FOOD FORWARD NDCs

Building circular food systems in cities

Overview

Urban areas are central to agriculture and food systems. The majority of food production (79%) is directed toward consumers residing in cities, where 57% of the global population resides. Yet many negative externalities and inefficiencies are built into current food systems that feed urban populations. Currently, for each one USD that is spent on food, **two USD in economic, environmental, and societal costs** is incurred. In many developing countries, urban residents living under high levels of poverty **spend 50% or more of income on food**, while many low-income urban residents of developed countries live in "food deserts," lacking access to sufficient fresh, nutritious, healthy food.

Circular food systems can address these pressing environmental problems across the food value chain, including natural resource degradation, high carbon intensity of food systems, pollution released into the environment and food waste in landfills (generating methane emissions). In effect, circular food systems close resource loops and establish cross-sector synergies (e.g., using treated wastewater for agricultural irrigation, or composting food waste to be applied as fertiliser) that contribute to the resilience and sustainability of urban food systems. Therefore, circular food systems can help safeguard the environment, preserve resources, achieve greater efficiency and reduce waste, while also encouraging economic development, social inclusion and overall resilience.

Local governments can play a pivotal role in building circular food systems in cities, as they are intricately connected to every stage of the food value chain, from public procurement to waste management. Cities, through their local

governments, have substantial purchasing power and serve as incubators for innovative policies and public services, which can later be scaled and adopted nationally. This approach can foster collaboration among key food system actors, paving the way for innovative solutions and business models to flourish at the local level.

Concrete measures to implement

Urban circular food systems encompass a wide range of sectors, stakeholders and specific intervention points. They are designed to reduce and eliminate pollution and waste, keep materials and products in use and regenerate natural areas and ecosystems. Given their distinct physical, socioeconomic, demographic, governance and political characteristics, actions taken by cities towards establishing circular food systems must be context specific.

Key policy measures to build circular food systems in cities fall across the following intervention points: production, processing, distribution and retail, consumption, waste management and synergies.

Production stage:

- **Source from local, regeneratively-produced and sustainable food sources**: Establish policies, regulations, and infrastructure to encourage local food production with agroecological and **regenerative farming** practices. Measures include:

    - Establishing policy frameworks to facilitate land access and improve tenure for practicing agroecology in areas surrounding cities. For example, the City of Bonn in Germany passed a resolution to prioritise organic farming methods on leased urban agricultural land.
    - Integrating agroecology and sustainable food production into city planning, zoning, and building standards. Utilise vacant urban spaces and underutilised city-owned land for sustainable food production (e.g., rooftop and home gardens, community gardens, vertical farms). For example, in Kesbewa, Sri Lanka, the **CITYFOOD Strategy** supports home-based food production and supplies inputs (e.g., seeds, equipment) to establish compact home and rooftop gardens, rainwater harvesting systems, composting systems for organic household waste and other related systems.

- Promoting the establishment of and supporting inclusive farmer cooperatives for farms using regenerative practices. Such cooperatives can aid farms by enabling co-investment and cost sharing for inputs and marketing.
- Providing training, extension services and educational materials to farmers for adopting agroecological practices. Extension services can promote the use of greater seed diversity and low-impact crops while also directly providing inputs (e.g., seeds). For example, in Toronto, Canada, the city established the **World Crops and Learning Gardens project** to improve the diversity of, and access to, locallymsourced foods.

- **Offer incentives and support for farmers and producers:** Provide financial support to implement agroecological, regenerative and circular economy practices. Examples include:

  - Providing tax reduction, credit facilities and preferential loans for farmers to adopt agroecological practices, and for reducing waste and utilising organic materials and byproducts. For example, the City of Bonn in Germany joined the **Organic Cities Network**, promoting organic farms and processing, boosting demand for organic, locally produced foods and giving priority to organic production on leased urban agricultural lands.
  - Designing preferential contracts (e.g., public procurement) and requirements for sourcing from local farms using regenerative and agroecological practices. Strengthen the emphasis on sourcing from small and medium enterprises (SMEs) and local businesses. See ***Integrate healthy and sustainable diets in public procurement***. For example, in San Paolo, Brazil, the city designed a preferential public procurement requirement that food providers must source food based upon local, regenerative and agroecological practices.
  - Promoting the adoption of cleaner, integrated closed loop systems (e.g., small-scale **integrated multi-trophic aquaculture** or hydroponic vertical farms), including in urban and post-industrial spaces. For example, in Northern Amsterdam, Netherlands, the city has partnered with Metabolic Institute to pilot **open-source aquaponic farms** in a former industrial shipyard, recycling nutrients in paired fish-vegetable production systems.

