THE URBAN FARMING-BASED SUSTAINABLE LAND USE MODEL (UFSLU)

COFARM4CITIES D.1.4.2

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Authors of UFSLU Model

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Foreword

CoFarm4Cities, an Interreg CE (CE0100253) project, aimed to create a sustainable model for urban fringe farming in Central Europe as an effective tool to prevent urban sprawl and to transition to a more sustainable food system and society. The project started in April 2023 and lasted until March 2026. Under the lead of Budapest III. District Óbuda-Békásmegyer Municipality it comprised 8 other project partners from 5 countries:

- **City of Zagreb, City Office for economy, environmental sustainability and strategic planning (Croatia)**
- **City of Turin (Italy)**
- **KAIROS Consortium of Social Cooperatives (Italy)**
- **Municipality of Krakow (Poland)**
- **City of Ljubljana (Slovenia)**
- **Institute for Circular Economy (Croatia)**
- **Obuda University (Hungary)**
- **Association DOVES - FEE Slovenia (Slovenia)**

During these 36 months, 5 pilot actions were implemented, using part of the total project budget of 2,24m EUR.

Recognising the socio-economic and environmental benefits of urban farming seen mainly in other regions (as such practises are scarce in CE or focus only on certain factors), CoFarm4Cities partners have decided to jointly find an environment-friendly solution for urban sprawl by identifying a sustainable utilisation of peri- urban agricultural, mixed-use or abandoned areas and developing a replicable model with stakeholder engagement tools (UFSLU) for transforming them into managed land for urban farming in CE cities.

Besides the model, the project resulted in Action Plans based on it, setting steps and actions for urban fringe farming in partner cities, aiming to curb urban sprawl and provide local healthy food, thus contributing to the transition to sustainable food systems (in line with the EU's Farm-to-Fork strategy).

1 Introduction

Central European (CE) cities are facing increasing pressure on land use due to urbanisation, particularly in peri-urban agricultural areas, leading to biodiversity loss and threatening land fertility and food systems. At the same time, there is growing demand from citizens for more cultivable urban land, as seen in the popularity of community gardens.

This trend, together with the climate change impacts affecting cities (such as the heat island effect and changing rainfall patterns), calls for a **new approach to land use** based on climate-friendly, nature-based solutions to increase cities' resilience, counteract urban sprawl, regenerate degraded peri-urban areas, preserve biodiversity and strengthen local food systems. It calls for **sustainable use of land**[1], that is particularly important in areas where local authorities often cannot keep pace with territorial expansion driven by infrastructure development, while the population of inner areas declines, resulting in underutilised infrastructure.

Urbanisation trends of the past decades show that peri-urban zones function as critical transitional areas where residential expansion, commercial development and infrastructural growth converge. Accelerated suburbanisation–driven by middle-class relocation from city centres as well as rural-to-urban migration–has made the periphery one of the most dynamically transforming and socially sensitive zones. Unregulated or spontaneous development in these areas often leads to fragmented urban structures, loss of green spaces, increased transport pressures and difficult-to-reverse spatial degradation, highlighting the need for timely and conscious spatial planning.

The Interreg CE project CoFarm4Cities addresses these challenges by **developing a replicable Urban Farming-based Sustainable Land Use (UFSLU) Model, including stakeholder engagement tools, to integrate** urban farming into urban infrastructure to increase land use efficiency and prevent urban sprawl by utilising unused areas and transform degraded areas into managed land. An urban farm can be seen as a means to **achieve sustainable urban development**, as it contributes to its main components: **environmental, social and economic**. Urban farming is widely recognised as a nature-based solution for climate change adaptation, playing a significant role in greening cities, preserving and enhancing local biodiversity and improving the urban climate, while promoting the productive reuse of urban organic waste and reducing the urban energy footprint. It also plays a key role in sociability, serving as a natural gathering place that promotes social inclusion. Safeguarding the territory, encouraging responsible lifestyles, practising organic farming, participatory management of urban green spaces and fostering social integration are just some cases to which urban farming can provide an immediate and low-cost response. Urban farms provide an integrated, local-level solution to the economic, environmental and social challenges of sustainable development.

The relevance of **urban farming is increasingly recognised through European policy frameworks**, most notably the European Commission’s Farm to Fork Strategy[2], a core component of the European Green Deal and aligned with the EU Biodiversity Strategy to 2030. This strategy highlights the interconnectedness of healthy people, healthy societies and a healthy planet. The Farm to Fork Strategy is also an integral part of the Commission's agenda for achieving the Sustainable Development Goals adopted by the United Nations, "aiming to accelerate and facilitate the transition of the Union towards a sustainable food system that has a neutral or positive environmental impact; mitigates climate change and supports adaptation to its effects; reverses biodiversity loss; ensures food and nutrition security and public health by guaranteeing that everyone has access to sufficient, nutritious and sustainable food; and maintains the affordability of food with fairer economic returns and promotes the competitiveness of the EU supply chain while encouraging fair trade”.[3]

[1] Sustainable land use is a practice that ensures that land-based resources – soil, water and wildlife – can provide goods and services in the long term without damaging the basic natural potential (soil quality, water and ecosystem functions, biodiversity), thereby meeting the socio-economic needs (food, energy, housing) of present and future generations in a sustainable manner. (Raquez, P., & Lambin, E. F. (2006). Conditions for sustainable land use: case study evidence. Journal of Land Use Science, 1(2–4), 109–125. https://doi.org/10.1080/17474230601079050)
[2] Farm to fork' strategy for a fair, healthy and environmentally-friendly food system. [1] Oberč, B.P. & Arroyo Schnell, A. (2020). Approaches to sustainable agriculture. Exploring the pathways towards the future of farming. Brussels, Belgium: IUCN EURO, DOI: https://doi.org/10.2305/IUCN.CH.2020.07.en,https://portals.iucn.org/library/sites/library/files/documents/2020-017-En.pdf [1]Food and Agriculture Organization of the United Nations (FAO) (1988). Report of the FAO Council, 94th Session, 1988. Rome, https://www.fao.org/4/t0087e/t0087e00.htm
[3] Farm to fork' strategy for a fair, healthy and environmentally-friendly food system. https://eur-lex.europa.eu/EN/legal-content/summary/farm-to-fork-strategy-for-a-fair-healthy-and-environmentally-friendly-food-system.html

Figure 1: Farm to fork Strategy[2]

Although urban farms are not the main contributors to food production, they can still achieve significant results, as demonstrated by Cuba, which was forced to adopt urban self-sufficiency.[4]

The **UFSLU model proposes a shift from linear to circular urban systems**, where waste, water and energy are reintegrated into productive cycles and where land is valued for its social and ecological functions as much as for its economic potential. By embedding food production within the city, this model challenges the assumption that urban growth must rely on spatial expansion. Instead, it demonstrates **how cities can "grow inward," regenerating underused land, strengthening local food resilience and fostering new forms of community engagement**.

It also offers a **comprehensive framework** detailing the complex effects of urban farms and **the steps necessary for their successful establishment and sustainable operation**, developing a replicable and adaptable framework whose elements can be easily customised and implemented in other cities' land-use action plans. Drawing on the experiences and results of the pilots implemented as part of the CoFarm4Cities project in 5 Central European cities: Budapest, Krakow, Ljubljana, Turin, and Zagreb the model also offers recommendations (guidelines) to support future urban farming implementations, taking Legal and Regulatory Framework, Environmental Sustainability, Economic Sustainability, Social Sustainability into consideration.

As there is no standard **definition of urban farm** (farming), we developed the following definition for the CoFarm4Cities model after reviewing the relevant literature and research:

"An urban farm, or urban farming, is an activity carried out by an individual or community with the primary aim of improving a local community's food self-sufficiency in an urban environment. The activity consists mainly of crop cultivation and, secondarily, animal husbandry (primarily small animals, such as poultry). Objectives may also include thematic education and training of the urban population, which can indirectly increase self-sufficiency. Urban farming can be either a for-profit or non-profit economic activity. Accordingly, those involved can be civil activists, employees of municipalities and public authorities, company employees, or other individuals with an employment contract."

In the UFSLU model, we use the term urban farm in this sense.

[4] Altieri, M. A. et al., 1999. The greening of the 'barrios': Urban agriculture for food security in Cuba. Agriculture and Human Values, 16(2). pp. 131-140, https://okovolgy.hu/varosi-kerteszek-az-onellatas-uj-utjai-kubaban/

2 Principles and objectives

This chapter presents the fundamentals and guiding principles of the UFSLU model. It describes in detail the key principles on which the model is based.

2.1 Sustainability principle

Traditional industrialised food production follows a linear model that creates environmental pressures and social inequalities. Urban farms introduce a circular and regenerative approach focused on natural systems and community well-being. Their sustainability relies on **reducing the ecological footprint**[5] through local food production, composting and efficient water management (e.g. rainwater harvesting) and, in some cases, improving energy efficiency in buildings and promoting the use of renewable energy sources (e.g. solar and wind energy).[6] Also the principles **strengthening the local economy** by supporting local businesses, creating jobs and shortening supply chains; **ensuring a sustainable food supply** by protecting soil, water and biodiversity and promoting seasonal, low-impact diets[7]; and **encouraging community involvement** by engaging residents in planning and shared work, which strengthens trust, social cohesion and intergenerational learning. Urban farms also support several SDGs, particularly **SDG 2, 3, 4, 8, 11, 12 and 13**.

2.2 Land use principles

Urban land use is often shaped by market-driven development, while sustainable site selection for urban farms requires attention to accessibility, social needs, job creation and early community involvement. Key land use principles include integrating green infrastructure[8] – a planned network of natural and semi-natural areas that improves climate resilience, biodiversity, quality of life and resource efficiency – preserving biodiversity through species and habitat diversity assessments, and improving resource efficiency through the local use of rainwater, environmentally friendly farming methods such as hydroponics and aeroponics, the introduction of methods such as permaculture and the use of sustainable technical solutions such as solar lighting and composting result in increased resource efficiency[9].

