economic resilience of communities through self-sufficient food security in urban areas.

The concept of a sustainable economy emerged as a response to the weaknesses of conventional economic models that prioritize short-term growth and often overlook the negative impacts on the environment and society. Research related to this concept highlights the challenges in achieving a balance between economic profit, environmental preservation, and social responsibility (Costanza et al., 2016; Sachs, 2015). A sustainable economy aims to reduce the negative impacts of traditional economic systems. However, its implementation faces barriers, such as the need for a shift in business orientation, supportive policies, and cross-sector collaboration.

The implementation of a sustainable economy faces significant challenges, particularly due to the high dependence on fossil fuels. The transition to renewable energy requires substantial investment in infrastructure and technology, while the influence of the oil and gas industries often slows down clean energy policies. Countries that rely on oil exports also struggle to shift to a more diversified and sustainable economy (Van de Graaf and Verbruggen, 2015; Fouquet, 2016; Cherp et al., 2017; Sovacool, 2016). Several studies suggest that this transition requires strong policy support and a cross-sectoral approach.

After several decades, the negative impacts of modern agriculture began to raise concerns about the sustainability of human life and environmental preservation, despite significant increases in agricultural production and productivity. On the other hand, traditional farming

practices are considered safer for human survival and the environment, but their lower production and productivity can threaten food security. Both approaches encourage thinking about how to sustain the use of external inputs in agricultural systems without damaging human life and the environment.

Urban farming involves innovation and skills in food production using intensive methods, as well as recycling urban resources and waste to meet both food and non-food needs in cities (KLHK RI, 2018). Rapid urban population growth impacts food supply, making urban farming a potential solution to support food security and a sustainable economy. In addition to maximizing the efficient use of urban land, urban farming also supports a sustainable economy by reducing emissions, increasing resource efficiency, and creating economic opportunities for urban communities.

Urban farming in a sustainable economy provides economic benefits through several aspects. First, it saves distribution costs by producing food close to consumers, reducing transportation and operational costs, making food more affordable. Second, urban farming increases community income by creating profitable new business opportunities, stimulating local economic activities, and helping to maintain food price stability. Third, urban farming supports economic diversification by providing alternatives outside the industrial and service sectors, opening new income opportunities in modern and sustainable agriculture.

According to several studies, urban farming contributes significantly to resource efficiency in a sustainable economy. This is achieved through the optimal use of land, water and energy efficiency, and waste management (Specht et al., 2014; Niemeyer and Lang, 2017). Urban farming also supports the principles of a sustainable economy by using environmentally friendly technologies, reducing energy consumption, and utilizing organic waste as fertilizer. All these elements create a sustainable resource cycle, reduce pollution, and support the sustainability of agriculture in urban areas.

In the concept of a sustainable economy, waste management is a crucial aspect for maintaining balance and reducing negative environmental impacts. Urban farming allows for the effective management of organic waste by using it as compost or natural fertilizer. In large cities that generate a lot of organic waste, urban farming helps reduce waste volume and adds value. By processing waste into productive resources, urban farming aligns with the circular economy, which optimizes resource utilization and minimizes environmental impacts (Rogers and Ho, 2018; Veen and Kooten, 2017).

Urban farming makes a positive contribution to a sustainable economy by reducing carbon emissions, creating economic diversification, improving food security, and reducing distribution costs. It also strengthens the resilience and self-sufficiency of urban areas. The more productive use of urban land, environmentally friendly technological innovations, and growing public awareness make urban farming a key element in sustainable urban development.

E. Conclusion

Urban farming is capable of producing food efficiently and environmentally friendly, offering great opportunities for development in Indonesia to support urban food security. Various studies show that urban farming can increase income, facilitate access to healthy food, and create job opportunities for urban communities. Additionally, urban farming has the potential to make a positive contribution to food security and sustainable economic development.

The implementation of urban farming requires good management and effective risk mitigation to ensure products that are safe and healthy for consumers. This aligns with the principles of sustainable economics, as urban farming uses resources efficiently and contributes to food security, food price stability, and the improvement of the economic well-being of communities. Technological innovations, especially digital-based ones like the Internet of Things (IoT), can enhance the efficiency and productivity of urban farming, making it more optimal and a part of urban lifestyles.

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