

URBAN AGRICULTURE'S POTENTIAL TO ADVANCE MULTIPLE SUSTAINABILITY GOALS

An International Resource Panel Think Piece

KEY MESSAGES, FACTS AND FIGURES

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Key Message 1: As environmental challenges grow and the COVID-19 pandemic highlights the fragility of food systems, one of the biggest challenges facing the world is feeding growing urban populations while attending to the social, economic, and environmental needs and aspirations of cities.



Key Message 2: Done well, urban agriculture can help feed people in cities and alleviate the triple planetary crises of climate change, nature and biodiversity loss, and pollution and waste. For example, hydroponic closed-loop systems can save 40 per cent of irrigation water and 35-54 per cent of nutrients.



Key Message 3: Despite the opportunities, we do not fully understand the effectiveness of urban agriculture and the policy actions needed to tap its potential. Local contexts and uncertainties need to be clarified, while diverse forms of urban agriculture must be integrated into a portfolio of approaches that cover land-based and vertical farming, poultry and fish farming, and high-tech indoor techniques.



Key Message 4: While there are trade-offs, a portfolio of urban agriculture policies integrated within a larger regional agricultural system can support the transition to a more resilient and sustainable food system while improving the circular economy of cities.



Key Message 5: When designed to support poor communities – in particular, households led by women – urban agriculture can reduce poverty, improve nutrition, reduce inequities, increase well-being and generate livelihoods. For example, a study in São Paulo, Brazil showed that enhanced urban agriculture could supply all 21 million residents of the city with vegetables while creating more than 180,000 jobs.



Key Message 6: When designed to develop a local food economy, high-tech indoor agriculture and local food hubs may play an important role. For example, vertical farming is expected to reach a value of \$7.3 billion globally by 2025. However, when looking at the scalability of business models, decision makers should consider impacts on energy, land, labour, and water, and the effects of pollution on food quality and safety.



Key Message 7: Due to the proximity to consumers, diversified and coordinated urban-regional agriculture can promote resilience to food system disruptions, such as those caused by COVID-19.



Key Message 8: Urban agriculture's contribution to reducing environmental impacts from food systems depends on business models and local contexts. Cities must gather data that are more locally and context-specific to measure the environmental impacts of different modes of urban agriculture and policies designed to address them.



Key Message 9: Institutional, governance, behavioural and technical barriers need to be addressed to make urban agriculture part of a sustainable food systems portfolio. Proper attention must be given to land-use planning, urban-regional policy directives, and the cost of land and energy.



RECOMMENDATIONS FOR ACTION

Policy and decision makers need to consider impacts on energy, land and water use, and the potential effects of pollution on food quality. As such they can implement/consider a range of policies/technologies/business models and governance to accelerate the transition towards circular urban farming:



01_Technologies

- Urban agriculture needs to be circular, and fair and equitable for producers and consumers.
- Urban agriculture can mitigate the environmental impacts of mineral fertilizers as well as the emissions from landfilling by using organic waste as fertilizer.
- Modern technologies such as controlled-environment agriculture (vertical or greenhouse farming, hydroponics, aeroponics, aquaculture, aquaponics) should be explored.



02_Policies

- Financing and technical assistance policies for transitioning food production towards more sustainable models without pesticides and with soil regeneration and sustainable use of water.
- Land access policies, through institutional regularization of areas already occupied by productive farmers and land-use agreements in available public areas.
- Recognition of urban agriculture and peri-urban policies in master plans, urban zoning and instruments for territorial planning and land-use regulation.
- Policies for more sustainable water use and access, such as infrastructure investment in cisterns, wells and irrigation systems that avoid using treated water for human consumption.
- Policies to oversee organic waste composting and urban planning for local food production.
- Policies to strengthen public markets for local producers.
- Public procurement policies that privilege local producers when possible (e.g., school meals).
- Policies that support research and data collection on food systems and related challenges.
- Policy interventions for a circular economy may also apply to urban agriculture. These are regulatory frameworks, fiscal frameworks, education, information and awareness creation, public procurement policies and innovation support schemes.



