
URBAN AGRICULTURE AS A SOCIAL STRATEGY IN ACHIEVING FOOD SECURITY: CASE STUDY OF YOGYAKARTA CITY

Amandita 'Ainur Rohmah, Falik Wardana, A. Riyan Rahman Hakiki, Sidharta Adyatma

Department of Geography Education, Universitas Lambung Mangkurat

e-mail: amanditaar@ulm.ac.id

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Abstract

Urbanization and population growth pose significant challenges for the City of Yogyakarta in meeting its food needs and ensuring availability. The rapid development rate that eliminates agricultural land is one of the problems faced by the City of Yogyakarta. On the other hand, the concept of urban agriculture has become a trend that is of interest to the Community and government, especially for dense populations with limited land. Urban agriculture itself has a significant role in achieving sustainable development. This article aims to identify the role and contribution of urban agriculture in the City of Yogyakarta and analyze the innovations and social strategies carried out in achieving food stability in the City of Yogyakarta. The research method employed is a qualitative approach, incorporating a literature review that draws on international journals, national journals, books, and articles from previous researchers. The results of the literature review indicate the successful implementation of urban agriculture in the City of Yogyakarta through two flagship programs, namely Kampung Sayur and Lele Cendol, which can be optimized by the synergy of stakeholders Gandeng Gendong Aktor 5K (Village, Campus, Community, Corporation, and Pemkot). Furthermore, the existence of various community innovations allows the City of Yogyakarta to implement the development of an integrated urban farming system.

Kata Kunci:

Pertanian Perkotaan;
Stabilitas Pasokan Pangan;
Kota Yogyakarta

Abstrak

Urbanisasi dan pertumbuhan penduduk memberikan tantangan bagi Kota Yogyakarta dalam pemenuhan kebutuhan dan ketersediaan pangan. Tingginya laju pembangunan yang mampu mengeliminasi keberadaan lahan pertanian menjadi salah satu permasalahan yang dialami oleh Kota Yogyakarta. Di lain sisi, konsep urban agriculture menjadi trend yang diminati masyarakat dan pemerintah khususnya untuk jumlah penduduk yang padat dengan lahan yang terbatas. Pertanian perkotaan sendiri memiliki peran utama dalam mencapai pembangunan berkelanjutan. Artikel ini bertujuan untuk mengidentifikasi peran dan kontribusi urban agriculture di Kota Yogyakarta serta menganalisis inovasi dan strategi sosial yang dilakukan dalam mencapai stabilitas pangan di Kota Yogyakarta. Metode penelitian yang digunakan adalah metode kualitatif dengan tinjauan pustaka yang bersumber dari jurnal internasional, jurnal nasional, buku, serta artikel dari peneliti terdahulu. Hasil literatur review menunjukkan adanya keberhasilan implementasi urban agriculture di Kota Yogyakarta melalui dua program unggulan yaitu

Kampung Sayur dan Lele Cendol yang dapat dioptimalkan dengan sinergi stakeholder Gandeng Gendong Aktor 5K yaitu Kampung, Kampus, Komunitas, Korporat, dan PemKot (Pemerintah Kota Yogyakarta). Lebih jauh, adanya berbagai inovasi masyarakat memungkinkan Kota Yogyakarta untuk menerapkan pengembangan integrated urban farming system.

Author Correspondence

Email: amanditaar@ulm.ac.id

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INTRODUCTION

Yogyakarta City is the capital of the Special Region of Yogyakarta (DIY) Province. It is the only second-level region with city status, alongside four other second-level regions with district status (BPKP Provinsi DIY, 2021). Yogyakarta City, as the capital of the Special Region of Yogyakarta, has a strategic location, namely in the center of the city. Yogyakarta City, a city of education, culture, and tourism, has a stronger attraction than the surrounding regencies. According to Tabrez (2025), the global urban population will reach 65% by 2025. The push for urbanization, driven by economic factors, access to education, and opportunities for a better life in the city, is a key factor contributing to the high population in Yogyakarta City. Based on the projection data of the Central Statistics Agency (BPS) of Yogyakarta City, it is predicted that by 2020, the population in Yogyakarta City will increase by 5,827 people.

