

URBAN AGRICULTURE'S POTENTIAL TO ADVANCE MULTIPLE SUSTAINABILITY GOALS

Policy Guidance from the International Resource Panel



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

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About This Think Piece

This document is an International Resource Panel (IRP) think piece, which is a technical or policy paper based on IRP scientific studies and assessments and other relevant literature. It is not a full study and assessment but a collection of science-based reflections that may catalyse the generation of new scientific knowledge and highlight critical topics to be considered in policy discourse.

Acknowledgements

Lead Authors: Elias T. Ayuk (IRP member, Ghana), Anu Ramaswami (IRP member, Princeton University, USA), Izabella Teixeira (IRP co-chair, Brazil)

Contributing Authors: Wisdom Akpalu (Ghana Institute of Management and Public Administration, Ghana), Kirti Das (Princeton University, USA), Emily Eckart (Princeton University, USA), Jaqueline da Luz Ferreira (Instituto Escolhas, Brazil), Vitoria Oliveira Pereira de Souza Leao (Instituto Escolhas, Brazil)

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Editor: Lisa Mastny





URBAN AGRICULTURE'S POTENTIAL TO ADVANCE MULTIPLE SUSTAINABILITY GOALS

POLICY GUIDANCE FROM THE INTERNATIONAL RESOURCE PANEL

Urban agriculture, for the purpose of this policy guidance and based on consistent use in literature across both developed and developing countries, is defined as: agri-food production that occurs both within urban administrative boundaries and in peri-urban areas around urban population centres. Urban agriculture can encompass many modes of agri-food production, including conventional land-based cropping, poultry and livestock rearing; indoor farming in greenhouses and more high-technology controlled-environment agriculture; as well as aquaculture, mushroom farming and insect farming. Urban agriculture has been classified into various types based on the scale/size of the farm, whether produce is sold in markets or used for personal consumption, and the location of the farm, e.g., individual household plots, community allotment gardens and larger urban farms that sell to markets. This policy guidance promotes understanding urban agriculture as part of larger sustainable food systems.

In recent years, there has been rising interest in urban agriculture as a means to rebalance urban-rural linkages, bring nature back into the city, address nutritional insecurity of the urban and peri-urban poor, and offer environmental benefits of lowered food miles traveled, with opportunity for resource circularity such as recycling nutrients from food waste and wastewater treatment to farms. For many cities that are developing food action plans, such as signatory cities to the Milan Urban Food Pact, urban agriculture emerges as a natural focal point with potential to advance multiple Sustainable Development Goals (SDGs) including sustainable cities and communities (SDG 11), good health and well-being (SDG 3), reducing inequalities (SDG 10) and zero hunger (SDG 2), in addition to multiple environmental dimensions related to land, water and climate.

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However, urban agriculture is not well understood in terms of both data and science and its effectiveness in advancing multiple dimensions encompassing nutrition, health and well-being, social equity, environmental sustainability, and sustainable cities and communities.

To address these knowledge gaps, this policy guidance serves two purposes:

- To highlight key features of urban agriculture taking an urban-rural systems perspective, drawing on a synthesis literature review across regions of the world to address urban agriculture's potential to advance multiple sustainability outcomes.
- To develop a road map for designing "fit-for-purpose" urban agriculture policies, taking a systems perspective to respond to different drivers and policy objectives, addressing multiple sustainability goals related to nutritional equity, environmental sustainability, economic development, and community health and well-being, drawing on the key features as highlighted below.

SEVEN KEY FEATURES OF URBAN AGRICULTURE ACROSS CITIES GLOBALLY

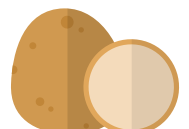


1 Recognize urban agriculture within a larger urban-rural regional system

Urban agriculture addresses food production occurring within urban administrative boundaries and peri-urban areas. At the same time, substantial agriculture is practiced in the broader rural regions around cities. Specifically, 60 per cent of global irrigated cropland and 35 per cent of global rainfed cropland is within 20 kilometres of urban extents (Thebo, Drechsel and Lambin 2014). Thus, taking an urban-rural regional systems perspective can maximize the beneficial impacts of urban food action plans, leveraging urban-rural teleconnections. Such an urban-rural regional systems approach can offer multiple benefits for food system sustainability, often greater than those realized by focusing solely within urban boundaries, as noted below:

- First, an urban-regional systems perspective can yield significant capacity for economic development, regional self-reliance and resilience in food provisioning through urban-rural connections (Nixon and Ramaswami 2018). Examples include the development of large dairy milk cooperatives in India that support urban nutritional needs and enhance rural livelihoods (Cunningham 2009) and urban farmers market programmes that engage regional farms (Farmers Market Coalition 2021).
- Second, an urban-rural perspective can highlight the importance of limiting urban sprawl wherein the outward expansion of impervious land surfaces (e.g., roads, buildings, parking lots) on surrounding agricultural lands has been shown to cause biodiversity loss, release greenhouse gas emissions and reduce livelihoods of farmers by taking over prime agricultural land (Seto, Güneralp and Hutyrá 2012).
- Third, beneficial resource circularity can be maximized through urban-rural regional exchange of resources. Examples include using nutrients from food waste composting and wastewater biosolids as fertilizers in surrounding regional farms, as research indicates that urban farmland is insufficient in area to reabsorb these nutrients (Miller-Robbie *et al.* 2017). Biochar from food waste valorization can improve soil carbon and larger-scale agricultural productivity (Woolf *et al.* 2010; Jindo *et al.* 2020). Likewise, generating energy/nutrients from rural crop residues that may otherwise be burned can create win-win opportunities, preventing air pollution in urban population centres, generating rural and urban incomes, and helping both rural and urban communities chart a path to zero-carbon energy systems.

Thus, an urban-rural systems perspective that protects and engages with agricultural lands around urban areas is a key complement to urban agriculture policies within cities.



2 Characterize the multiple modes of urban agriculture within cities

Within cities, there are multiple modes of urban agriculture including land-based personal household plots, community allotment gardens and larger commercial farms, as well as other novel types of agriculture that have less requirement for open land including indoor gardening, aquaculture, mushroom farming, etc. These diverse modes are suited to different business models and to differing purposes and goals. For example, high-tech vertical farming, usually profitable for niche crops (e.g., herbs, select vegetables), can create economic development and reduce transport needs and related impacts,

but may not necessarily serve the nutritional and income needs of the urban poor, particularly as high-tech indoor farms envision greater use of robots in precision agriculture. In contrast, business models connecting conventional small allotment agriculture in underserved neighbourhoods with community nutrition programmes can provide income and help improve nutritional security for underserved communities. There may be many business models book-ended between conventional and high-tech urban agriculture that can address unique local needs.



Thus, different modes of urban agriculture may be promoted for different benefits to society.

2

3 Recognize the multiple potential benefits of urban agriculture as well as trade-offs

An extensive literature review, convergent across cities globally, shows that urban agriculture has the potential to advance multiple sustainability outcomes related to the environment (e.g., resource efficiency, carbon mitigation, water sustainability), food insecurity, social equity, economic development and general social well-

being. However, planning, design, business models and context matter, and trade-offs may have to be made. The literature review shows that urban agriculture is not a silver bullet and cannot achieve all these outcomes simultaneously and universally across city contexts.



Thus, in considering multiple benefits of urban agriculture, the local context and the purpose of pursuing urban agriculture need to be clearly identified early-on to help optimize the outcomes accordingly.

3



4 Understand the multiple/varied reasons to pursue urban agriculture in world cities

In many developing world cities, urban land is used for agriculture mainly to address food insecurity of the urban poor, particularly rural-to-urban migrants who may also derive livelihoods from this activity. Studies suggest that a greater proportion of women pursue urban agriculture in many low-income developing countries; food insecurity may be a significant driver particularly because self-grown produce may be the major source of nutrition for the poor (Maxwell 1995; Nabulo *et al.* 2004; Hovorka, Zeeuw and Njenga

2009; Nabulo, Kiguli and Kiguli 2009; Hadebe and Mpofu 2013; Orsini *et al.* 2013; Poulsen *et al.* 2015). In developed cities, particularly in the United States and the European Union, urban agriculture, other than in times of emergency (*e.g.*, World War II), has been practiced more for broader social well-being (*e.g.*, happiness), although increasingly the role of urban agriculture to meet the nutritional needs of underserved populations has been recognized.