- Encouraging the use of biological, organic alternatives to synthetic fertilisers and pest control in farms (e.g., using **integrated pest management** to replace pesticides, or using compost to replace chemical fertilisers).

For additional relevant guidance, see ***Implementing nature-positive food production practices***, ***Developing and improving agriculture in urban and peri-urban areas and enhancing local food markets***, and ***Improving physical and economic access to healthy and sustainable foods***.

Processing stage:

- **Facilitate industrial symbiosis**: Plan industrial areas to interlink production processes, reducing industrial waste by sustainably utilising outputs. Industries in the same location can coordinate to share useful byproducts, where one industry uses the otherwise wasted byproducts from another industry in its production processes. Byproducts from cities can also be applied back into the regional agricultural system to shorten supply chains and close resource loops. For example, the Rizhao Economic and Technology Development Area (RETDA) in China interlinks resource streams between 31 companies in various sectors, including food and oils, machinery, cereal, paper, and textiles, to share outputs in their production processes. Within RETDA, for example, one brewery produces vinasse, a waste byproduct from sugar, which is used as a production input by a chemical factory.
- Encourage the use of food byproducts in other products: Establish regulations, quotas, and standards for safe and sanitary material treatment and reuse, to ensure sustainable sourcing where possible and the reuse of food byproducts. Utilisation of food byproducts could be directed into three broad product streams:

    - **New food products** (e.g., natural food coloring, nutritional supplements, sweeteners, pet food).
    - **Inputs for agricultural production** (e.g., livestock and fish feed, insect protein, compost, fertiliser) that can be utilised in peri-urban agriculture or local food production. However, companies must design consumer food products such that the waste can be safely repurposed as a farming input (e.g., avoid chemical food additives that are unsafe to return to the soil as compost).

    - **New materials and bioenergy** (e.g., biodegradable/compostable packaging, combustable briquettes, biogas) can be sold to consumers or used to power industrial and municipal processes (e.g., electricity provision, heating, transportation). Guidelines and requirements for companies can encourage sourcing more sustainable alternatives from compostable/biodegradable materials (e.g., cellulose material like cassava plant or bamboo) to make food packaging and consumer products (e.g., paper towels, drinking straws).

Distribution and retail stage:

- **Improve urban infrastructure used for food systems (e.g., roads, storage facilities)**: Promote the maintenance and repair of food-specific storage infrastructure and cold chain assets based on circular food economy principles. For example, the City of Barcelona in Spain has improved its overall food market sustainability and increased food proximity, in part through implementing repairs and upgrades to its electricity and water infrastructure.
- **Encourage food redistribution:** Encourage food providers to donate safe, unsold food to food banks, charities or other food insecure populations. Facilitate direct connections between food providers (e.g., supermarkets, restaurants) and community initatives or nonprofits. In 2016, the City of Milan in Italy established **local food waste hubs** to facilitate surplus food recovery from supermarkets and cafeterias to redistribute to food insecure populations. The city also provided buildings for collection and redistribution centers, as well as tax reductions for participating businesses.
- **Strengthen direct producer-to-consumer channels:** Shorter supply chains allowing food producers to interact with, and sell directly to, retailers and consumers can provide fresh, high quality produce to city residents, reduce food loss and waste, reduce GHG emissions from longer transit and foster stronger relationships between producers and consumers. Measures include:

    - Providing public spaces (i.e., food hubs) and logistical support for community food initiatives (e.g., food cooperatives, farmers markets). For example, the **Liege Food Belt (CATL)** in Belgium is a program that fosters and promotes local food production and regional distribution, with 20 cooperatives in operation.