The process of urbanization has led to rapid development, resulting in the elimination of agricultural land in urban areas. The increasing population growth each year places a burden on Yogyakarta City's ability to meet its basic needs, including food availability. Food is a basic human need. A relatively stagnant food supply compared to demand can create economic instability and greater inequality. The larger the population, the greater the need for food in a region.

On the other hand, the COVID-19 pandemic in Indonesia has had a significant impact, particularly on the Community's economy. Yogyakarta is no exception, with numerous small and medium enterprises, the informal sector, and the private sector significantly impacting the city's economy. Continuous population growth, increased food demand, and the unstable economic conditions caused by COVID-19 have impacted poverty levels in Yogyakarta. Figure 1 shows that the COVID-19 pandemic in 2020 led to an increase in the percentage of people with low incomes in 2021. Poor people often struggle to afford sufficient food. This finding aligns with research showing that 32 to 43 percent of people in urban areas in low-income countries are food insecure (Tefft et al., 2020).

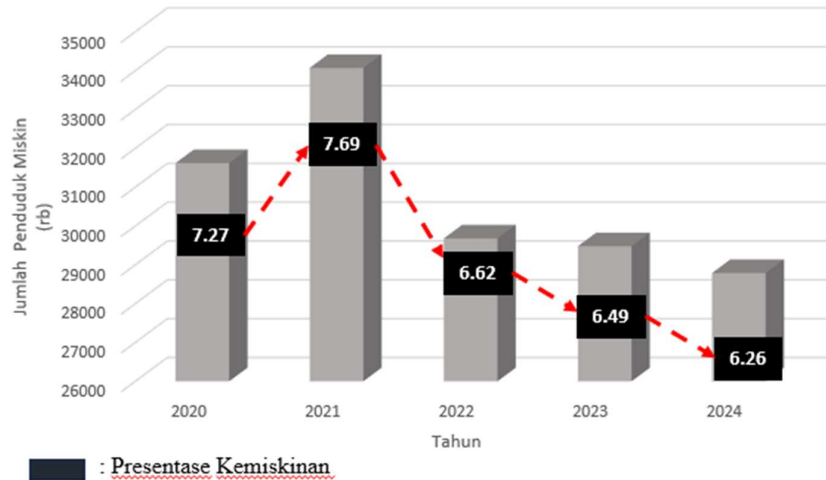


Figure 1. Population Projection and Poverty Percentage in Yogyakarta City 2020-2024
Source: Processed data, 2025

The simultaneous increase in urbanization and poverty will lead to the emergence of issues of urban food insecurity, availability, and stability (Putra et al., 2020). Various factors, such as individual food preferences, social factors, and economic factors, influence urban food needs. Poverty indirectly impacts people's purchasing power, especially the poor. Therefore, the government's role is crucial in ensuring that poor households can continue to meet their food needs.

Agriculture is an important activity in supporting food production for consumption by the population of a region. The limited availability of paddy fields, which are increasingly rare in urban areas, is one of the challenges facing urban food supply. Table 1 shows that non-paddy fields dominate the land area in Yogyakarta City. The 2022-2024 period shows a trend of decreasing paddy fields and increasing non-paddy fields. Non-paddy fields, in this case, consist of yards, dry fields, and other areas.

Table 1. Productive Land Area in Yogyakarta City

Land area	2022	2023	2024
Paddy Fields (Ha)	46.75	37.33	34.17
Non-Rice Field Land (Ha)	3,234	3,244	3,215

Source: BPS Yogyakarta City, 2022; BPS Yogyakarta City, 2023; BPS Yogyakarta City, 2024

Urban agriculture, more commonly referred to as urban farming, is an alternative solution for food supply in urban areas. The initiative to optimize yard space stems from the government's desire to increase household incomes by utilizing local resources, specifically those owned by the majority of the population (Pasha et al., 2014). Well-managed urban agriculture can contribute to the food supply. In Indonesia, urban agriculture has been

implemented in various regions, including the city of Yogyakarta.