[5] Reducing the ecological footprint is one of the most important principles. Cities occupy only 3% of the Earth's surface, yet they are responsible for 60-80% of global energy consumption and 75% of carbon dioxide emissions.
[6] A global dataset of annual urban extents (1992–2020) from harmonised night-time lights, ESSD, 2022 (https://essd.copernicus.org/articles/14/517/2022/) + UNFCC (https://unfccc.int/news/urban-climate-action-is-crucial-to-bend-the-emissions-curve
[7] WWF, Sustainable Food Systems WWF Principles for Central Europe, https://wwfcee.org/pdf_collections/28/WWF%20PRINCIPLES%20FOR%20SUSTAINABLE%20FOOD%20SYSTEMS%20IN%20CENTRAL%20EUROPE-2-1.pdf
[8] In 2013, the European Commission's " Green Infrastructure Enhancing Europe's Natural Capital" defines Green Infrastructure as "a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned), other physical features and terrestrial (including coastal) and marine areas. On land, Green Infrastructure is present in rural and urban settings." Zucchelli et al., Shaping a sustainable future with Green Infrastructure, 2022, ISBN 978 88 8134 142 9 https://www.burgenland.at/fileadmin/user_upload/20220627_LUIGI_Book_digital_version.pdf
[9] Bodáné et al,(2024),Application of Sustainable Technical Solutions in 'Csúcshegy' Urban Farm Model Project, Interreg Central Europe CoFarm4Cties

The various functions of green infrastructure are illustrated in Figure 2.

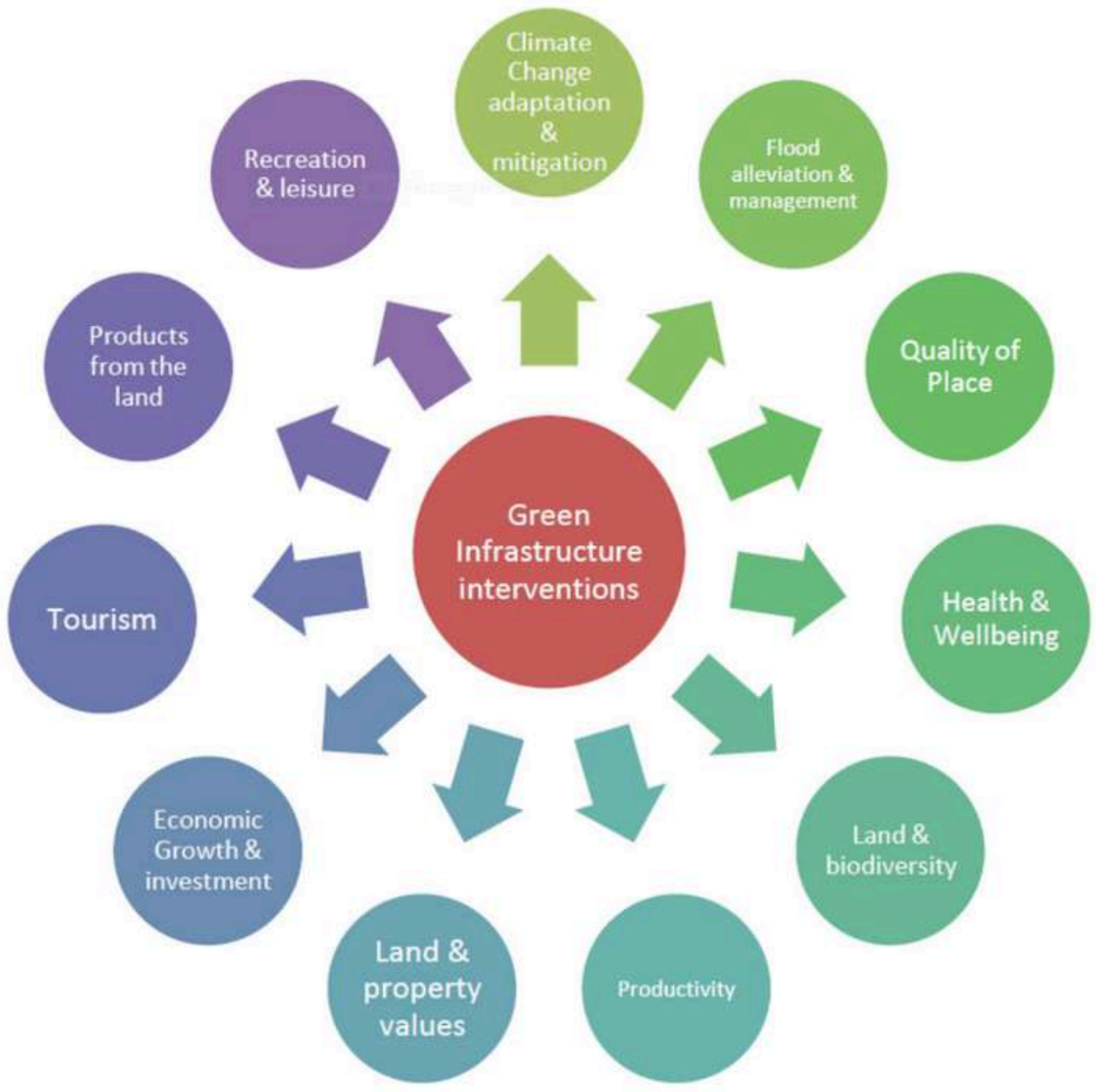


Figure 2: Elements of green infrastructure[10]

2.3 Circular economy principles

The main goal of the circular economy is to replace the linear material flow processes (raw material-product-waste) characteristic of modern societies with processes that minimise the use of natural resources and the amount of waste generated.[11] (Figure 3)

Figure 3: The circular economy model[12]

[10] European Environment Agency, Spatial analysis of green infrastructure in Europe, EEA Technical report No 2/2014, ISSN 1725-2237 https://www.eea.europa.eu/en/analysis/publications/spatial-analysis-of-green-infrastructure

[11] European Parliament, Closing the loop, New circular economy package January 2016, https://www.europarl.europa.eu/RegData/etudes/BRIE/2016/573899/EPRS_BRI%282016%29573899_EN.pdf

[12] https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits

To achieve this goal, the circular economy is based on three main principles, which are implemented in practical activities[13]: **elimination of waste and pollution, keeping products and materials in circulation, regenerating natural systems.** These principles fit perfectly with the concept of urban farms, which reduce transport distances and associated carbon emissions by producing local, fresh food.

Urban farms can recycle organic waste through composting, apply closed-loop systems such as hydroponics and aquaponics, reuse irrigation water, harvest rainwater and integrate renewable energy. Applying circular economy principles reduces emissions, lowers costs, creates jobs and strengthens environmental awareness.

Applying the principles of the circular economy to urban farms has several advantages:

- **Environmental benefits:**

It reduces waste, water consumption and carbon dioxide emissions and maintains soil fertility.

- **Economic benefits:**

Reduces production costs by recycling waste and increasing energy efficiency and can also generate new sources of income (e.g. the sale of compost).

- **Social benefits:**

Creates local jobs, provides communities with fresh, healthy food and increases environmental awareness among the population. Functioning as a community space, it increases social cohesion and reduces tensions among different social groups.

2.4 Community-Based Approach principle

Communities often feel apathetic, disconnected or assume that responsibility for the land use lies with external authorities. This mindset creates inertia and deepens neglect[14] and should be avoided. At the heart of the UFSLU model lies the **principle of community ownership and active participation (Community-Based approach)**. Urban farming in urban areas cannot succeed if it is seen only as a technical solution or a municipal project; it must be rooted in the involvement of local people who live, work and interact with the land.

Engaging residents from the outset helps align urban farming initiatives with local needs and expectations. This shared responsibility fosters a sense of belonging and pride, encouraging long-term stewardship of the land. Community involvement also enhances social cohesion, bringing together diverse groups to collaborate in cultivating and maintaining the spaces. In this way, urban farming becomes a driver of social inclusion and empowerment, reducing inequalities and strengthening resilience. Ultimately, the UFSLU model sees urban farming not only as a way to produce food but also as a way to create stronger, healthier and more connected communities.

[13] Ellen MacArthur Foundation, The Circular Economy/Definition, Model Explained, https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

[14] Urban Transformation. The future of land use is local: harnessing community ownership for urban land regeneration, World Economic Forum, 2025. https://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits

3 The pillars of the model

There is no unified agreed-upon definition of sustainable agriculture. In principle, sustainable agriculture should be able to meet current societal needs without compromising future generations' ability to meet their own needs. It should take into account environmental, social and economic sustainability, which constitute the three central pillars of sustainable development.[15]

Consistent with this definition and relating to these three pillars, the FAO defines sustainable agriculture as the “management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such development... conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable”.[16]

In line with this, the UFSLU model has three main pillars: environmental, social and economic sustainability.

3.1 Environmental sustainability

Environmental sustainability plays a key role in the creation of urban economies, contributing to the liveability of cities, economic stability and social well-being. It is closely linked and interacts with the other two pillars.

The establishment and operation of urban farms can yield numerous environmental benefits for city life. Below, we present the positive environmental impacts we have observed in the CoFarm4Cities project pilot programmes, which can be generalised based on data from the literature and serve as a basis for environmental sustainability.

[15] Oberč, B.P. & Arroyo Schnell, A. (2020). Approaches to sustainable agriculture. Exploring the pathways towards the future of farming. Brussels, Belgium: IUCN EURO, DOI: https://doi.org/10.2305/IUCN.CH.2020.07.en, https://portals.iucn.org/library/sites/library/files/documents/2020-017-En.pdf

[16] Food and Agriculture Organization of the United Nations (FAO) (1988). Report of the FAO Council, 94th Session, 1988. Rome, https://www.fao.org/4/t0087e/t0087e00.htm

3.1.1 Soil management

Regenerative agriculture

Urban farms can achieve regenerative agriculture by restoring soil organic matter, improving fertility and increasing productivity, thereby focusing on improving and maintaining soil health. As a result, agricultural yields increase and resilience to climate change is enhanced. It increases farm diversity and improves water and energy management.[17]

The basic principles of regenerative agriculture are:

- minimising or eliminating agrochemicals,
- maintaining permanent soil cover – ideally with living roots,
- minimising soil disturbance,
- maximising functional biodiversity.