Overall, addressing the food insecurity of underserved populations emerges as a major motivation for urban agriculture across cities globally, which can complement other nutrition assistance programmes such as school meals and subsidized food programmes.



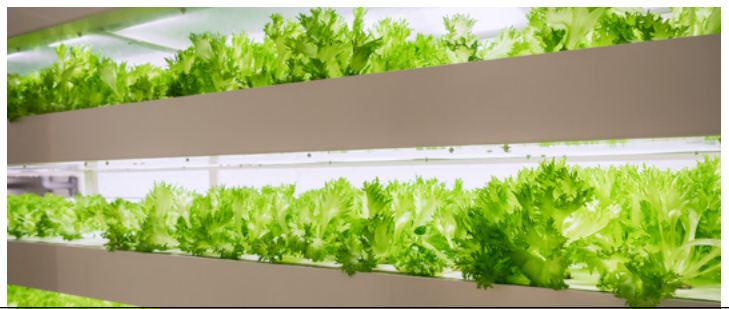
5 Evaluate scaling-up of land-based versus alternative modes of agriculture within cities

Recent science and policy dialogues have grappled with questions on how and how much to scale up urban agriculture. Land-based urban agriculture is not easy to scale up substantially because of competition within cities for resource-efficient economic development through commercial and industrial activities. From a land efficiency perspective, urban planners must consider efficient spatial arrangement of other activities such as commercial and industrial enterprises in

addition to agriculture, parks and other greenery. In most cities, land use for urban agriculture is a small fraction of urban land; however, there is significant peri-urban agriculture and broader-scale regional (rural) agriculture occurring around urban areas. As an alternative, approaches that are less land-intensive – such as mushroom farming, urban insect farming and controlled-environment agriculture – are opening up new business models in cities.



Alternate modes of urban agriculture that are land-efficient – such as aquaculture, mushroom farming, and indoor and controlled-environment agriculture – may offer economic and environmental gains.

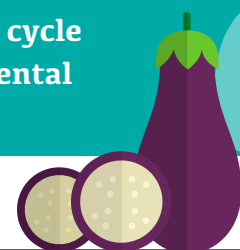


6 Support gathering local data on the environmental benefits of urban agriculture

A recent comprehensive global literature review shows a wide variation in the resource intensity of urban agriculture (Dorr *et al.* 2021a), making its environmental benefits inconclusive, despite some potential reduction in food miles travelled. Some practices for resource circularity, such as using compost derived from food waste or innovative practices of growing mushrooms from

spent coffee grounds, can contribute to resource circularity (Dorr *et al.* 2021b); however, life cycle assessments are needed to ensure environmental benefits. Existing studies show mixed results, suggesting that the environmental benefits of resource circularity in urban agricultural systems can be positive and negative.

Thus, local contexts and locally conducted life cycle assessments are essential to ensure environmental benefits of urban agriculture.



7 Recognize the potential for benefits and unintended harms to the environment and human health

Urban agriculture has potential to provide environmental benefits including climate mitigation and adaptation, heat and flood mitigation, erosion reduction, carbon capture, maintenance of agricultural biodiversity, increased presence of pollinators and the consequent reduction in biodiversity loss. However, more scientific evidence is needed to confirm these benefits, as noted in a review article by Keeler *et al.* (2019). Urban agriculture can offer nutritional benefits through access to fresh vegetables, fruits, milk and eggs, particularly to those facing food insecurity in cities. It can also generate a better understanding of food production and nutrition and serve as a trigger to behavioural change.

At the same time, policymakers should be aware of the potential for unintended harms to

health and the environment. For example, health risks can emerge from growing crops on urban polluted lands (polluted with sewage, lead or other industrial contaminants), and urban agriculture can contribute to added environmental distress due to high water demands in cities that may already be water stressed (Brown and Jameton 2000; The Economist 2010; Kim *et al.* 2014; Miller-Robbie, Ramaswami and Amerasinghe 2017; Boyer, Sarkar and Ramaswami 2019). Additionally, in some contexts, these health risks are heightened for women in low-income developing countries, who often rely on urban agriculture as their only source of food and, due to a lack of access to arable land, are forced to grow food on contaminated sites (e.g., waste dumps) using contaminated water (Nabulo *et al.* 2004; Nabulo, Kiguli and Kiguli 2009).

