



Urban Agriculture: Cultivating Sustainable Food Systems for Resilient Cities

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Abstract

Urban agriculture is the practice of growing plants and raising animals in a city or town and its surrounds primarily for human food and other domestic requirements. Urban agriculture is the term used to describe farming in urban and peri-urban areas. Peri-urban areas are those that transition from rural land uses (like agriculture or animal production) to urban ones (like the built environment, manufacturing, services, and utilities), and are located between the perimeter of metropolitan and regional centers and the rural environment.

Urban agriculture includes activities including cattle rearing, aquaculture, beekeeping, and large-scale floriculture and aims to cultivate or develop a variety of food and non-food things. Producing, processing, selling, and transporting agricultural products are also included in its scope. A variety of production methods make up

urban agriculture. From small-scale domestic agriculture and processing to industrial-scale agribusiness, they cover the entire spectrum. On the outskirts of the city is where this is typically done. Urban and peri-urban agriculture (UPA) is recognized by the Food and Agricultural Organization (FAO) as an important contributor to food security, the creation of livelihoods, particularly for women, the alleviation of poverty, and the resilience and sustainability of cities.

Emergence of urban agriculture

Urban agriculture is thought to be originated way back in prehistoric periods in the Persian semi-desert towns and the medieval city of Machu Picchu (André, Viljoen (2005)). The early systems included oases fed through aqueducts which carry mountain water to support farming in the town were found in Persia and water storage, reuse, stepped architecture, and specialised designs to grow vegetables were found in the medieval city of Machu Picchu. During industrialization period the realization of importance of supplemental food production beyond rural farming and distant import struck the population. It was mainly during the war periods and depression times the realization struck when food insecurity arose. Allotment gardens in Germany rose as result of poverty and food insecurity in the 19th century. The actual intension of urban agriculture started when depression-struck citizens of Detroit were asked by the city mayor to use vacant lots to grow vegetables in 1893. Such green areas were intended to produce income, food supply and raise the confidence during hardship. World war I and II paved were for victory gardens in US, Canada, and UK where fruits, vegetables and herbs were grown. These efforts released the tension on food production that was an after effect of the war. The aspects of urban agriculture have grown from subsistence



food production to commercial scale over the years. But still urban agriculture hasn't reached its full potential. The expansion of urban agriculture in cities hasn't been what was expected. Some of the underlying challenges includes poor economic profitability, lack of awareness, amount of available land in the cities, environmental perspectives etc., The clear and thorough understanding of the purpose and advantages of urban agriculture can lead to more of its development. Urban agriculture is accompanied with various socioeconomic benefits including food security, social justice, environmental quality, urban health, and hygiene (Atheena, 2023).

Expansion of urban agriculture by utilization of innovative methods and technologies, the constant pressure on rural agriculture for balancing the food security can be alleviated. Moreover, the monoculture system which is continuedly been practised in rural agriculture systems can be reduced by urban agriculture practices where cultivation is based on needs and can provide sufficient variety of crops and vegetables required for daily consumption (Viljoen, 2005).

- ❖ Cities once regarded as no place for agriculture started to change into green spaces when the perception of people changed, and people discovered ways to incorporate agriculture into cities.

Creative utilization of vacant lots, designing roof top gardens, biotechnological advances paved way for the modern urban agriculture.

Methods of urban agriculture

Urban agriculture encompasses a range of methods and practices that are tailored to the unique conditions of urban environments. Here are some commonly employed methods:

- Vertical farming: By growing plants in vertical structures like walls or

towers or in stacked layers, vertical farming makes use of available vertical space. This approach maximizes the utilization of land, especially in places with constrained horizontal space.

- Container gardening: Growing plants in pots, containers, or raised beds is known as container gardening. Small places like balconies, rooftops, or windowsills are ideal for using this technique. It offers flexibility in plant choices and is simple to modify for certain urban environments.
- Rooftop gardening: Rooftop gardens make use of rooftops for growing plants. They can be created on the roofs of buildings, offering opportunities for urban agriculture in densely populated areas. Rooftop gardens may require structural modifications to support the weight of soil, and irrigation systems are typically installed to ensure adequate water supply.
- Community gardens: Residents gather in communal areas called community gardens to grow fruits, vegetables, and herbs. These gardens encourage neighborhood interaction and provide people a chance to gain and share gardening knowledge. Individuals or groups are frequently given plots in community gardens so they can grow their own food.
- Greenhouse farming: Plants may be grown year-round in a controlled environment thanks to greenhouses. They offer the best conditions for growth while safeguarding plants from harmful insects and extreme weather. A variety of crops can be grown in greenhouses, extending the



growing season in metropolitan locations.