The Yogyakarta City Government, through the Vegetable Village and Lele Cendol Programs, has become one of the flagship programs in 2019 as a government effort to ensure food stability, alleviate poverty, and improve community welfare based on community groups. The Vegetable Village is a program that utilizes alleys in residential areas, street alleys, and residents' yards to grow various vegetables. The Lele Cendol program, on the other hand, involves catfish cultivation using concrete pipes as a pond medium (Yuningrum & Sahayati, 2020). However, the role and contribution of urban agriculture in Yogyakarta City in achieving food supply stability have not been identified.

The two research questions used as the basis for this research are: 1) What is the role and contribution of urban agriculture in Yogyakarta City?, and 2) What innovations and efforts have been made to achieve food stability in Yogyakarta City? The literature review indicates that the socio-economic role of Kampung Sayur and Alley Sayur strengthens household food security and increases the potential for social capital (stakeholders) to support food security. However, the lack of a systematic evaluation and role model of urban agriculture in urban food security and stability represents a gap in this research. Therefore, this research provides a platform for exploring the role and contribution of urban agriculture in Yogyakarta City, as well as stakeholder role models within it. Furthermore, urban agriculture can be projected to address food availability and strengthen the city's food security.

METHOD

The research "Urban Agriculture as a Social Strategy in Achieving Food Security: A Case Study of Yogyakarta City" is an exploratory study. This study aims to obtain an overview of the role and contribution of Urban Agriculture as a social strategy in achieving food security. Therefore, the research design used is a literature study method. According to Sugiyono (2016), a literature study is defined as a theoretical study related to the values, culture, and norms that develop in the social situation being studied, where the research will not be separated from scientific literature. Furthermore, a literature study can also be defined as a mandatory activity in research, which aims to develop theoretical and practical aspects (Magdalena et al., 2021). A literature study is conducted to gather information from previous studies that can serve as a basis for further research. Furthermore, the literature study is derived from a range of reading materials, including national and international journals, news, and other relevant sources, which support the research being conducted. The research technique used is qualitative descriptive analysis.

This study analyzes community social capital in strengthening food security and stability. According to Putnam (Damsar, 2009), social capital is a social investment encompassing social resources such as networks, trust, values, and norms within the structure of social relationships to achieve individual or group goals efficiently and effectively with other assets. Social capital can also grow and be inspired by collective movements (Sudarmono, 2021). In the context of Yogyakarta City, social capital is manifested in the Gandeng Gendong (Gage) Movement.

RESULTS AND DISCUSSION

The research results show that urban agriculture in Yogyakarta City plays a crucial role in providing food for the Community, particularly in addressing the food crisis during difficult times such as the COVID-19 pandemic. Furthermore, the social capital of the Yogyakarta City community, involving the synergy of the 5K Actors: Villages, Campuses, Communities, Corporations, and the Yogyakarta City Government, is a strength for Yogyakarta City in realizing urban food security. This is further explained in more detail below.

The Role and Contribution of Urban Agriculture in Food Provision in Yogyakarta City

Agriculture, according to Law Number 22 of 2019, is defined as the activity of managing biological natural resources with the help of technology, capital, labor, and management to produce agricultural commodities that include food crops, horticulture, plantations, and/or livestock in an agro-ecosystem. Currently, the concept of urban agriculture is a trend that is of interest to the public and government, especially for densely populated areas and limited land. Urban agriculture has a significant role in achieving sustainable development (Guzman-Molina et al., 2025; Karpe et al., 2025; Thwaites et al., 2025; Yang & Sono, 2025), especially in SDG 2 (Zero Hunger), SDG 11 (Sustainable Cities and Communities), and SDG 12 (Responsible Consumption and Production). Urban agriculture contributes to food production, income generation, waste recycling, preventing urban sprawl, preserving biodiversity, and increasing local resilience and economy (Tabrez, 2025).