These principles are implemented through various practices. Examples include:

- no-till or minimum tillage, which aims to increase soil aggregation, water infiltration and retention and carbon sequestration.
- biological enhancement of soil fertility by closing the nutrient cycle, using cover crops, crop rotation, perennial plants, compost and animal manure.

This approach minimises or eliminates the use of synthetic fertilisers and pesticides and aims to achieve fertility on the farm without external inputs.

3.1.2 Recycling and composting organic waste

The recycling of organic waste plays a key role in the operation of urban economies. Returning biodegradable organic matter to the natural carbon cycle is high on the European Union's environmental agenda. To achieve this goal, the amount of organic matter disposed of in landfills must be reduced in EU Member States. Primary biomass (plants) obtains the nutrients necessary for their life processes from the soil. One desirable way to utilise plant-based agricultural waste, which avoids landfill disposal, is to use it to replenish soil fertility. When compost produced from plant waste is applied to arable land, both macro- and microelements can be replenished in an environmentally friendly way, while also replenishing the organic matter content of the soil (Figure 4).

Figure 4: Soil improvement with compost[18]

The operation of the urban farm generates plant-based (green) waste, which can be used to maintain soil fertility at the place of generation through local residential and community composting. To involve a wider section of the population, it is also important that the urban farm's composting facility accepts selectively collected kitchen green waste from local residents. The local treatment of green waste generated on the urban farm can help maintain soil fertility and avoid less appropriate treatment and disposal of biodegradable materials, such as landfill disposal.

Urban agriculture plays an important role not only in recycling but also in reducing waste, as it reduces the need for food packaging for locally produced and consumed food.

3.1.3 Water management

Urban farming can be a key factor in addressing stormwater impacts by reducing runoff, improving water infiltration and rainwater harvesting. Vegetation in urban areas collects and retains precipitation, thereby preventing rainwater from soaking into the ground and impeding groundwater recharge, leading to increased runoff during natural events such as rain or snowmelt. In episodes of high-volume, high-velocity storm flows, this significantly increases the risk of floods, landslides and sewer overflows. Besides, water runoff collects oil, grease, toxins, pathogens, nutrients and other pollutants from pavements and roads, thereby polluting nearby waterways and potentially contaminating groundwater, which could pose a health hazard to local communities and beyond.[19]

[17] Jeff Moyer, Andrew Smith, PhD, Yichao Rui, PhD, Jennifer Hayden, PhD, Regenerative Agriculture and the Soil Carbon Solution, 2020, Rodale Institute, https://rodaleinstitute.org/wp-content/uploads/Rodale-Soil-Carbon-White-Paper_v11-compressed.pdf
[18] https://fer-play.eu/wp-content/uploads/2025/02/18feb2025_14.00_Aline_Granjard.pdf
[19] Andrés, J. F. (2017). Can urban agriculture become a planning strategy to address social-ecological justice? Stockholm, Sweden: KTH Royal Institute of Technology, School of architecture and built environment.

Instead, the vegetation and soil in these urban farming areas act as natural sponges, intercepting rainfall, reducing runoff velocity and allowing water to infiltrate into the ground.

Moreover, in urban farming settings, permeable surfaces such as gravel paths, mulched areas and porous pavements are often used instead of impermeable surfaces like concrete or asphalt. Permeable surfaces allow rainwater to infiltrate into the soil, replenishing groundwater supplies and reducing surface runoff.

Urban farming contributes to stormwater management also with the implementation of rainwater harvesting to capture and store rainwater in rain barrels, cisterns or underground storage tanks for irrigation purposes.

Methods that can be used in farm operations to support sustainable water management[20]:

- **Green infrastructure**, e.g. rain gardens, green walls and permeable pavements, helps to utilise rainwater and improve the microclimate.
- **Collection and reuse of rainwater** from roofs and paved surfaces, storage and filtration of collected water to meet or support irrigation needs.
- **Wastewater** generated during dishwashing and laundry that does not contain sewage bacteria or faeces – known as greywater – can be used for irrigation or toilet flushing after biological filtration.
- **The high organic matter content** of the soil increases productivity and permeability, thereby enhancing water infiltration and retention. Appropriate landscaping techniques, such as mulching, basins and ditches, improve water infiltration and retention. These permaculture techniques reduce runoff into storm drains and improve soil conditions. Retaining or keeping water on site reduces water requirements.
- **Chemical-free plant protection**, biological control, insect-friendly plants and natural soil conditioners provide the basis for sustainability and a healthier food source.

The combined use of these methods enables urban farms to serve not only as production units but also as green spaces that provide ecosystem services, thereby increasing urban biodiversity and fostering community life.

3.1.4 Energy efficiency

Local production is fundamental to the energy-efficient operation of urban farms, as growing food close to consumers sharply reduces transport distances and the energy needed for cooling, storage and logistics. This proximity lowers reliance on fossil-fuelled food transport, cuts greenhouse gas emissions and reduces energy use for packaging and distribution.

Energy sustainability is further enhanced through the use of renewable energy sources such as solar panels, wind turbines and geothermal heat pumps. Solar panels commonly power lighting, pumps and automation systems, reducing dependence on the traditional grid, while geothermal systems support efficient heating and cooling. Plant waste can also be used as biomass or for biogas production, reinforcing circular economy principles and contributing to greater energy independence.

3.1.5 Biodiversity

Urban farms contribute to biodiversity preservation and thus promote a healthy urban environment. The positive effects of biodiversity are realised when urban agriculture provides a complex plant structure, offers diverse habitats for pollinators and other organisms, uses local varieties and native plants and practises chemical-free farming.[21]

The crop production strategy of urban farms focuses on a sustainable circular economy and maximises resources within the farm. It focuses on preserving existing soil without adding new soil. The main emphasis is on low-input, native plants. This approach aims to promote local biodiversity by adapting plants to the site's specific conditions and minimising reliance on external resources. [22]

[20] Janett Nolasco, Sustainable Water Management for Urban Agriculture, Pacific Institute, https://pacinst.org/wp-content/uploads/2018/07/sustainable_water_management_for_urban_agriculture3.pdf
[21] Clucas, B., Parker, I.D., Feldpausch-Parker, A.M. (2018): A systematic review of the relationship between urban agriculture and biodiversity. Urban Ecosyst 21, 635–643. https://doi.org/10.1007/s11252-018-0748-8
[22] Chomsky, R. (2023). Urban Farming and Sustainability, https://sustainablereview.com/urban-farming-and-sustainability

The cultivation of native plants promotes plant resistance to local climatic conditions and reduces the need for external interventions such as pesticides and fertilisers. This helps maintain the area's ecological balance and promotes long-term sustainability.

The selected plants are characterised by low input requirements, such as water, fertilisers and energy. This not only reduces the overall environmental impact but also makes urban agriculture more accessible and manageable for the local community. Understanding local climatic conditions and their impact on different plants is essential and determines which crops are grown (vegetables, fruits, herbs, pollinators, etc.).

3.1.6 Climate resilience

Urban agriculture is a key element of adaptation to climate change through the creation of additional green spaces, the preservation of green belts in urbanised areas and the greening of cities. Functioning as green spaces, they can help improve air quality, as the vegetation in urban green spaces (including urban farms and gardens) binds carbon dioxide, absorbs air pollutants (particles) and reduces airborne dust through plant foliage, thereby contributing to the reduction of air pollution.[23] Green spaces also help mitigate the urban heat island effect.[24] Vegetation cools the air through evaporation, while soil and green spaces reduce the proportion of heat-absorbing artificial surfaces. Increasing green spaces and integrating urban farms improve the microclimate, reduce energy demand and contribute to a more liveable urban environment. This not only serves food production purposes but can also be used as a climate adaptation tool.[25]

In urban and peri-urban areas, there are numerous innovative forms of cultivation available (food forests, vertical farms, rooftop gardens, zero-acreage farming) that, in addition to contributing to food production, also help strengthen urban communities, maintain urban ecosystems and mitigate the effects of climate change.[26] Table 1 shows some examples of these.

Form of farming	Characte-ristics	Advantages	Challenges	Required area	Area requirements
Food forest	Layered planting of perennial plants	Increasing biodiversity, community access, climate protection	Long-term maintenance, community cooperation required	Medium (parks, public spaces)	Low-medium
Vertical farm	Multi-storey, natural, artificial lighting	Maximum space utilisation, year-round production, water conservation	High investment costs, technological maintenance	Very small (indoor scenes)	High
Roof gardens	Open or greenhouse gardens on roof surfaces	Increased green space, reduced heat island effect, community space	Structural and waterproofing issues, access	Small (roof surfaces)	Medium
Z-farming (integrated into buildings)	Hydroponic or aeroponic systems integrated into buildings	Energy efficiency, circular systems, urban integration	Complex design, regulatory barriers	Very small (within buildings)	Low

Table 1: Examples of innovative farming practices

[23] Andrés, J. F. (2017). Can urban agriculture become a planning strategy to address social-ecological justice? Stockholm, Sweden: KTH Royal Institute of Technology, School of architecture and built environment.
[24] Akbari, H. (2002). Shade trees reduce building energy use and CO2 emissions from power plants. Environmental Pollution, 116, S119-S126
[25] Ladan, T.A., Ibrahim, M. H., Ali, S.S.B.S., Saputra, A. (2022): IOP Conf. Ser.: Earth Environ. Sci. ISSN: 1755-1315 RSS 986 012071. DOI 10.1088/1755-1315/986/1/012071
[26] Orsini, F. Innovation and sustainability in urban agriculture: the path forward. J Consum Prot Food Saf 15, 203–204 (2020). https://doi.org/10.1007/s00003-020-01293-y, https://link.springer.com/article/10.1007/s00003-020-01293-y

3.2 Economic sustainability

Urban farms play a vital role in achieving local economic sustainability by providing a direct link between production and consumption. Their operation fundamentally strengthens circular economic models, helping to use resources more efficiently and increase the resilience of regional food supply chains. Not only do they reduce their environmental footprint by minimising transport distances, but they also create new local jobs and contribute to the self-sufficiency of urban communities.