03_Business Models

- Urban agriculture should be designed to create, deliver and capture value by identifying a viable market for products that have real demand.
- Leverage urban consumers increased concerns about environmental and social issues related to food production and distribution – such as in the vegetable box subscription model for organic produce.
- Urban agriculture business models must distinguish themselves by adapting to cities and shifting away from “mainstream commodity market and global prices mechanisms”



04_Governance

- Implement multi-stakeholder initiatives for monitoring and management of food systems that serve communities as urban agriculture becomes integrated within cities.
- Establish a multi-stakeholder forum or mechanism that addresses issues and the integration of related public policies in a coordinated and holistic way.
- Promote integrative and systemic approach and create platforms for collaboration among key food system actors.
- Bring together a range of actors, including city planners, farm managers, the underserved urban population, state institutions, and non-governmental and civil society organizations.



FACTS AND FIGURES

(Please refer to Think Piece for sources)

Feeding the world's cities

- By 2050, 70 per cent of the world's population will live in urban areas, and 80 per cent of food globally is expected to be consumed in cities.
- Urban food consumption is one of the largest sources of material flows and carbon footprints in cities
- The COVID-19 pandemic has aggravated urban food insecurity, affected livelihoods and food prices, and increased the urban waste burden.

Circular Economy

- Urban agriculture is key for transitioning the global economy to circularity as resources per person tend to be lower in urban areas.
- Reconnecting consumers and farmers reshapes the traditional supply chain, with the potential to reduce food losses and greenhouse gas emissions.
- Connecting city dwellers with food production can bring greater transparency to the benefits and impacts of the production chain and subsidize better choices.
- Urban centres provide test beds for developing circularity-supporting techniques such as vertical farming, hydroponics and rooftop greenhouses. These techniques can benefit the environment. As an example, hydroponic closed-loop systems can save 40 per cent of irrigation water and 35-54 per cent of nutrients daily.

Climate Change

- Urban agriculture can reduce the carbon footprint of food consumed in cities by bringing it closer to consumers.
- If practiced sustainably, urban agriculture can be a nature-based solution to address environmental concerns in cities.
- Expanding green and sustainably cultivated areas can mitigate the heat-island effect while increasing the uptake of soil water and atmospheric carbon.
- Urban agriculture can also play a role in flood mitigation. A study in São Paulo showed that urban agriculture based on ecological practices could prevent the erosion of 1 million tons of soil from riverbanks, reduce the average temperature by 0.1 degree Celsius and increase rainfall infiltration in the soil.

Biodiversity

- Urban agriculture can impede urban encroachment into forest areas and provide an ecological corridor for fauna, thus helping to reduce biodiversity loss.
- Studies have shown urban agriculture maintains agrobiodiversity. For example, a survey of 25 urban backyards in Santarém, in Brazil's Amazon, identified 176 species.
- Urban agriculture can benefit ecosystems by supporting pollination and seed dispersion and regulating the microclimate.
- Urban agriculture also has the potential to enhance local food culture. Increasing the supply of local products and maintaining traditional farmers on their land enhance traditional knowledge, customs and the preservation of agrobiodiversity.

Economy and Social Benefits

- Urban agriculture can provide job opportunities and support greater community development. A study of São Paulo, Brazil concluded that enhanced urban agriculture has the potential to supply all 21 million residents of the city with vegetables while generating more than 180,000 jobs
- Urban agriculture can support social integration of disadvantaged groups (e.g., the unemployed and women) into economic activities.
- Research shows significant potential for vertical farming, a market that is expected to reach USD 7.3 billion globally by 2025.

Health Benefits

- Benefits include improved mental health, increased physical activity, consumption of fresher food, better nutrition and dietary diversity, and improved food health literacy.
- In developed countries, household and community gardening can improve nutrition by increasing participants' access to and consumption of fresh produce.