- **Aquaponics:** A technique known as aquaponics combines hydroponics (plant growth in water without soil) and aquaculture (fish farming). This process involves a symbiotic relationship between the plants, which filter the water while receiving nutrients from fish faces. Aquaponics systems provide year-round food production and can be installed indoors or outdoors (Grace *et al.*, 2022).

Advantages of Urban Agriculture:

1. Enhancing Food Security:

Contributing to food security is one of urban agriculture's main advantages. It lessens reliance on far-off and unreliable food supply systems by moving food production closer to urban populations. Urban agriculture may give inhabitants, especially in food deserts or underserved areas, with fresh, nutrient-dense produce, including fruits, vegetables, and herbs, enhancing access to healthy food options.

2. Environmental Benefits:

Urban agriculture benefits the environment in a number of ways. It maximizes land use effectiveness and lessens the effects of urban heat islands by making use of unused lots, rooftops, and vertical spaces. Through rainwater collection and green infrastructure, urban farms may reduce stormwater runoff and encourage water conservation. Furthermore, local food production lessens the carbon impact brought on by long-distance travel and traditional agricultural methods.

3. Community engagement and social cohesion:

Urban agriculture promotes social cohesiveness and community involvement. Urban farms and community gardens work

as gathering places, providing chances for locals to talk, learn from one another, and form relationships. These programs foster a sense of neighborhood pride, belonging, and cultural diversity, which strengthens ties between neighbors.

4. Economic Development and Local Resilience:

Urban agriculture helps the local economy grow and is resilient. It creates job opportunities and boosts the local economy by assisting small-scale farmers, company owners, and neighborhood establishments. Urban agriculture also makes cities more resilient by varying their food sources and lowering their susceptibility to outside disturbances like natural catastrophes or supply chain disruptions (Hazen, 2014).

5. Health and well-being

The public's health and wellbeing are positively impacted by having access to fresh, locally grown food. By making fresh produce more accessible and affordable, urban agriculture promotes healthier eating habits. Urban farming involves physical activity that encourages physical activity and can help fight sedentary lifestyles. Furthermore, the presence of green spaces in cities contributes to better mental health, reduced stress, and an overall higher standard of living.

Challenges of Urban Agriculture

Limited land availability, soil contamination, water management issues, resource accessibility, regulatory impediments, managing pests and diseases, and a lack of information and skills are just a few of the difficulties faced by urban agriculture. Urban agriculture provides answers for food security, environmental sustainability, and community development in cities despite these obstacles. To solve these issues and develop resilient urban food systems, cooperation among policymakers, urban



planners, community leaders, and farmers is essential.

Future thrust

Urban agriculture has a bright future ahead of it. Technology breakthroughs like vertical farming, hydroponics, and smart farming systems that maximize resource utilization and boost productivity are some of the main emphasis areas. Sustainability will be further improved by the incorporation of renewable energy sources and cutting-edge water management strategies. Urban planners, decision-makers, and agricultural professionals working together will produce supporting policies, rewards, and rules that favor urban agriculture. Urban farmers will be given the skills and knowledge they need with the help of investments in training, education, and research and development programmers. The urban agricultural movement will also be strengthened by encouraging community involvement and developing networks for information sharing and resource exchange. Urban agriculture can thrive and contribute to food security, environmental sustainability, and resilient cities by embracing these thrust areas.

Conclusion

Urban agriculture is a transformative force that can help solve urgent problems that face contemporary cities. Urban agriculture helps to build resilient and livable urban environments by fostering food security, environmental sustainability, community engagement, economic rewards, and better health and well-being. In order to ensure a sustainable and successful future for urban residents as cities expand, it is essential to embrace and promote urban agriculture as a fundamental element of urban planning, policymaking, and community development.

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