3.2.1 Local production and short supply chains

Local production and the promotion of short supply chains are at the core of the economic sustainability pillar of the UFSLU model. These approaches not only address the vulnerabilities of global food systems but also create economic opportunities, enhance food security and resilience in cities and reduce ecological impact in urban and peri-urban areas. By shortening the food supply chain, urban agriculture reduces reliance on pesticides and fertilisers, conserves water and mitigates land degradation. [27]

Short local supply chains differ from globalised systems by reducing transport distances, emissions and food miles while increasing transparency between producers and consumers. This proximity strengthens resilience by limiting dependence on fragile international logistics and offering cities more stable access to fresh produce. It also lowers costs by reducing intermediaries, storage and transport needs, allowing producers to retain more value and enabling municipalities to revitalise underused land.

Environmentally, shorter chains reduce greenhouse gas emissions, support ecological farming practices and facilitate circular solutions such as composting and water reuse. Economically and socially, local production stimulates jobs in cultivation, processing and retail and strengthens community ties through farmers' markets, community-supported agriculture and local food hubs. Together, these benefits make short supply chains a key component of sustainable, resilient and community-oriented urban food systems.

	Globalised Food System	Local Food System (Urban Agriculture)
Supply Chain Length	Long, complex, geographically dispersed	Short, direct, geographically concentrated
Transportation	High transportation costs and emissions	Reduced transportation costs and emissions
Food Miles	High food miles	Low food miles
Transparency	Lower transparency and traceability	Higher transparency and traceability
Resilience	Vulnerable to global disruptions	More resilient to local and regional disruptions

Table 2: Comparing the globalised food system with a localised model rooted in urban agriculture[28]

[27] Gunapala et. all., Urban agriculture: A strategic pathway to building resilience and ensuring sustainable food security in cities, Farming System, Volume 3, Issue 3, 2025, https://doi.org/10.1016/j.farsys.2025.10015.

[28] https://lifestyle.sustainability-directory.com/question/how-can-urban-agriculture-affect-local-economies/#:~:text=Re%2DLocalizing%20Supply%20Chains,and%20strengthen%20local%20food%20economies

3.2.2 Innovative business model

There are several business models specifically for urban agriculture, all of which demonstrate how urban farms create value and how this value is realised for the company and its stakeholders. Based on case studies[29] ,[30] ,[31] ,[32] ,[33] ,[34] ,[35] and analysis, three main business models were identified for urban farms: low-cost specialisation, differentiation and diversification. Research from the CoFarm4Cities project shows that diversification is the dominant and most viable model, as small urban farms cannot compete with large-scale monocultural farms. Their stability relies on multiple revenue streams such as direct sales, processed products, subscription schemes, trainings, workshops, events, therapeutic programmes, consulting or rental of plots. Urban farms also operate within a circular economy and provide ecological (biodiversity, nutrient cycling, microclimate regulation) and social functions (recreation, culture, aesthetics), making an integrated business approach essential.[36]

To capture these diverse functions, the **Business Model Canvas (BMC)** offers a practical framework for analysing and designing urban farm business strategies.

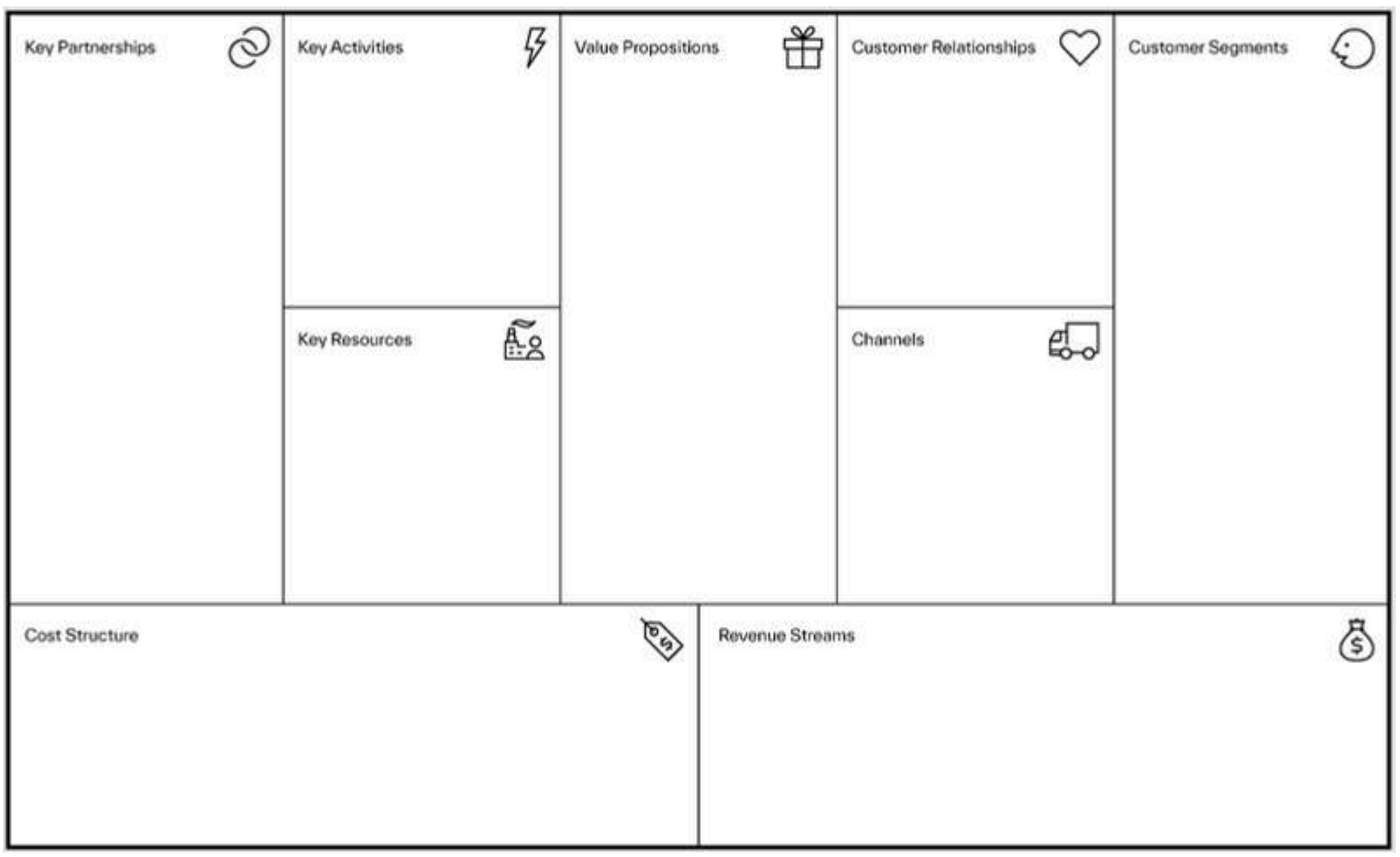


Figure 5: Business Model Canvas [37]

According to Osterwalder and Pigneur (2010), "A business model describes how an organisation creates, delivers and captures value".[38] The BMC consists of nine building blocks grouped into four components – customers, offerings, infrastructure and financial viability – covering key partners, activities, resources, value proposition, customer relationships, segments, channels, cost structure and revenue streams. It helps urban farms visualise how they create value, reach users and ensure financial sustainability by defining essential values, required infrastructure and funding options. Table 3 summarises the nine building blocks and guiding questions for preparing a BMC.

[29] Bodáné et al, CoFarm4Cities D.1.1.2 , Overview and high-level comparison of 21 selected urban farms, case study
[30] Gardner, B. L. (1994): Commercial Agriculture in Metropolitan Areas: Economics and Regulatory Issues. Agricultural and Resource Economics Review, 23(1): 100–109.
[31] Pölling, B., Mergenthaler, M., Lorleberg, W. (2016): Professional urban agriculture and its characteristic business models in Metropolis Ruhr, Germany. Land Use Policy. 58 (15):366-379 DOI:10.1016/j.landusepol.2016.05.036
[32] Pölling, B., Prados, MJ., Torquati, B. M., Giacche, G., Recasens, X., Paffarini, C., Alfranca O., Lorleberg, W., (2017): Business models in urban farming: A comparative analysis of case studies from Spain, Italy and Germany. Moravian Geographical Reports. 25(3):166-180.
[33] Torquati, B., Giacche, G., Marino, D., Pastore, R., Mazzocchi, G., Nino, L., Arnaiz, C., Daga, A. (2018): Urban farming opportunities: a comparative analysis between Italy and Argentina. Acta Horticulturae. DOI:10.17660/ActaHortic.2018.1215.37
[34] Zasada, I. (2011): Multifunctional peri-urban agriculture–A review of societal demands and the provision of goods and services by farming. Land use Policy. 28 (4): 639-648., DOI:10.1016/j.landusepol.2011.01.008
[35] Zasada, I., Fertner, C., Piorr, A., Nielsen, T.S. (2011): Peri-urbanisation and multifunctional adaptation of agriculture around Copenhagen. Geografisk Tidsskrift Danish Journal of Geography 111(1):59–72., DOI:1
[36] Lovell, S.T.; Johnston, D.M. (2009) Designing landscapes for performance based on new principles of landscape ecology. Ecol. Soc., 14, 44.
[37] Osterwald, J., Pigneur, Y. (2010): Business Model Generation: A handbook for visionaries, game changers and challengers. John Wiley and Sons, Inc., Hoboken, New Jersey
[38] Osterwald, J., Pigneur, Y. (2010): Business Model Generation: A handbook for visionaries, game changers and challengers. John Wiley and Sons, Inc., Hoboken, New Jersey

Table 3: Nine building blocks of Business Model Canvas[39]

Business Area	Building Blocks	Description
Offer	Value Propositions	The bundle of products and services that create value for a specific customer segment
Customer	Customer Segments	The different groups of people of an enterprise aim to reach and serve
Customer Relationships	The types of relationships a company establishes with specific customer segments	
Channels	The company communicates with and reaches its customer segments to deliver a value proposition	
Infrastructure	Key Partnerships	The network of suppliers and partners that make the business model work
Key resources	The most important assets required to make a business model work	
Key Activities	The most important things a company must do to make its business model work	
Financial Viability	Cost Structure	All the costs incurred to operate a business model
Revenue Streams	The cash a company generates from each customer segment	

3.2.3 Green jobs and job creation

From the perspective of urban economies, green jobs and job creation can contribute to sustainable development and social welfare during their establishment and operation. The International Labour Organization (ILO) defines the concept of green jobs as follows: „Green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency.” [40]

[39] Shuang L. (2015): Business Characteristics and Business Model Classification in Urban Agriculture. Master thesis, Wageningen University, p.76.
[40] International Labour Organization, https://www.ilo.org/topics-and-sectors/just-transition-towards-environmentally-sustainable-economies-and-societies/what-green-job

Green jobs help:

- improve energy and raw materials efficiency,
- limit greenhouse gas emissions,
- minimise waste and pollution,
- protect and restore ecosystems,
- support adaptation to the effects of climate change.