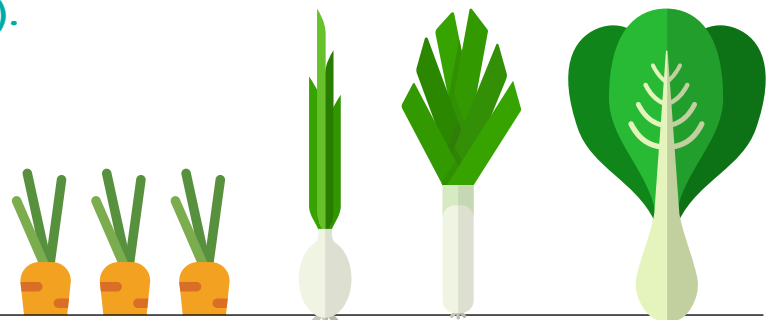
Environmental monitoring alongside urban agriculture can maximize the benefits and reduce potential unintended harms. Urban agricultural production systems need to proactively respond to such environmental pressures and risks and embrace sustainable practices.

7



Overall, urban agriculture can provide select and different benefits to different populations (e.g., access to food to underserved populations, or new business models for high-tech agriculture). The need to consider context-sensitive drivers, expected outcomes, pressures and risks means that it is not a universal solution for all people in all cities; business models and production systems as well as policy frameworks will vary in accordance.

A more regional, systems-based and data-driven approach to urban agriculture policy that leverages rural-urban linkages and highlights the local context can create greater benefits across all dimensions (see next section).



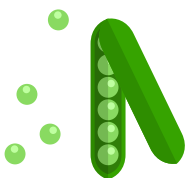


A PROPOSED ROAD MAP FOR URBAN AGRICULTURE POLICY

Against the backdrop of these key features, we provide guidance for urban agriculture policymaking, taking a systems approach. We propose a sequence of three steps, outlined below and highlighted in the attached flow chart.

01 Delineate the policy purpose of urban food action plans, and the role of urban agriculture

For urban policymakers that are creating urban food action plans with a focus on urban agriculture, it is critical to clarify early-on the purpose of these plans and policies and the extent to which urban agriculture can contribute to different goals. Urban agriculture can meet different goals to different degrees, including goals such as: food security and social equity; environmental benefits and resource circularity; increasing food self-reliance; economic development with a focus on high-tech agriculture; and advancing community-wide social well-being. Trade-offs may exist among these objectives. Also, local environmental monitoring may be needed to reduce unintended harms and demonstrate environmental benefits. Policy goals and the goals of urban farmers can also differ by city and national context.



Thus, in considering the multiple benefits of urban agriculture, we recommend that urban policymakers delineate upfront the purpose/goal of their urban food action plan/policy, to help optimize the outcomes and to make explicit any trade-offs.





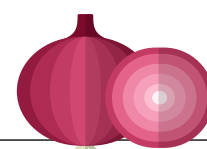
Develop multilevel urban-rural regional agricultural and food system partnerships

02

To maximize benefits, we encourage policymakers to adopt a systems approach, leveraging connections between urban consumers, urban agriculture and the larger regional food system around them, including with rural food producers. This can result in multilevel partnerships from city to region to the state and countries, with great potential to achieve many co-benefits.

Policy examples include:

- **Dairy cooperatives:** In India, establishing urban-rural dairy cooperatives has been demonstrated to secure milk supplies to metropolitan areas while providing livelihoods to millions of peri-urban and rural smallholder livestock farmers, including millions of landless households that hold one or two buffaloes (Cunningham 2009).
- **Farmers markets:** In the United States, federal policies support the development of farmers markets, leveraged by cities to enable urban residents to access local and regionally sourced agri-foods (Farmers Market Coalition 2021).
- **Urban development boundaries / Urban growth boundaries and zoning practices:** Globally, urban development/growth boundaries and zoning have been used to preserve farmlands (e.g., in China, India and the United States). Furthermore, a recent study shows that massive urbanization, if well planned, can also support the release of rural residential land for farming (Wang *et al.* 2021). Urban regional, provincial and national policies will need to be coordinated to create beneficial land-use changes as much of Asia and Africa urbanizes. Zoning laws that are overly restrictive may prevent urban agriculture.