In general, urban agriculture is an activity of growing, handling, and distributing food in urban areas, and making food production a part of city life (Tabrez, 2025). The role and contribution of urban agriculture in Yogyakarta City are evident in the implementation of the Yogyakarta City Government's flagship programs, the Vegetable Village and Lele Cendol Programs. The Vegetable Village and Lele Cendol Programs are agricultural cultivation techniques that do not require extensive land. The Vegetable Village Program is implemented

by utilizing alleys in residential areas, street alleys, and residents' yards. Meanwhile, the Lele Cendol Program uses drums as ponds. This aligns with research by Dona et al. (2021) that found community gardens are the most popular model in urban agriculture, compared to other models.

The Vegetable Village and Catfish Cendol program was chosen as a flagship program in Yogyakarta City because vegetable and catfish cultivation do not require large areas of land. Furthermore, it is hoped that a more secure vegetable supply will increase the need for minerals and vitamins obtained from vegetable production, as well as protein from fisheries, specifically catfish. The types of vegetables planted are basic commodities most frequently needed by the Community, such as shallots, mustard greens, kale, spinach, chilies, and so on. The selection of plant types is based on ease of cultivation, thus reducing the risk of crop failure, and the types of common crops frequently consumed by the local population.

On the other hand, the demand for fish consumption, which is not commensurate with the production capacity of fish farming in the Community, remains a challenge. In Yogyakarta City itself, fish consumption is dominated by catfish, which remains a favorite and primary choice. The demand for catfish in Yogyakarta City is influenced by the large number of food stalls serving pecel lele (a type of catfish served in a salad), which require a daily supply of catfish, both for street stalls, lesehan (a type of food served in a salad), and for restaurants.

To meet its catfish demand, Yogyakarta City has relied on catfish supplies from outside the region, such as Boyolali and Magelang. According to Lang & Barling (2012), the distance between production locations and consumers impacts availability, accessibility, utilization, affordability, and the stability of the food system. Commodity production, often located far from consumers, has ecological implications, quality concerns, and price implications. With the Vegetable Village and Lele Cendol Programs, agricultural products such as vegetables, fruit, and catfish can be produced in the city, thereby maintaining product quality. Furthermore, urban agriculture provides direct access to home-produced food for households and informal markets. Urban agriculture is now recognized as a strategy for addressing various urban challenges, particularly in developing countries (Baffoe & Antwi-Agyei, 2025; Ramadan et al., 2025).

Proximity to consumers can save transportation costs and maximize farmers' profits. In terms of quality, urban agriculture products improve the freshness of perishable foods, facilitate access to urban consumers, and increase the variety and nutritional value of available foods. Urban agriculture provides positive value not only in meeting food needs but

also has practical values that can impact the ecological and economic sustainability of urban areas. The Kampung Sayur and Lele Cendol Program in Yogyakarta City aims to alleviate poverty, increase food security, and stabilize food supplies through community empowerment schemes. Urban agriculture in Yogyakarta City, through the Kampung Sayur and Lele Cendol Program, has been able to optimize the city's potential to meet community needs and achieve food supply stability in Yogyakarta City.

The choice of agricultural business type in Yogyakarta City is tailored to regional conditions. Based on Table 2, it is evident that the volume of vegetable and catfish harvests in Yogyakarta City is sufficient to meet family food needs, with some being sold commercially to neighbors, residents, informal markets, and vegetable vendors. In addition to growing vegetables, some communities also maximize profits by farming catfish. Catfish farmers use a pond rotation system, allowing farmers to harvest commercial-sized fish every two to three months.

Table 2. Evaluation of the Lele Cendol and Kampung Sayur Programs in Yogyakarta City

No	Aspect	Catfish Cendol Program	Vegetable Village Program
1	Human Resources (HR)	Dominated by high school education (57.8%)	Dominated by high school education (67.9%)
2	Harvest Production Amount (1x Harvest)	0 - 499 tails	0 - 10 kg
3	Seeding to Harvest Time	2 – 3 months	1 month
4	Yields	For personal consumption and sale	For personal consumption and sale

Source: Yuningrum and Sahayati, 2020

Furthermore, a review of the Yogyakarta City Statistics Agency (BPS) Data in Figures for 2025 shows an increase in catfish production from 2023 to 2024. In 2023, it was 34,077 kg, and in 2024, it reached 38,126 kg. This suggests that urban agriculture in Yogyakarta City, supported by city government policies, can enhance the food supply in the form of catfish commodities for Yogyakarta City residents.