Urban farming can generate direct employment (full-time or part-time) and offers strong opportunities for job training and skills development – from technical farming and gardening to cooking, nutrition, leadership, project management, marketing and customer service. These transferable skills support workforce integration of youth, immigrants, differently abled people and formerly incarcerated individuals.

Urban farms can provide jobs in the following areas:

- farm workers, seasonal workers (planting, cultivating, harvesting and maintaining crops)
- farm managers, supervisors and administrative staff (managing day-to-day operations, overseeing production activities, planning, scheduling, budgeting)
- marketing and sales (promoting farm products, managing online sales platforms, coordinating farmers' market participation)
- workers to handle distribution and logistics, including packaging, labelling, transportation and delivery of produce
- processing surplus produce into value-added products such as jams, sauces, pickles or baked goods (within or outside the farm)
- educators, trainers as urban farming initiatives often involve educational programs, workshops, etc.
- researchers, scientists, other specialists working in fields such as urban agriculture, hydroponics, aquaponics and vertical farming
- support services (accounting, legal, consulting services, etc.)

Additionally, urban farms stimulate employment beyond the farm itself, including farm-to table chefs, restaurant staff, local delivery services, farmers' markets and local retailers.

3.2.4 Financing options

Financing is a complex, dynamic combination of resource mobilisation – both monetary and non-monetary – as well as savings, grants and loans.[41] Financing an urban farm involves a mix of monetary and non-monetary resources, including savings, grants, loans and community contributions. Key sources include local authorities that may provide land, infrastructure, expertise or direct funds; local communities through volunteer work and organisational capacity; EU funding programmes; community income such as membership fees; and cooperation with universities, research institutes, associations and residents. Businesses can also play an important role by offering financial sponsorships, in-kind donations of materials or expertise, volunteer engagement through corporate volunteer days and strategic partnerships that support education, environmental initiatives and efforts to address food insecurity.

[41] Yves Cabannes, Financing urban agriculture, Environment and Urbanization 2012 24: 665, https://journals.sagepub.com/doi/10.1177/0956247812456126

3.3 Social sustainability

3.3.1 Community engagement

Urban farming contributes to social sustainability when it creates not only food but also opportunities for participation, learning and shared responsibility. **Community engagement must be intentional**, as urban farms do not automatically generate cohesion; instead, inclusion, collaboration and continuous involvement are needed to build genuine social ties.

Volunteers play a crucial role by taking on tasks ranging from gardening and maintenance to education, communication and event coordination. Through these activities, they gain skills, confidence and a sense of ownership while contributing to intergenerational and intercultural exchange. Their participation strengthens social networks, supports marginalised groups and reduces operational costs. Workshops, trainings and school partnerships enhance hands-on environmental learning, while community events such as harvest festivals or seed exchanges turn the farm into a welcoming social space.

Partnerships further expand the social value of urban farms. NGOs and civil society organisations provide advocacy, expertise and volunteer mobilisation, ensuring that farms address wider community needs such as inclusion, education and environmental protection. Collaboration with local businesses, restaurants and markets reinforces short supply chains and provides material or financial support, while municipalities enable engagement by providing land, institutional backing and integration into broader urban strategies on health, climate resilience and social inclusion. These alliances help position urban farms as important community hubs with long-term relevance.

Ensuring meaningful engagement, however, requires careful attention. **Challenges** include volunteer fatigue, unequal participation, language and cultural barriers and conflicts over land use or governance. Without shared decision-making, transparent processes and secure land tenure, participation may become symbolic or dominated by a few individuals. Genuine community involvement needs mechanisms for co-responsibility, open communication and inclusivity, as well as continuous dialogue and adaptation to evolving community needs. When these conditions are met, urban farms become powerful drivers of social inclusion, empowerment and community resilience.

3.3.2 Education and training

Education and training are core elements of the UFSLU model, transforming urban farms into learning ecosystems that strengthen ecological literacy, social inclusion and sustainable behaviour.

Urban farms and community gardens act simultaneously as places of production, discovery and reflection. When residents sow seeds, compost organic waste or share a harvest meal, they participate in a form of experiential learning that connects them to the natural processes sustaining urban life. As Yap (2025) notes, “learning the city through agriculture” allows citizens to renegotiate their relationship with nature and transform routine activities into civic education[42]. This form of **learning by doing** is central to the pedagogical approach promoted by initiatives such as the Eco-School Gardens[43] and the Urban School Garden, a teacher's guide[44]. Each garden bed, compost heap or irrigation system becomes a visible demonstration of circular economic principles, linking daily practice with broader ecological understanding.

[42] Yap, C., Anderson, C. (2025). Learning the city through urban agriculture. Environment and Planning D: Society and Space. 43. 10.1177/02637758241304667. https://www.researchgate.net/publication/387918191_Learning_the_city_through_urban_agriculture
[43] Eco-School Gardens (Šolska VRTilnica), https://ekosola.si/solska-vrtilnica-25-26/
[44] Eco-Schools (DOVES – FEE Slovenia), (2025). Urban school garden: A teacher’s guide. Portorož: DOVES – FEE Slovenia.

Schools and kindergartens benefit through curriculum-linked outdoor learning, while adults and families engage in workshops on organic gardening, composting, seed saving and sustainable cooking[45]. Gardens may also function as therapeutic spaces, accessible through raised beds, adaptive tools and sensory planting, ensuring full inclusion of children with disabilities. Turin's Cascina Falchera[46] may serve as an example of good practice as a multifunctional educational hub that links agriculture, social inclusion and vocational training. The centre organises regular workshops for families and young people on organic cultivation, water conservation, waste reduction and circular economy principles. Through its open days, cultural events and guided tours, Cascina Falchera promotes environmental awareness and community cohesion, showing how an urban farm can operate as both a learning environment and a civic common.

Partnerships with universities and vocational schools bring research and innovation into the learning cycle. In Budapest and Turin, academic institutions collaborate with municipalities to co-design experimental plots, test irrigation systems and study soil quality. These partnerships mirror broader trends in urban agroecology, in which universities act not merely as research institutions but also as active facilitators of community learning. As Nicklay et al. (2020) argue, community-university collaborations in urban agroecology create "reciprocal learning spaces" that link academic inquiry with local action. Such frameworks emphasise co-production of knowledge, participatory experimentation and shared reflection – transforming the urban farm into a living laboratory that bridges theory and practice. Through these partnerships, local knowledge gains scientific validation, while academic research becomes socially embedded and responsive to community needs[47].

The educational potential of an urban farm depends on its **physical and organisational design**. A well-planned, learning-oriented landscape combines productivity with accessibility and demonstration. Key features include clearly labelled plots, thematic zones dedicated to biodiversity, composting and pollinators, shaded pergolas for workshops and interpretive signage explaining ecological and social processes. Visible systems – such as rainwater harvesting units, compost stations and observation areas – transform the site into an open-air classroom for residents, students and visitors alike. Year-round workshops, volunteering and community events sustain participation and provide opportunities to observe seasonal changes.

The UFSLU model proposes modular learning blocks adaptable to age and context, as shown in Table 4.

Table 4: The UFSLU model proposes modular learning blocks adaptable to age and context

Theme	Key competences	Typical activities
Gardening 101	Understanding soil, plant cycles	Seeding, transplanting, soil testing
Circularity and composting	Waste minimisation, systems thinking	Composting, waste audits
Biodiversity and citizen science	Observation, classification	Pollinator counts, insect hotels
Food literacy and health	Nutrition, local economies	Seasonal cooking, tasting sessions
Creative expression	Cultural engagement	Art or theatre in the garden
Leadership and responsibility	Civic participation	Roles such as "garden steward" or "data recorder"

[45] Learning Gardens provide free, expert-led training sessions on soil care, composting, biodiversity enhancement and aesthetic design of small urban plots: Municipality of Ljubljana: Learning Gardens (Učni vrtovi), https://www.ljubljana.si/sl/ljubljana/zelena/vrticki-v-ljubljani

[46] Cascina Falchera, https://cascinafalchera.it

[47] Nicklay, J.A., Cadieux, K.V., Rogers, M.A., Jelinski, N.A., LaBine, K., & Small, G.E. (2020). Facilitating Spaces of Urban Agroecology: A Learning Framework for Community–University Partnerships. Frontiers in Sustainable Food Systems, 4, https://www.frontiersin.org/journals/sustainable-food-systems/articles/10.3389/fsufs.2020.00143/full

Evidence shows that such programmes improve nutritional health, scientific literacy and social cohesion across different populations.

Education and training programmes succeed when **evaluation is simple, participatory and transparent.** Suggested instruments include learner reflection journals and photo diaries; attendance and diversity logs; pre- and post-knowledge quizzes; biodiversity observations; community feedback assemblies. Data feed into an annual municipal review that adjusts teaching content, schedules and infrastructure investments.