03

Develop “fit-for-purpose” urban agriculture policies tailored to specific objectives of food action plans

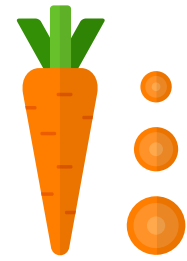
Policy guidance based on varying purposes/goals includes the following:

3a URBAN AGRICULTURE POLICY FOR NUTRITIONAL SECURITY AND SOCIAL EQUITY:

Studies have shown that poor migrant populations and other underserved groups often practice urban agriculture as a means of feeding their households. It is important that cities recognize this and create enabling policies that allow the strategic growing of specific foods (e.g., perishables such as fruits, vegetables and milk) (Zezza and Tasciotti 2010). Additionally, addressing the gender dimension is particularly important from a social equity perspective as women in low-income developing countries often face unique or heightened barriers to urban agriculture participation compared with their male counterparts, and the nutritional security for mothers generally overflows to the family (Maxwell 1995; Hovorka, Zeeuw and Njenga 2009; Nabulo, Kiguli and Kiguli 2009).

- **Support agricultural practices of underserved populations:** Allow urban agriculture where it is already being practiced and avoid restrictive zoning laws that prohibit agriculture within cities. In particular, support urban agriculture by migrant and poorer urban communities, and women in low-income developing countries.
- **Promote public procurement contracts for small farms via gleaners or aggregators:** Small farms, individually, produce product volumes that are often below the threshold for local government contracts. Here, formal arrangements with aggregators or gleaners of small farm outputs can promote the procurement and use of locally grown foods for school meal programmes, as illustrated in Ghent, Belgium (City of Ghent 2016).
- **Reduce land tax for urban agriculture:** Some cities have adopted a lower land-use tax for urban agricultural lands to help preserve them (e.g., in California, United States).
- **Link nutritional assistance programmes with local agriculture:** In addition to school meal programmes, access to fresh fruits and vegetables to underserved populations can be enhanced by providing subsidies for these nutritious foods and enabling small farmers to accept these subsidies (for example, the Women and Infants Nutrition Program in the United States).
- **Develop vacant land policies:** Explicit policies have been developed that allocate vacant lands in cities for urban agriculture and protect them over the long term from more profitable development (Santo, Palmer and Kim 2016).
- **Facilitate income opportunities / markets for urban small-scale farmers:** The sale of food can be an income opportunity, particularly for low-income residents. Cities can facilitate this by enabling markets, including roadside informal markets, retail outlets for food cooperatives and local government procurement programmes, such as for school meal programmes.





3b URBAN AGRICULTURE POLICY FOR ENVIRONMENTAL SUSTAINABILITY AND RESOURCE CIRCULARITY:

An emerging base of literature is showing that data are too sparse to come to conclusions about the environmental and resource circularity benefits of urban agriculture. Some cities have shown that urban agriculture can be more resource efficient, but only if implemented with care (McDougall, Kristiansen and Rader 2019), while other data from global case studies indicate uncertainty on whether growing food within cities is more resource efficient (Dorr *et al.* 2021a). The impact of food miles is relatively small in the United States, at around 10 per cent of total greenhouse gas emissions (Weber and Matthews 2008), and is likely smaller in other countries.

We propose a four-step approach to maximize the environmental gains of urban agriculture, recognizing the need for more local data on farms within cities:

- **Reduce urban sprawl into agricultural lands to reduce biogenic carbon emissions and biodiversity loss:** Building on the systems approach noted above, we recommend that cities must first prioritize reducing urban sprawl so that they conserve surrounding agricultural lands, carbon pools and biodiversity.
- **Leverage intra-urban, rural-urban and regional opportunities for resource circularity:** Studies have shown that urban agriculture alone is not of large-enough scale to absorb the nutrients released from food waste and wastewater. In contrast, a systems approach can offer both environmental and economic benefits. Zero waste laws that support composting of food waste, refuse-derived fuels, carbon valorization of food waste to fuels and biochar, and conversion to crop residue energy can be paired with circular economy policies that promote the use of these resources – creating circular resource flows and leveraging stakeholders within cities and in larger regions. Local life cycle assessments will be needed to ensure environmental benefits.
- **Do not promote land-based, irrigated intra-urban agriculture in regions that are already water stressed:** Many cities and nations are already water stressed, *e.g.*, Delhi, India (Boyer, Sarkar and Ramaswami 2019), where substantially increasing local agriculture can exacerbate local water stress. In such areas, the use of alternative agricultural systems such as aquaponics and hydroponics can reduce water use; however, these can have large energy and greenhouse gas impacts (Rufi-Salís *et al.* 2020)
- **Gather local data to ensure that intra-urban agriculture is resource efficient and avoids unintended harms to the environment and local health:** Data-driven promotion of urban agriculture is important to ensure environmental benefits and to mitigate unintended harms.
 - *Soil testing for lead and pathogens:* Many cities are mapping areas with high soil lead concentrations. Likewise, pathogens in soil in areas with uncontrolled sewerage can also be of concern for urban agriculture.
 - *Establish food safety and agricultural best practices for small farms and gleanors:* Without placing undue burdens on small farms, best management practices have been developed (*e.g.*, in California) to support small farmers and gleanors, who aggregate produce from small farmers to sell in larger markets (Sowerwine *et al.* 2020).