- Promoting digital technologies (e.g., digital marketplaces) can also improve cooperation and coordination between producers, retailers and consumers. In Belo Horizonte, Brazil, a **program** was created to directly connect food producers with consumers, eliminating retailer price markup and improving food security. In Leuven, Belgium, a local distribution platform **Kort'om Leuven** connects peri-urban farmers and food retailers (e.g., supermarkets, restaurants) through regular timed deliveries.
- Offering incentives for SMEs and local businesses including food service providers that source from local and regenerative farms (e.g., facilitate land and space access).
- Organising public innovation challenges and grants for solutions related to shortened food chains (e.g., local food products, sustainable local logistics). In Ede and Barneveld, Netherlands, farmers can join the **Short Food Chain Masterclasses**, organised by the cities in cooperation with a university, to develop innovative services and products for local markets.

Consumption stage:

- **Encourage sustainable shifts in consumption behaviour**: Various policies and programs can help steer attitudes and spur action towards reducing food waste, supporting higher levels of efficiency and more circular outcomes in food systems. Measures include:

  - Promoting behavourial changes through public campaigns, events, programming and education materials to reduce food waste, address negative biases around reuse and encourage the purchase of food produced locally and under regenerative agriculture. For example, the City of Melbourne in Australia joined a local nonprofit to develop the **We Need to Talk About Food** guide, an educational resource for consumers and businesses on sustainable food consumption. The City of Porto in Portugal is home to a number of ongoing national initiatives to combat food waste, including **Refood** and the **Fruta Feia** (Ugly Fruit) Cooperative, diverting food waste from landfills and marketing imperfect vegetables and fruits.
  - Developing standards and rules about consumer food labelling and claims, to create greater awareness and transparency about the socio-environmental impacts of different production processes (e.g.,

biodiversity benefits of agroecology, fair wages on farms) or packaging types (e.g., recycled, biodegradable).

- Establishing partnerships with city schools to integrate food waste reduction into curricula. Development of educational materials to teach youth about healthy, sustainable diets can also help encourage positive lifelong eating habits. See ***Increasing demand for healthy and sustainable diets***.
- Promoting the use of improved technologies for traceability in supply chains (e.g., tracking farm origins, production and farming techniques, environmental impacts).

For additional guidance on reducing food waste, see ***Reducing food waste in gastronomy sector, retail and at household level***.

Waste management stage:

- **Facilitate diversion of inedible food and organic waste from landfills:** Circular systems employ waste management strategies that can redirect organic waste streams back into productive uses. Measures include:

  - Requiring municipal waste management companies to adopt innovations for the advanced collection, sorting and treatment of organic wastes.
  - Encouraging municipal waste management agencies to form public-private collaborations, promoting the development of bioeconomy products made from food byproducts and other reusable organic materials.
  - Establishing the infrastructure, guidance and requirements for sorting waste at both the commercial and household levels (e.g., multiple coloured bins for compost, recycling and landfill and explanatory signs/flyers). Distribution of educational materials and programing to raise public awareness can improve outcomes for more effective waste sorting. The development of **deposit-and-refund schemes** and recycling systems for beverage containers and food packaging can reduce waste sent to landfill. (See ***Reducing food waste in gastronomy sector, retail and at household level***.)
  - Providing technical assistance (ongoing) for businesses to help them measure and monitor food waste.
  - Implementing bans on sending food waste to landfills, and requiring mandatory reporting and reduction targets for the private sector,

especially large corporations. In Beaverton, OR (USA), the city implemented an **ordinance** requiring food scrap composting for businesses that produce high quantities of food waste.

- Creating inclusive partnerships and cooperation with informal sectors of workers (e.g., waste collectors) to generate resource streams and create decent, safe income opportunities (e.g., **Circular Credits**). The City of Pune in India developed the **SwaCH model**, a pro-poor public-private partnership that employs informal waste collectors in the formal municipal waste system, where they generate income by collecting waste for processing, composting and biofuel production.