For **successful implementation and replication**, municipalities that wish to transform individual gardens into cohesive educational ecosystems should follow these key steps: set a shared learning vision, mobilise partners, map plots and designate learning zones, install basic infrastructure (raised beds, compost units, irrigation), launch modular programmes, formalise participation structures, and publish an annual calendar of workshops, festivals and secure diverse funding. Municipalities should also monitor outcomes annually and adapt programmes accordingly and ensure continuity via university engagement and volunteer mentorship

3.3.3 Health and well-being

Urban farms contribute significantly to public health and well-being by providing access to fresh, locally grown food, creating green spaces and offering opportunities for physical activity.

Local production supports healthier diets, reduces the environmental impact of food transport and can benefit communities with limited access to nutritious food. As green spaces, urban farms help prevent non-communicable diseases such as cardiovascular illness, obesity and diabetes,[48] while encouraging regular movement and healthier lifestyles.

Beyond nutrition and physical health, urban farms foster mental well-being and social cohesion. Gardening, contact with nature and shared activities reduce stress, improve mood and enhance self-esteem, with research showing that green spaces lower rates of depression and anxiety.[49] Improving mental health benefits not only individuals but also society. Work efficiency improves, absenteeism decreases (both in schools and at work) and community cohesion is strengthened. As community hubs, urban farms strengthen relationships across different age and cultural groups, support youth development and can provide therapeutic or rehabilitative activities. By combining food production with social interaction and nature-based benefits, urban farms act as holistic tools that promote healthy, inclusive and sustainable urban living.

3.3.4 Ensuring fairness and equal opportunities

Urban farms, particularly social farms, play an important role in promoting fairness and equal opportunities by supporting marginalised groups such as the unemployed, people with disabilities and individuals with low levels of education.

They provide meaningful work, opportunities for training and skills development, community belonging and pathways to reintegration into the labour market, while also contributing to the growth of the green economy through sustainable job creation, as mentioned in section 3.2.2.

[48] United Nations, N Chronicle, Green Spaces: An Invaluable Resource for Delivering Sustainable Urban Health, https://www.un.org/en/chronicle/article/green-spaces-invaluable-resource-delivering-sustainable-urban-health
[49] United Nations, N Chronicle, Green Spaces: An Invaluable Resource for Delivering Sustainable Urban Health, https://www.un.org/en/chronicle/article/green-spaces-invaluable-resource-delivering-sustainable-urban-health

3.4 Self-assessment (environmental, economic, social)

By examining the **environmental impacts** of urban farms implemented as part of the CoFarm4Cities project, we found that the most significant environmental benefit of urban farming in urban spaces is the preservation of biodiversity. At the same time, reducing the urban heat island effect and mitigating impacts related to rainwater are less of a priority.

In the CoFarm4Cities project, when analysing the **economic impact** of the five pilot urban farms, we found that their impact focuses on training and savings in food expenditure. In contrast, their impact on direct income generation and job creation is estimated to be lower. The project partners see the most significant economic and social value primarily in human capital development, the transfer of sustainable farming knowledge and the acquisition of new professional skills. Farms, therefore, play an important role in knowledge sharing. The data obtained also show that farms are not primarily drivers of direct economic profit and job creation, but rather important tools for building resilient, conscious and self-sufficient communities.

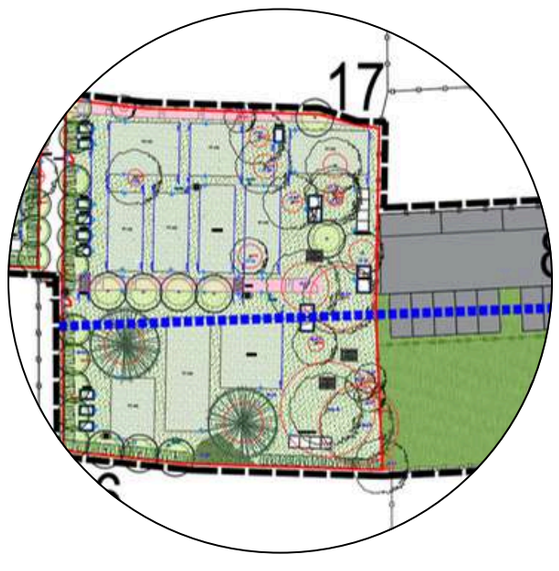
Analysing the **social impact** of urban farms implemented within the CoFarm4Cities project, we found that their activities are considered particularly important for community building, health promotion and education. The involvement of kindergartens and schools and the raising of consumer awareness are the most substantial social impacts, indicating that the partners see the most significant social potential in shaping the environmental and food awareness of the next generation. Farms create a direct link between production and consumption, thereby improving awareness of healthy eating habits. The opportunities for collaborative work provided by farms create an excellent platform for knowledge transfer and relationship-building among different age groups, especially between older and younger people. At the same time, the results show, as in the previous economic analysis, that the direct job creation capacity of farms is underestimated.

4 Implementation

Establishing urban farms is a complex process that requires careful planning, consideration of a strict regulatory environment and precise implementation steps. The purpose of this chapter is to present in detail the key stages through which an urban farming project successfully progresses from idea to functioning farm. The journey begins with the initial, comprehensive planning phase, continues with an interpretation of the necessary background regulations and requirements, then moves on to the step-by-step process of practical implementation and finally addresses the importance of continuous control and monitoring to ensure the long-term sustainability and success of the project.

4.1 Planning phase

The first and perhaps most critical step in implementing urban farms is the planning phase, which lays the foundation for the future of the entire project.



During this preparatory phase, the strategic objectives of the farm must be defined, taking into account local environmental, social and economic considerations. It is important to work out details such as site selection, technological solutions, financial frameworks and sustainability plans during the planning phase. In addition, it is essential to develop an appropriate strategy for the success of the project, which includes tasks related to the involvement of key stakeholders.

4.1.1 Situation analysis

Situation analysis is the foundation of any successful urban farming initiative. It is the process of systematically assessing the physical, social, institutional and economic context in which a project will operate. Rather than being a static checklist, situation analysis is a dynamic and iterative tool that informs every stage of project development, from site selection and infrastructure planning to community engagement and long-term governance.

Urban farming is inherently complex. It intersects with land use planning, environmental management, education, public health and local economies. Without a thorough understanding of the local context, projects risk misalignment with community needs, regulatory frameworks and ecological realities, so situation analysis is not optional, but essential.

The first and most tangible element of situation analysis is land. Urban farm planning begins with identifying **available land**, but availability alone is not enough. The land must be suitable for cultivation, accessible to the community and compatible with existing urban functions. Potential lands are often underutilised, fragmented or contested. Transforming such spaces into productive agricultural zones requires not only physical investment but also institutional coordination and community negotiation. The process typically begins with site selection, which involves ecological assessments, soil testing and water availability studies. In some cases, the land is already earmarked for other uses, such as recreation or development, which necessitated dialogue and compromise with local stakeholders.

If land is secured, **infrastructure development planning becomes the next critical phase**. This includes fencing to secure the site, installation of water and sewage systems, electricity connections and the construction of tool sheds, composting stations and raised beds. Additionally, implementation of rainwater harvesting systems to support circular water use and solar lighting to enhance sustainability should be also considered. Planning needs to be flexible, considering phased implementation and contingency strategies to overcome challenges.

Community engagement is both a prerequisite and a product of urban farms. Early and continuous involvement of local residents, NGOs, schools and other stakeholders is essential for building trust, ownership and long-term commitment. You can find further details about stakeholder identification and engagement in Stakeholder Toolkit in Annex A.1.

Engagement and training future growers, establishing support networks and embedding farming into broader community development strategies are fundamental.

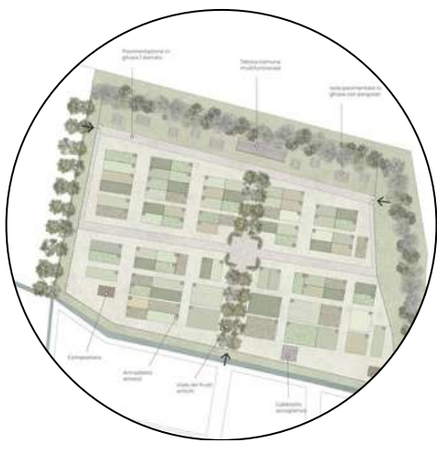
Economically, urban farms can have a significant potential for local economic development. Plot rental schemes, composting systems and partnerships with local producers can create modest revenue streams and reduce operational costs.

A situation analysis helps determine the **economic model** that best fits the local context. It clarifies whether the project should aim for self-sufficiency, public funding or hybrid models involving community contributions and external grants.

From a **policy perspective**, urban farms must be embedded within broader urban planning and sustainability frameworks. This includes aligning with climate adaptation strategies, biodiversity goals, waste reduction initiatives and food system resilience plans. Urban farms can contribute to multiple policy objectives simultaneously, but this requires cross-sectoral collaboration, integrated funding models and supportive legal environments. Zoning regulations, land tenure arrangements and procurement procedures must be adapted to accommodate the unique needs of urban agriculture. Situation analysis plays a key role in identifying these policy intersections and ensures that the project is not isolated but part of a larger urban strategy. It also helps anticipate regulatory challenges and build alliances with institutions that can provide long-term support.

Situation analysis should be revisited regularly to assess progress, identify new opportunities and respond to emerging needs.

4.1.2 Strategy development



Urban farming is a complex, interdisciplinary endeavour that requires more than enthusiasm and available land. It demands a **well-defined strategy**, one that is grounded in local realities, shaped by community needs and aligned with broader urban development goals. Strategy development is the process of translating vision into action. It involves setting clear objectives, defining milestones and establishing priorities that guide implementation, evaluation and long-term sustainability.

Objectives are the backbone of any strategy. They define what the project aims to achieve and provide a framework for decision-making and evaluation. In urban farm strategies, objectives must be both ambitious and realistic, reflecting the multifaceted nature of the initiative.

Typical strategic objectives include:

- Transforming underutilised land into multifunctional green spaces that support cultivation, recreation and education.
- Promoting sustainable and circular farming practices, such as composting, rainwater harvesting and organic cultivation.
- Engaging local communities through participatory design, inclusive governance and accessible programming.