Through urban agriculture, the utilization of unused land in urban areas can be optimized to meet community needs (food sufficiency) and potentially facilitate export expansion. Furthermore, urban agriculture has gained global recognition as a strategic approach that promises to create sustainable and reliable food sources, as well as improve food security and resilience in urban areas (Gunapala et al., 2025), especially in areas facing rapid urbanization, food insecurity, economic vulnerability, and environmental pressures (Alkhaja et al., 2025). The implementation of urban agriculture in Yogyakarta City through a community empowerment scheme fosters a sense of togetherness, creates a culture of cooperation, and becomes a productive activity that the Community can participate in.

Furthermore, urban agriculture can make cities more resilient, not only by diversifying urban food sources and income opportunities, but also by maintaining urban green spaces, increasing vegetation cover and water infiltration, and contributing to sustainable water and natural resource management. Furthermore, urban agriculture is promoted as a means to increase food security, reduce climate impacts, and enhance urban resilience (Acevedo-De-los-Ríos et al., 2025).

Innovation and Efforts to Achieve Food Stability in Yogyakarta City

Urban agriculture focuses more on proximity to consumers and prioritizes sustainability and community development (Hawes et al., 2024). The Kampung Sayur and Lele Cendol programs, implemented in Yogyakarta City, are driven by the innovation and efforts of various stakeholders. Yogyakarta City, in particular, has the potential for social capital in the form of the Gandeng Gendong (Gage) synergy. Gandeng Gendong is a comprehensive, flexible, and user-friendly joint movement program that can be used in a variety of situations. Its implementation involves the synergy of the 5K actors: Villages, Campuses, Communities, Corporations, and the Yogyakarta City Government. The development of urban agriculture within the Gandeng Gendong synergy scheme can optimize the implementation of urban agriculture in achieving food stability in Yogyakarta City.



Figure 2. Design of Urban Agriculture Development Model in Yogyakarta City's Cooperation and Support Synergy Scheme
Source: Analysis results, 2025

Based on Figure 2, the basis for program implementation and development in Yogyakarta City is through village development. The dynamics of village development in Yogyakarta City itself have varying characteristics and uniqueness. Examples include Guava Village in Gemblakan, Avocado Village in Surokarsan, Passion Fruit Village in Blunyahrejo, Red Onion Village in Sidikan, and many more. Furthermore, the Yogyakarta City Government has designated Sustainable Food Villages as targets for growing various staple foods as part of food security.

The city, specifically the Yogyakarta City Government, contributes to policy interventions, planning, monitoring, and evaluation of the implementation of urban agriculture programs. The development, handling, and distribution of food in urban areas through urban agriculture make food production a part of urban life (Tabrez, 2025). In line with existing flagship programs, the Yogyakarta City Department of Agriculture and Food has also launched the "Community Movement for Consuming Fruits and Vegetables," often referred to as Gebyur. This activity was formed as an effort to increase the demand for fruits and vegetables, synergized with the Vegetable Village Program in Yogyakarta City. Not limited to the Gebyur Movement in encouraging urban agriculture in Yogyakarta City, the Department of Agriculture and Food has an agricultural motto, "nandura sik dipangan, mangana sik ditandur," which means the recommendation to plant what people eat, and eat food from plants that have been planted. This initiative aims to achieve food independence and stability in Yogyakarta City. Overall, government governance will determine the extent to which cities can effectively address food system issues and how local solutions can contribute to food system challenges (Tefft et al., 2020).

Furthermore, the Campus, specifically the potential for higher education in Yogyakarta City, can provide academic research support to strengthen human resources through research development packaged in empowerment schemes, such as research, KKN, KKL, or other empowerment schemes. Meanwhile, Corporations can play a role in the development of local products, marketing and promotion of production results, and facilitation with CSR funding schemes. Urban agriculture allows for the utilization of urban agricultural technology and green infrastructure (Debie, 2025). With a synergy scheme of cooperation with business actors, it is hoped that businesses in Yogyakarta City can supply or utilize their needs from the Harvest of residents (business actors need raw material input, while residents have raw materials harvested to supply the needs of business actors).