Synergistic measures:

- **Develop synergies between municipal waste, waterwater, energy and agricultural systems:** Various municipal agencies handling solid waste, wastewater treatment, electricity generation, public transportation and other core functions can coordinate to build circularity into their respective operations. Such synergies might include and combine:

  - Wastewater treatment systems, whereby water, nutrients and biosolids can be recovered and reused for other productive processes. Biosolids and nutrients from wastewater can be used to produce agricultural fertilisers and combustible biomass for electricity/heat generation in industrial or municipal functions (e.g., powering buses for public transit). Interventions could also explore natural methods for capturing nutrients from wastewater and agricultural run-off (e.g., use of **algae** in remediation). In cities under water scarcity conditions, treated wastewater can be an important source of agricultural irrigation. Such systems should be developed according to **sustainable and circular sanitation solutions** principles. In Turku, Finland, a biodigesor facility recovers nutrients from wastewater and produces biogas, providing both inputs for agriculture and energy for public transport systems.
  - Reclaimation of nutrients and biosolids from solid municipal waste. Biosolids from municipal waste facilities (i.e., food waste, plant trimmings), if properly and safely separated and processed, can be used to enhance soil in agricultural systems as compost. Benefits include the creation of new business models and revenue stremes, replacement of chemical fertilisers with nitrogen and phosophorous

rich organic fertilisers and improvement of nutrient content of soils in cropland. If properly separated, food waste could also be **processed using sustainable insect farming**, producing insect protein for use in livestock and fish feed. In Riga, Latvia, the city developed a waste management site to reduce organic food waste in landfills, make compost and produce biogas, using the biogas to grow indoor tomatoes and cucumbers that supply supermarkets all year.

- Energy generation through burning biosolids reclaimed from both municipal waste and wastewater treatment. Often, the production of compost, fertiliser or other products from organic waste can be paired with the production of biogas or combustable biomass. This resource can then be used in developing electricity and heat to power other processes, including industrial production, transportation or residential heating. In Naivasha, Kenya, the local government partnered with **Sanivation**, a company that produces fuel briquettes from treated fecal sludge, to supply commercial heating processes.

Enabling governance measures

Relevant governance measures include:

- Coordination with governments and other public institutions at the regional, national and international level to align and complement corresponding food systems policies.
- Integration of circular food system strategy/measures into climate and land-use policies, as well as broader city-wide strategies, action plans and roadmaps.
- Forming inclusive and participatory Food Policy Councils or Platforms at the city level, to inform city strategic plans, targets, policies and programs and foster dialogue between stakeholders.
- Building capacity of municipal government staff to understand and implement circular food system policies.
- Increasing research on the benefits of circular food systems in cities, circular innovations and best practices for implementing them. Research into food systems, as well as other public investments related to circular food systems, should maintain an emphasis on ensuring equitable outcomes and serving marginalised populations.

- Reforming agricultural subsidies and tax policies to incentivise production of locally grown sustainable foods. **Redirect subsidies** that support environmentally harmful production towards local, sustainable, regenerative agriculture.
- Divesting city funds from investments, policies, incentives, and assets that support linear (non-circular) economic models.
- Seeking investments from private and multilateral donors to support the transition to circular food systems.
- Enabling and encouraging public-private partnerships that help reduce investor risk in projects for circular food system innovations.
- Regulation around waste reduction, processing and reuse.

Tools and MRV systems to monitor progress

Guides and handbooks

ICLEI City Practitioners Handbook: Circular Food Systems

A practical handbook for designing circular food systems created by Local Governments for Sustainability (ICLEI), a global network working with more than 2,500 local and regional governments committed to sustainable urban development.

Link: https://circulars.iclei.org/wp-content/uploads/2021/03/ICLEI_Handbook_CircularFoodSystems_Stakeholdersmapping.pdf

---

Global Food Donation Policy Atlas

Evaluates laws and policies across the most relevant issue areas relating to food donation, food loss and food waste.

Link: https://circulars.iclei.org/wp-content/uploads/2021/03/ICLEI_Handbook_CircularFoodSystems_Stakeholdersmapping.pdf

---

Stakeholder mapping tools

ICLEI City Practitioners Handbook: Action Card Template

The ICLEI City Practitioners Handbook includes guidance to develop a template action card together with stakeholders, in order to prioritise and rank subcategories of sub-strategies and to formalise a vision and potential outcomes for prioritised sub-strategies.