- Creating educational opportunities, especially for children, youth and vulnerable populations.
- Building institutional partnerships with schools, NGOs, universities and municipal departments.
- Ensuring long-term viability through clear management structures, funding models and policy alignment.

Milestones break the strategy into actionable phases. They help track progress, allocate resources and maintain momentum. Due to complexity of the project, a phased approach is recommended:

Phase 1: Preparation and Planning	Phase 2: Infrastructure Development	Phase 3: Community Activation	Phase 4: Operational Launch	Phase 5: Evaluation and Expansion
Conduct ecological and social assessments.	Install fencing, water, electricity and composting systems.	Launch public events and workshops.	Begin cultivation and educational activities.	Document outcomes and lessons learned.
Identify and secure land.	Build tool sheds, raised beds and community areas.	Recruit participants and operators.	Implement training and mentoring programs.	Adjust governance and programming.
Map stakeholders and initiate engagement.	Ensure accessibility features (e.g. ramps, signage, lighting).	Establish communication channels (e.g. newsletters, social media).	Monitor participation and gather feedback.	Plan for replication or scaling to new sites.
Clarify legal and administrative requirements.				

Each milestone should be time-bound (utilisation can be done by a GANTT-chart), supported by a budget and linked to specific responsibilities. Flexibility is essential, delays and changes are inevitable and the strategy must be able to accommodate and respond to them.

Not all actions can be pursued simultaneously. Prioritisation ensures that the most critical elements are addressed first, especially when resources are limited or timelines are tight.

Priority 1: Community Engagement	Without community support, urban farm cannot thrive. Early engagement builds trust, surfaces local knowledge and fosters ownership. This includes co-design workshops, consultation meetings and transparent communication.
Priority 2: Infrastructure Readiness	Basic infrastructure must be in place before cultivation and programming can begin. Delays in procurement or construction can stall momentum and erode stakeholder confidence.
Priority 3: Governance and Management	Clear rules, roles and responsibilities must be established early. Whether the site is managed by an NGO, a municipal body or a community group, governance structures must be transparent, inclusive and adaptable.
Priority 4: Educational Integration	Urban farm offers unique opportunities for learning. Prioritising educational components -especially for youth- can deepen impact and build long-term commitment. This includes training mentors, developing curricula and coordinating with schools.
Priority 5: Sustainability and Replication	From the outset, projects should consider how they will sustain operations and potentially scale. This includes financial planning, documentation and partnerships with institutions that can support long-term growth.

Urban farm does not exist in a vacuum. It must be embedded within broader urban planning, environmental and social policy frameworks. Strategy development should include:

- Reviewing zoning laws and land tenure regulations.
- Identifying funding opportunities (e.g. municipal budgets, EU programs, private grants).
- Building alliances with departments of education, environment, health and social services.
- Ensuring that the initiative contributes to climate resilience, biodiversity and food system goals.

Institutional support is not just helpful, but it's essential. Projects that align with existing policies and priorities are more likely to receive funding, political support and long-term stability.

A good strategy is not static, but it evolves. Monitoring and evaluation should be built into the strategy from the beginning. This includes:

- Defining indicators for success (e.g. number of participants, volume of produce, biodiversity metrics).
- Collecting qualitative and quantitative data.
- Holding regular review meetings with stakeholders.
- Adjusting objectives, milestones and priorities based on feedback and results.

Documentation is key. Recording activities, challenges and outcomes not only support internal learning, but also enables replication and scaling. Sharing results with other cities, networks and funders strengthens the broader urban farming.

4.2 Implementation phase

Implementation phase of an urban farm initiative marks the transition from planning to action. It is the stage where strategic intentions are translated into tangible outcomes: land is prepared, infrastructure is built, communities are engaged and cultivation begins.

Implementation is structured around a series of interdependent phases and milestones. These milestones serve as checkpoints for progress, coordination and evaluation. Although specific details may vary depending on the local context, the general structure of implementation follows a recognisable pattern that can be adapted to other urban farm projects.

PHASE 1: **Preparatory activities**	The first phase typically involves preparatory work, such as finalising legal and administrative documentation, securing land and initiating public procurement processes. This phase also includes early community engagement efforts – like informal meetings, media outreach and stakeholder consultations – to build awareness and interest. To avoid delays due to budget approval processes or other institutional and administrative procedures, early coordination with local authorities and partners is essential.
PHASE 2: **Groundworks**	Next phase focuses on infrastructure. This includes fencing the area, installing water and sewage systems, connecting electricity and constructing essential facilities such as tool sheds, composting stations and raised beds. To support sustainability and circular resource use rainwater harvesting systems and solar powered lighting can be also implemented. Infrastructure development is critical, with priority given to securing the site and enabling basic functionality before expanding to more complex features.
PHASE 3: **Testing and Community involvement**	With infrastructure in place, attention shifts to activating the community. This phase includes organising public events, workshops and informal meetings to recruit users and operators. Transparent communication, early definition of eligibility criteria and streamlined recruitment procedures are necessary.

The operational launch marks the beginning of cultivation and programming. This includes distributing plots, initiating training sessions and starting educational activities. NGOs or other operators often took over management responsibilities at this stage, coordinating day-to-day operations and ensuring alignment with community needs. The launch phase also involves monitoring participation, collecting feedback and adjusting activities based on real-time observations.

As the project matures, the final tasks focus on evaluation and sustainability. This includes documentation activities, assessing outcomes and planning for long-term governance and funding. Operators are expected to report results, organise stakeholder workshops and maintain communication channels such as social media and newsletters. Sustainability planning also involves preparing rules and regulations for plot use, organising regular training and integration events and exploring replication opportunities in other locations.

Partner cities participating in the CoFarm4Cites project provided durations of different project tasks and activities based on their real experiences. The average of these durations can be seen in Figure 7 below, which can help the implementation planning in the follower cities.

A Gantt chart is a project management tool that visually maps tasks along a timeline, showing their start and end dates, duration and dependencies. By breaking complex projects into clear, sequential activities, it helps teams assign responsibilities, allocate resources and monitor progress. Its benefits include clear structure and task order, realistic time-based planning and improved communication through a shared visual reference. However, Gantt charts can become unwieldy in very large projects, focus mainly on time rather than cost or risk and are less adaptable to highly iterative workflows. Overall, they are effective for structured, phase-based projects and work best when complemented by other management tools.

Figure 7 shows the GANTT chart, which represents the time-planning and implementation of different phases in the function of time.

ID	TASK NAME	MONTHS
1.	**Preparation phase**	12
2.	Needs assesment & Defining of the project..	9
3.	Environmental issues identification & Feasa..	3
4.	Hidrogeological and water analysis	6
5.	Soil analysis	4
6.	Stakeholder research and analyses	7
7.	Landscape architecture plans	6
8.	Public utilities design	7
14.	Authorization of public utilities	6
23.	Public procurement	6
24.	**Groundworks phase**	9
25.	Area clearance of waste, tree felling	9
26.	Earthworks operations	6
27.	Ground preparation	5
28.	Equipments procurement	5
29.	Construction /materials /infrastructure/urban fu..	6
30.	Feasibility study results should be considered	8
31.	Procurement of plants & planting & plant nursery	4
32.	Procurement of urban furniture	3
34.	**Testing/Community involvement**	14
35.	Communication activities	13
37.	Test Phase	7
38.	Opening event	1
39.	Workshops, demonstration event	13
40.	Evaluation	5
41.	Project closing event	1

Figure 7: Gantt chart

Implementation tasks and activities by phases

Preparations phase

In preparation phase the strategic and technical foundation for the project are established (Initial organisational setup, resource allocation and defining governance structures to ensure smooth implementation):

- **Needs Assessment & Defining of the Project Task**: Comprehensive analysis of user needs, expectations and potential demand. This includes consultations, surveys and market research to define realistic objectives and scope.

- **Environmental Issues Identification & Feasibility Study**: Evaluation of environmental constraints, sustainability requirements and technical feasibility. This step ensures compliance with ecological standards and identifies potential risks early.

- **Hydrogeological and Water Analysis**: Detailed examination of water availability and supply options, including well-drilling feasibility, rainwater harvesting and irrigation planning.

- **Soil Analysis**: Assessment of soil quality, contamination risks and suitability for cultivation to guarantee productive and safe agricultural use.

- **Stakeholder Research and Analyses**: Engagement with relevant stakeholders through meetings, workshops and consultations to build trust, gather input and foster long-term collaboration.

- **Landscape Architecture Plans**: Design of the physical layout, including cultivation areas, green spaces and community zones, ensuring functionality and aesthetic quality.

- **Public Utilities Design**: Planning for essential infrastructure such as water, electricity and sewage systems to support farm operations and community activities.

- **Authorisation of Public Utilities**: Securing necessary permits and approvals for utility connections and infrastructure works.

- **Public Procurement**: Conducting transparent procurement processes for construction, landscaping and equipment delivery, in compliance with legal and financial regulations.

Groundworks phase

Groundworks phase transforms the site into a functional and operational space (general site preparation activities to enable construction and farming):

- **Area Clearance of Waste, Tree Felling**: Removal of debris, waste and vegetation to prepare the land for development.

- **Well, Water Operations**: Implementation of water supply solutions, including drilling, installation of tanks and irrigation systems.

- **Ground Preparation**: Levelling, soil improvement and installation of basic infrastructure for cultivation.

- **Equipment Procurement**: Acquisition of farming tools, storage units, composters and other essential equipment for agricultural activities.

- **Construction/External Infrastructure/Urban Furniture**: Building paths, fences, tool sheds, composting areas and installing lighting and community furniture to create a safe and accessible environment.

- **Feasibility Study Tracing**: Monitoring and verifying that implementation aligns with the initial feasibility study and adjusting plans if necessary.

- **Procurement of Plants & Planting & Plant Infrastructure Construction**: Purchasing and planting crops, trees and ornamental plants, along with setting up irrigation and plant-support structures.

- **Procurement of Urban Furniture**: Installing benches, tables and other elements to enhance usability and comfort for community members.