Furthermore, the Community plays a role in inter- and intra-community consolidation. Several Kampung Sayur and Lele Cendol communities in Yogyakarta City include: the Green

Volunteer Community, the Tanam Tuwuh Farmers Group (Karangwaru), the Srikandi Women's Farmers Group (KWT) (Umbulharjo), the Sumber Asri Farmers Group (Bausasran), the Makmur Farmers Group (Jetis), and many more. Through the synergy of stakeholder actors facilitated by Gandeng Gendong, the emergence of more comprehensive, effective, and efficient innovations and new businesses can be encouraged.

The various potentials in Yogyakarta City allow for the development of an integrated urban farming system where agriculture and livestock farming in limited land, especially in urban areas, are integrated so that the results can be optimized for household food production. Specifically, urban farming is a form of agricultural cultivation activity that combines agriculture, fisheries, and/or animal husbandry (integrated farming) or agricultural activities in the narrow sense (agricultural farming) (Septya et al., 2022). Urban farming also plays a role in maintaining social sustainability by reducing inequality in access to food (Pratio et al., 2024), which enables the production of a wide variety of crops, including vegetables and fruits, which are essential for a healthy diet (Lal et al., 2021).

With this system, it is possible to sell the produce. Several Vegetable and Lele Cendol Villages in Yogyakarta have implemented an integrated urban farming system with biofloc and wolkaponics cultivation systems, a vertical vegetable cultivation system where catfish are raised in small ponds beneath the plants, allowing the catfish waste and mucus to support the growth of the plants above.

So far, the implementation of urban agriculture in Yogyakarta City has been limited to production. Breakthroughs or innovations are needed to improve quality and marketing. The Gandeng Gendong synergy is expected to provide input and strategies for farmers, thereby providing development insights. Given the characteristics of modern urban communities, the sale of agricultural commodities in processed form (cooked or semi-cooked) can increase the economic value significantly, such as frozen catfish ready to fry, catfish floss. Innovations in catfish feed that are branded, packaged, managed, and marketed appropriately will have a greater impact.

Some innovations carried out in the implementation of urban agriculture in the City of Yogyakarta include: 1) Lumbung Mataram Innovation, an innovation by utilizing residents' unmaintained empty land (idle land) into agricultural land; 2) Gogrok COVID-19 Innovation, an innovation in cooperation for community resilience in facing the COVID-19 outbreak; and 3) Gelar Gulung'55 Innovation, a lumantar guyub lung tinulung movement between community members. Overall, the innovations and efforts are based on the Kampung Sayur and Lele Cendol Programs, which utilize unused land to turn the Harvest into fulfilling

family food and nutrition needs through a buying and selling system with neighbors. This approach aims to achieve empowerment, resilience, independence, and food sovereignty for residents.

CONCLUSION

Urbanization, the COVID-19 pandemic, and poverty issues have increased pressure to provide sufficient, safe, affordable, and nutritious food. The City of Yogyakarta, through its two flagship programs, Kampung Sayur (Vegetable Village) and Lele Cendol (Cendol Lele), has successfully implemented the concept of urban agriculture to achieve a stable food supply in the city. The synergy between stakeholders (Villages, Campuses, Communities, Corporations, and the City Government) in managing and developing urban agriculture helps address complex and interconnected issues in the food system.

Support for food in various thematic areas, including technology, capital, innovation, policy intervention, and market management, is vital from various stakeholder perspectives. Better knowledge and understanding provide a basis for all stakeholders to work together to find solutions to emerging problems in achieving food stability and creating a more inclusive, sustainable, nutritious, and efficient food system in Yogyakarta City.

This research is limited to using the literature review method and is limited to the Yogyakarta City area. Further research could be conducted by expanding and comparing the study area to other cities in Indonesia to compare variations in urban agriculture practices and social strategies. Furthermore, future research could place greater emphasis on community social capital, including the level of community participation, in determining the success of urban agriculture practices as a social strategy.

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