Link: https://circulars.iclei.org/wp-content/uploads/2021/03/ICLEI_Handbook_CircularFoodSystems_ActionCard.pdf

---

Netmap

A tool for research and strategic network planning developed by Eva Schiffer and sup

Link: https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://ebrary.ifpri.org/digital/api/collection/p15738coll2/id/10463

Climate change mitigation benefits

Implementing circular economy for food systems in cities has **the potential to reduce 4.3 Billion tons of CO_2** equivalent by 2050 by sourcing food grown regeneratively and locally where appropriate; ensuring inevitable by-products are used at their highest value, transforming them into new products ranging from organic fertilisers, animal feed products and biomaterials to medicine and bioenergy; and by redesigning and marketing healthy food products.

Other environmental benefits:

- Sustainable agriculture practices: Adoption of sustainable farming methods like organic farming and regenerative agriculture contributes to carbon sequestration and soil health improvement.
- Land conservation: Prevention of land conversion from natural ecosystems to agricultural land, reducing habitat destruction and associated carbon emissions.
- Water conservation: Efficient water management practices, including rainwater harvesting and sustainable irrigation, leading to reduced water consumption in food production.

- Promotion of plant-based diets: Encouragement of plant-based diets, which typically have a lower carbon footprint compared to diets rich in animal products.
- Improved air quality.

Adaptation benefits

- Resilient Urban Infrastructure: Circular food systems often incorporate resilient infrastructure, such as green infrastructure for water and waste management, which can enhance a city's overall resilience to climate impacts and reduce costly inputs.
- Climate Resilience: Increased resilience to climate-related challenges such as extreme weather events and water scarcity due to diversified and local food production.
- Adaptive Governance: Adaptive governance structures facilitating real-time adjustments in food systems to address emerging climate risks.
- Community Engagement: Equitable engagement with communities in circular food initiatives fosters social cohesion, and it can lead to the development of community-led climate adaptation strategies, food recovery and food banking efforts.
- Ecosystem Restoration: Circular systems may involve restoring urban green spaces and urban agriculture, which can provide habitat for wildlife and support ecosystem services that enhance urban resilience to climate change.
- Local Climate Resilience: Diversified, localised and equitable food production can reduce the vulnerability of urban areas to climate-related risks, including supply chain disruptions and food shortages.
- Enhanced Food Security: Circular food systems are often more resilient to climate-related disruptions, ensuring a consistent food supply during extreme weather events or other challenges, thus supporting food security.

Other sustainable development benefits

- SDG 1 (No poverty): by creating local employment opportunities.
- SDG 2 (Zero hunger): by ensuring consistent access to nutritious food.

- SDG 3 (Good health and well-being): by encouraging better dietary choices.
- SDG 4 (Quality education): by providing opportunities for sustainable food education and fostering environmental education.
- SDG 10 (Reduced inequalities): by ensuring equitable access to food and fair opportunities for participation in food systems.
- SDG 12 (Responsible consumption and production): by ensuring effective waste management and climate-smart food production.
- SDG 15 (Life on land): by supporting sustainable agriculture and habitat protection.

Implementation challenges and potential externalities and trade-offs

- Higher Initial Costs: Implementing circular food systems can involve higher upfront costs for infrastructure, technology and education, which may pose financial challenges especially for low income countries and communities who often struggle to finance even basic waste management.
- Unequal Access: Circular food systems may inadvertently exacerbate inequalities if access to resources, such as land or education, is unevenly distributed among communities.
- Competition for Resources: Circular systems could compete with other essential urban services, such as housing or transportation, for resources like space and funding.

Measures to address challenges and potential externalities and trade-offs

- Adequate public and private funding through public-private partnerships with retailers and consumer goods companies to propel innovation, research and learning.
- Inclusive policy planning and implementation processes by active participation of marginalised voices to ensure a just, equitable transition to circular food systems.
- Address the power asymmetries in governance, e.g. when large corporate food companies have high influence relative to low-income or marginalised

communities.

- Platforms and governance structures to accelerate cooperation among all stakeholders.
- Strengthened local food production through practices tailored to local contexts, such as rotational grazing, agroforestry, and growing diverse crop varieties and cover crops.