Trade-offs

- Urban agriculture can cause health issues, especially in low-income, minority communities. One study found that using untreated or partially treated wastewater for urban agriculture in Hyderabad, India contaminated produce, soil and water with pathogens.
- Pesticide and fertilizer poisoning can affect urban farmers, consumers and residents.
- Urban agricultural systems can lead to biological invasions that could harm native species, to greater mosquito-borne disease because of stagnant water from irrigation, and to spill-over of chemicals.



CASE STUDIES

In **São Paulo, Brazil**, a municipal programme to install five composting yards made it possible to process waste into organic compost. In the first half of 2020, the yards produced 1,400 tonnes of compost, which is given to urban farmers and residents.

In **Latin America**, some cities are betting on urban agriculture to promote food security. Teresina, in north-eastern Brazil, has implemented community gardens in vulnerable areas to facilitate access to fresh foods and reduce food imports. In Medellín, Colombia, the plan to promote food and nutritional security includes actions to integrate local producers into markets fairly and equitably.

In **Bogota, Colombia**, the Huertas Urbanas en Espacios Públicos de Bogotá (Urban gardens in public spaces in Bogota), project is led by the Department of Public Space Advocacy and a range of public institutions. The objective is to transform public spaces through urban agriculture to counteract the effects of climate change while allowing environmental education and promoting food security (Bogotá 2020). Currently, the regulation covers seven different community gardens in public areas.



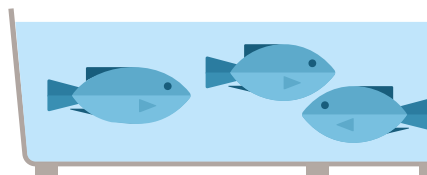
In **Minneapolis, USA**, the city helps provide access to water and compost for local community gardeners. The city also adopted a resolution that aims to expand the consumption, production, and distribution of local, sustainably produced and healthy foods.

Ghent, Belgium was one of the first European cities to launch its own urban food policy, Gent en Garde, in 2013, with strategic goals to create a sustainable food system. Awarded a United Nations Global Climate Action Award in 2019, the policy calls for a greater focus on urban agriculture incorporating programmes such as locally grown school lunches and exploring innovative business models to promote urban agriculture.

As part of its Climate Action Plan, **Paris, France** committed to creating 100 hectares of green roofs and walls, with a third of this allocated to urban agriculture project.

The city of **Bobo-Dioulasso in Burkina Faso** has put in place a policy to promote open urban lots (greenways). The greenways are planted with different fruit-bearing tree species, and space is provided for recreation. Participating households have increased their consumption of fresh vegetables and reduced their food expenditures.

In **Singapore**, one of the wealthiest nations in Asia that imports more than 90 per cent of its food, urban farming is becoming popular. The city-state, which ranks on top of the Economist Intelligence Unit's global food security index for 2019, aims to produce 30 per cent of its nutritional needs by 2030 by increasing the local supply of fruits, vegetables and protein from meat and fish.



AeroFarms is dedicated to urban agriculture, using data-driven innovations to feed a growing global population while conserving natural resources. The company uses data to take indoor vertical farming to a new level of precision and productivity, with algorithms assisting in just-in-time growing all year long. The company grows nutritious leafy greens and herbs without sunlight, soil or pesticides — with 390 times greater productivity annually than a commercial field farm while using 95 per cent less water.

In 2011, **Antananarivo, Madagascar** launched an urban agriculture initiative to promote micro-gardens in vulnerable neighbourhoods to boost food security and incomes. In 2014, a multi-actor platform was created to connect these activities, and two years later, with the signing of the Milan Urban Food Policy Pact, the idea emerged of creating a food policy committee to strengthen food governance. Thus, the Antananarivo Food Policy Council was born from a pre-existing platform of food actors who moved from focusing on urban agriculture to having a systemic vision of the food chain.

► **Urban Agriculture's Potential to Advance Multiple Sustainability Goals - An International Resource Panel Think Piece**
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