3C URBAN-REGIONAL AGRICULTURE POLICY FOR SELF-RELIANCE AND RESILIENCE:

Many cities are interested in potentially scaling up urban agriculture to increase self-reliance and improve resilience to supply shocks through localization. While grains, which are crucial to diets, need considerable land that is not available solely within urban areas, opportunities abound for strengthening regional supply linkages. Regional linkages to nearby rural agriculture can also create better opportunities for environmentally beneficial resource circularity while offering opportunities for increased resilience through diversification of food supply chains to cities (Gomez *et al.* 2021). Furthermore, specific urban agriculture products (e.g., fresh vegetables, milk and eggs) can be an important part of diversifying supply chains through localization, enhancing nutritional security and promoting local economic activities.

Policy recommendations include:

- **Facilitate databases on the agri-food requirements of local diets**, existing nutritional gaps and supply chains: Emerging databases allow analysis of household consumer expenditure data to understand nutrition gaps, agri-food requirements of local diets, and local-regional supply chains to cities (Boyer, Sarkar and Ramaswami 2019). Policymakers at the local and national levels can facilitate the development of such databases, enabling the assessment of nutrition gaps and supply chain risks.
- **Build strategic urban-rural regional partnerships to diversify food supply chains for nutrition and resilience**: Urban-regional integrated policies are also highlighted in the European Parliament's urban-peri-urban policy research (Piorr *et al.* 2018).



3d URBAN AGRICULTURE POLICY FOR ECONOMIC DEVELOPMENT CONSIDERING DIVERSE MODES AND MOTIVATIONS OF AGRICULTURE:

Given the many modes of urban agriculture and different motivations for farming, policymakers can develop different policies for different modes.

- **Economic development connecting agriculture, jobs training and nutrition assistance:** To meet the needs of underserved communities, there can be strategic advantages in connecting urban agriculture – for example, community allotment farms – with jobs training and nutrition assistance programmes to advance multiple benefits.
- **Brownfield redevelopment with high-tech indoor agriculture:** In brownfield re-development areas where soil may be polluted, agriculture modes that do use local soils can be promoted, such as high-tech indoor farms. There is a substantial market for high-tech agriculture, with many companies already growing year-round specialty foods using novel technologies (AeroFarms 2021; Gotham Greens 2021; GroCycle 2021). However, these technologies – which emphasize automation – may not necessarily provide livelihoods, creating a trade-off situation.
- **Food hubs to pair urban agriculture modes and market opportunities:** Food hubs can be created that pair the different modes of agriculture with local market opportunities, including local restaurants that source local products and small industries around food processing.
- **Support urban food entrepreneurship with private sector linkages:** Emerging technologies around indoor agriculture, mushroom farming and aquaculture can be beneficial and already represent a billion-dollar market in many parts of the world (Markets and Markets 2020; Alterman 2021). Projects such as Food Innovation Hubs enable public and private actors from the local to national levels to create partnerships to collaborate, innovate and invest in food systems (World Economic Forum 2021)



3e URBAN AGRICULTURE POLICY FOR COMMUNITY-WIDE HEALTH AND SOCIAL WELL-BEING:

Increasingly, there is an understanding that urban agriculture can create communal spaces for social interactions, offer educational and recreational opportunities, and enhance social well-being (i.e., happiness). At the same time, care must be taken to ensure that both household and community-based allotment gardening are beneficial to health by avoiding polluted areas or soils. Example actions include:

- **Hire dedicated staff to promote communal farming spaces / allotment gardens:** For example, the city of Saint Paul, United States hires community garden and engagement coordinators tasked with maintaining community gardens and building a sense of community among gardeners through activities, collaboration and community-driven solution building.
- **Establish community soil testing and best practices safety guides for urban farms:** For example, soil testing programmes and best practice guides for smaller-scale agriculture have been established in many cities, states and countries (Philipps *et al.*, 2003; Collins, 2012; Johns Hopkins Center for a Livable Future, 2014; Sowerwine *et al.* 2020).



Overall, matching urban agriculture policies with their goals, making fit-for-purpose policies, having a plan for assessing outcomes and leveraging urban/peri-urban/rural linkages using a systems approach can advance multiple anticipated benefits of urban food action plans.

This will require establishing a dedicated food policy coordinator and food policy councils to enable communities to prioritize plan goals, assess trade-offs/co-benefits, maintain data and assess outcomes in the long term, using this road map as a starting point.

The action-oriented flow chart on the next page provides a synthesis of the text:



A city wants to create multi-objective urban agriculture policy, taking a systems perspective:



01

Delineate the policy purpose of urban food action plans, recognizing trade-offs/co-benefits across goals of nutritional security, social equity, environment, economy and community well-being.

02

Develop multilevel urban-rural regional agricultural and food system partnerships. Understand a city's trans-boundary agricultural linkages, regional production, supply chains, economy and opportunities for resource circularity.

03

Develop “fit-for-purpose” urban agriculture policies tailored to specific objectives of food action plans. Understand current practices of urban agriculture (both intra-urban and peri-urban).

3a URBAN AGRICULTURE POLICY FOR NUTRITIONAL SECURITY AND SOCIAL EQUITY

- Support agricultural practices of underserved communities via land set-asides, reduced land tax, etc.
- Develop vacant land policies and offer fair compensation for peri-urban farms lost to urban impervious expansion
- Support markets for agricultural produce from local and regional farms via informal markets, farmers markets and direct-to-consumer opportunities
- Connect local fresh produce sales with nutritional assistance programmes – school meals, women's programmes
- Develop local procurement contracts supporting gleaners/aggregators to consolidate small farm produce

3b URBAN AGRICULTURE POLICY FOR ENVIRONMENTAL SUSTAINABILITY AND RESOURCE CIRCULARITY

- Reduce urban sprawl into agricultural lands to reduce biogenic carbon emissions and biodiversity loss
- Leverage intra-urban, rural-urban and regional opportunities for resource circularity (e.g., utilizing compost and wastewater biosolids as fertilizer)
- Do not promote land-based, irrigated intra-urban agriculture in cities that are already water stressed
- Gather local data to ensure that intra-urban agriculture is resource efficient and avoids unintended harms to the environment and local health

3c URBAN-REGIONAL AGRICULTURE POLICY FOR SELF-RELIANCE AND RESILIENCE

- Enable open database on agri-food requirements of local diets, existing nutrition gaps and supply chains
- Build strategic urban-rural regional partnerships to diversify food supply chains for nutrition and resilience

3d URBAN AGRICULTURE POLICY FOR ECONOMIC DEVELOPMENT

- Connect urban agriculture with jobs training and nutrition programmes to benefit underserved areas
- Promote high-tech indoor farms that do not use soil in brownfield re-development areas
- Develop food hubs pairing urban agriculture with local markets and small-scale processing industries
- Develop urban entrepreneurship with private sector

3e URBAN AGRICULTURE POLICY FOR COMMUNITY-WIDE HEALTH AND SOCIAL WELL-BEING

- Promote communal farming spaces / allotment gardens with dedicated staff
- Develop soil testing and remediation programmes and best practice guides for healthy, safe urban farming

OVERALL: Establish a dedicated food policy coordinator and food policy councils to enable communities to establish policy goals, prioritize actions, evaluate trade-offs, collate long-term data, assess outcomes and coordinate across urban-rural systems

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United Nations Avenue, Gigiri
P.O. Box 30552, 00100 Nairobi, Kenya
Tel. +254 20 762 1234
unep-publications@un.org
www.unep.org