Implementation costs

Costs vary across countries and contexts.

Intervention in practice

- In Cape Town, South Africa, the organization **FoodForward SA** collaborates with retail stores and food outlets with high levels of food wastage to channel otherwise wasted food to beneficiary organisations. In this way, FoodForward SA has recovered and distributed around 2,148 tons of food surplus to 203 beneficiary organisations, predominantly focusing on educational institutions, women, and youth. Moreover, the initaitve has created various other benefits for the community, including 30 direct jobs, opportunities for youth to gain supply chain upskilling, and the removal of 8,592 tons of GHG emissions.
- In the City of Lilongwe, Malawi, food waste had been a source of pollution in local river ecosystems. The **UNA Rivers Project** was created to divert organic food waste that orginated from several nearby markets before it enters the river. To utilise the organic waste, local women volunteers collected and transported it to a nearby composting site, then earned income from selling the final compost products.
- In Hong Kong, an innagural Organic Resources Recovery Center (ORRC) began operating in 2018. Its Organic Resources Recovery programme, developed through the coordination of the government's environmental protection department and its Special Administrative Region, established three ORRCs. Once operational, the first ORRC had capacity to treat more than 200 tonnes of source-separated organic waste each day, or 80,000 tonnes annually. After the initial treatment, organic resources are sent to an anaerobic digestion plant that produces both compost and biogas. An on-site combined power-heat unit burns biogas and generates electricity that

feeds directly into the grid, while also generating usable heat. At the end of the process, each tonne of biowaste has been converted into about 100 kg of compost and one MWh of biogas.

- The City of Porto in Portugal is home to a number of ongoing national initiatives to combat food waste, including **Refood** and the **Fruta Feia** (Ugly Fruit) Cooperative. Refood diverts still edible food waste from the landfill through redistribution to food banks. Similarly, Fruta Feia collects and redistributes imperfect vegetables and fruits while running effective marketing campaigns. With 378 producers and 16 delivery points across the country, Fruta Feia has saved 5,916 tons of food waste, with significant benefits to soil preservation and reductions in energy and water use. With 6,800 beneficiaries and 60 centers nationally, Refood provides 150,000 meals and avoids 1,000 tons of biowaste each month.

References

1. Bhatt, P., Bhandari, G., Turco, R. F., Aminikhoei, Z., Bhatt, K., & Simsek, H. (2022). Algae in wastewater treatment, mechanism, and application of biomass for production of value-added product. *Environmental Pollution*, *309*, 119688.
2. C40. (2021) How cities can reduce municipal food waste. Retrieved from https://www.c40knowledgehub.org/s/article/How-cities-can-reduce-food-waste-by-households-and-businesses?language=en_US.
3. City of Sydney (2023). Insect Farming Trial for Food Waste. Retrieved from https://meetings.cityofsydney.nsw.gov.au/ieDecisionDetails.aspx?AIId=1565.
4. Ellen MacArthur Foundation (2019). *Cities and Circular Economy for Food.* Retrieved from https://www.ellenmacarthurfoundation.org/cities-and-a-circular-economy-for-food/overview.
5. Ellen MacArthur Foundation (2019). *Completing the Picture: How the Circular Economy Tackles Climate Change*. Retrieved from https://www.ellenmacarthurfoundation.org/completing-the-picture.
6. FAO. (n.d.) Integrated Pest Management. Retrieved on 22 July, 2024 from https://www.fao.org/pest-and-pesticide-management/ipm/integrated-pest-management/en/
7. FAO. (2019). *FAO framework for the Urban Food Agenda*. Retrieved from https://www.fao.org/3/ca3151en/ca3151en.pdf.
8. FAO and Toilet Board Coalition. (2021). *Future proofing agriculture systems – Circular sanitation economies for more resilient and sustainable food systems.* Land and Water Discussion Paper No. 18. Rome, FAO. https://doi.org/10.4060/cb2444en.

9. Food Forward SA https://greencape.co.za/assets/EI_CASE_STUDY_6_4_21.pdf.
10. GIZ (2021). Circular Economy as a Cornerstone for Meeting the Goals of the Paris Agreement. Retrieved from https://www.giz.de/fachexpertise/downloads/giz2021-en-circular-economy-paris-agreement.pdf.
11. Hawkes, C., Harris, J., & Gillespie, S. (2017). IFPRI, Global Food Policy Report. *Washington, DC, USA: International Food Policy Research Institute*, 35. Available at https://gfpr.ifpri.info/gfpr2017/.
12. Hamam, M., Chinnici, G., Di Vita, G., Pappalardo, G., Pecorino, B., Maesano, G., et al. (2021). Circular Economy Models in Agro-Food Systems: A Review. *Sustainability*, *13*(6), 3453.
13. HLPE (2023). *Reducing inequalities for food security and nutrition*. Rome, CFS HLPE-FSN. Available from https://www.fao.org/cfs/cfs-hlpe/insights/news-insights/news-detail/reducing-inequalities-for-food-security-and-nutrition/en.
14. ICLEI (Local Governments for Sustainability). (2021a). *City Practitioners Handbook: Circular Food Systems*. Retrieved from https://circulars.iclei.org/wp-content/uploads/2023/09/ICLEI-Circulars-City-Practitioners-Handbook-Food.p.
15. ICLEI (2021b). *City Practitioners Handbook: Circular Food Systems – Circular Food Systems Action Card Template*. Retrieved February 8, 2024, from https://circulars.iclei.org/wp-content/uploads/2021/03/ICLEI_Handbook_CircularFoodSystems_ActionCard.
16. ICLEI (2021c). *City Practitioners Handbook: Circular Food Systems – Overview of city-level food system assessment methods*. Retrieved February 8, 2024, from https://circulars.iclei.org/wp-content/uploads/2021/03/ICLEI_Handbook_CircularFoodSystems_City-levelFSassessment.pdf.
17. ICLEI (2019). *The Urban Nexus: Integrating Resources for Sustainable Cities.* Retrieved from: https://circulars.iclei.org/wp-content/uploads/2021/01/Urban-Nexus-Publication_130519.pdf.
18. Jurgilevich, A., Birge, T., Kentala-Lehtonen, J., Korhonen-Kurki, K., Pietikäinen, J., Saikku, L., & Schösler, H. (2016). Transition towards circular economy in the food system. *Sustainability*, *8*(1), 69.
19. Milan Urban Food Policy Pact. (2020). *Food Waste Milan 2019*. Retrieved from https://www.milanurbanfoodpolicypact.org/wp-content/uploads/2020/12/FW-Milan_2019.pdf.
20. Pune India waste pickers https://resilientcitiesnetwork.org/downloadable_resources/UR/UO/case-study-pune-01-.pdf.

21. Resilient Cities Network (2022). *Urban Eats: How cities can leverage opportunities to build resilient food systems through circular pathways.* Retrieved from https://resilientcitiesnetwork.org/urban-eats-resilient-food-systems/.
22. Resource Centres on Urban Agriculture and Food Security Foundation (RUAF) (2017). *CITYFOOD: Linking Cities on Urban Agriculture and Urban Food Systems*. Retrieved from https://ruaf.org/document/cityfood-linking-cities-on-urban-agriculture-and-urban-food-systems/.
23. Shafer, P. J., Chen, Y. H., Reynolds, T., & von Wettberg, E. J. (2022). Farm to institution to farm: Circular food systems with native entomoculture. *Frontiers in Sustainable Food Systems*, *5*, 721985.
24. Walls, M. (2011). Deposit-refund systems in practice and theory. *Resources for the future discussion paper*, (11-47). Available from https://www.rff.org/documents/1568/RFF-DP-11-47.pdf.
25. Wensing, J., Cremades, R., & van Leeuwen, E. (2023). Cities can steer circular food systems at scale. *Nature Food*, 4(1), 4-4.
26. World Economic Forum (2022). What is regenerative agriculture? Retrieved from https://www.weforum.org/agenda/2022/10/what-is-regenerative-agriculture/
27. WWF (2024). Can Your Money Do Better? Redirecting Harmful Subsidies to Foster Nature and Climate Resilience. Retrieved from https://wwfeu.awsassets.panda.org/downloads/wwf—harmful-subsidies-report_full-report.pdf.