Testing and Community involvement phase

This phase ensures the site becomes an active, community-driven space.

- **Communication Activities**: Implementing outreach campaigns through media, social platforms and public events to raise awareness and attract participants.

- **Test Phase**: Launching initial cultivation and monitoring performance to validate design and operational assumptions.

- **Opening Event**: Hosting an inaugural event to present the project to the public and celebrate its launch.

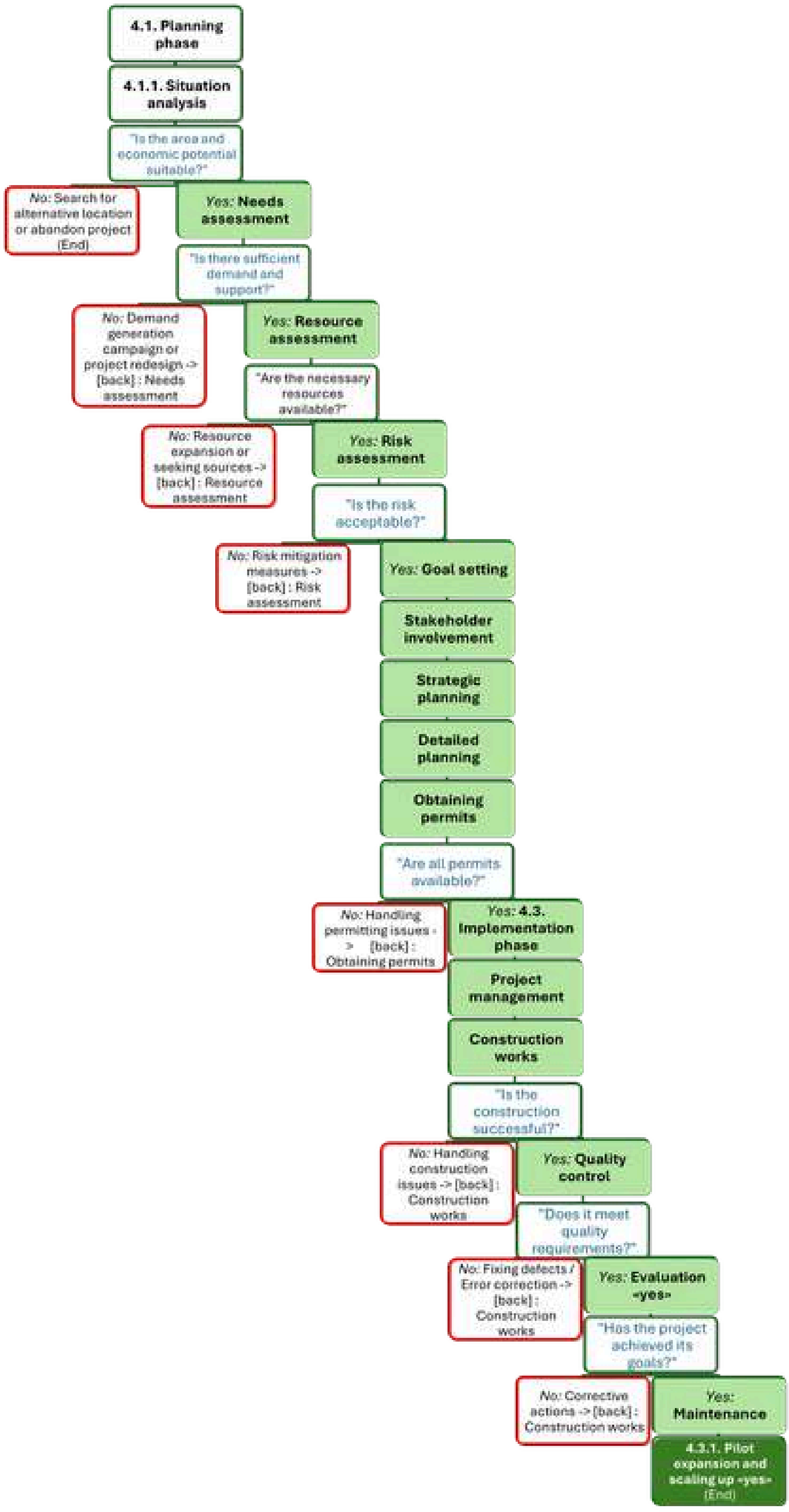
- **Workshops, Demonstration Event**: Conducting practical demonstrations and training sessions to showcase best practices and innovative techniques.

- **Evaluation**: Assessing project outcomes, community involvement and sustainability to inform future improvements and replication.

- **Project Closing Event**: Final event to share results, lessons learned and plans for long-term operation and scalability.

You can follow the step-by-step process of setting up and operating an urban farm in Figure 8.

Figure 8: The Diagram of the implementation phase



4.3 Monitoring and evaluation phase

Urban farms are complex, multifunctional interventions aimed at improving the quality of urban life. However, for these initiatives to become truly long-term and sustainable solutions, it is essential to systematically monitor and evaluate their performance.

This chapter presents key measurement frameworks and indicators that enable local authorities and community partners to quantify the three fundamental dimensions of the urban farm model: environmental sustainability, economic viability and social impact. We examine the tools that can be used to demonstrate the return on investment, measure the increase in biodiversity and monitor the strengthening of community cohesion, thereby ensuring the future adaptability and success of the model.

4.3.1 Development of indicators

The objectives of urban management align with the transition to a circular economy and the implementation of the United Nations' sustainability goals.

The success of the urban management model can therefore be assessed in three areas: environmental, economic and social impacts. These metrics can be used to directly link it to the achievement of the Sustainable Development Goals (SDGs).

In order to analyse the operation of urban farms, identify changes and trends, set targets and evaluate the results achieved, it is important to create objectively measurable performance indicators and define them and their changes for relevant periods (typically calendar years).

The types of urban farms and their primary objectives may vary, so it is advisable to set quantifiable targets related to specific objectives in all three areas during the planning stage, before the farm is established. Below, we present a set of criteria and quantifiable indicators that can be used to characterise the operation of urban farms in all three areas and that are generally applicable in most cases.

The effectiveness of a system can be verified by defining quantifiable monitoring indicators aligned with the operational objectives and measuring them regularly. These indicators, expressed as absolute values, are often related to the volume of activity (e.g. net sales revenue, total weight of products sold, etc.). Suppose we are not interested in absolute effects but want to determine the success of an operating model. In that case, the indicators must be defined as specific values (e.g. net sales as a percentage of total operating costs, the weight of products sold relative to the farm's unit of production area, etc.).

In the evaluation according to the three criteria (economic, environmental, social) proposed below, we can define three (or more) monitoring indicators for each criterion, with which we aim to measure the efficiency of the operation and the implementation of the criteria, with a primary focus on effective return on investment. The indicators below have been defined based on experiences of the CoFarm4Cities pilot projects. Additional and/or different indicators can be used by urban farms according to their actual profile and operational model.

It is worth illustrating indicators on a radial diagram suitable for visual evaluation. To this end, it is important that all indicators are on a scale of 0 to 10, which we considered when determining the proposed metrics and the calculation method.

Measuring Environmental Impact

The contribution of urban farms to environmental sustainability is crucial.
Success is indicated by the following indicators:

Land use change: hectares of preserved green/cultivated land compared to built-up area. Increasing urban green spaces improves the quality of the urban environment and the liveability of the city. For example, if a community garden is created on a previously abandoned plot of land, this can be quantified.

- **Proposal for a land use change indicator on a scale of 1-10:**

The percentage of the cultivated area of the urban farm compared to the total area before the farm was established, divided by ten.

Water use: The amount of water used in litres, compared to traditional agriculture and the amount of rainwater retained locally in litres. Water-saving methods such as hydroponics result in significant savings.

- **Proposal for a water consumption indicator on a scale of 1-10:**

The amount of water used in urban farming (i.e. not for social purposes) from locally collected rainwater as a percentage of total water consumption, divided by ten.

Carbon footprint reduction: Reduction in carbon dioxide emissions from transport kilometres avoided through local production. Shorter supply chains minimise environmental impact.

- **Proposal for a carbon footprint reduction metric on a scale of 1-10:**

The quantity (weight) of products produced on the urban farm and sold or used locally as a percentage of the total quantity (weight) of products produced on the farm, divided by ten.

Measuring Economic Impact

The economic viability of urban farms is essential.

The amount of local food production is the number of kilograms or tonnes of food grown on the farm. Local food production improves food security and supply for the urban population.

- **Proposal for a local food production indicator on a scale of 1-10:**

The amount of revenue generated from the sale of food produced on the urban farm, as a percentage of the farm's total operating costs, divided by ten. (Note: If the farm generates a profit, the indicator will result in a number greater than 10. In this case, enter 10).

Number of jobs created and increase in local revenue. The urban farm strengthens the local economy by creating new, sustainable jobs.

- **Proposal for the Employment indicator on a scale of 1-10:**

The total wage-type costs of persons employed on the urban farm as a percentage of total operating costs, divided by ten and multiplied by two. (Note: If the farm employs a large number of workers, e.g. in the context of social employment, the calculated value may exceed 10. In this case, enter 10).

Local economic embeddedness indicator, which measures the role of the urban farm in strengthening local supply chains and supporting local cash flow. Embeddedness in the local supply chain has a direct, positive impact on the local economy.

- **Proposal for a local embeddedness metric on a scale of 1-10:**

The amount paid to local suppliers used by the urban farm as a percentage of total operating costs, divided by ten and multiplied by two. (Note: If the farm uses a large number of local suppliers, the calculated value may exceed 10. In this case, enter 10).

Measuring Social Impact

Community involvement is one of the most valuable aspects of urban farming.

Community engagement indicators: Number of participants in community programmes, number of organised programmes and workshops and number of volunteer hours. These indicators show how the urban farm strengthens social cohesion and local identity.

- **Proposal for a measure of organised programmes on a scale of 1-10**

The number of community programmes organised by the urban farm in a year is divided by two. (Note: If the farm functions primarily as a community space, the calculated value may exceed 10. In this case, enter 10).

- **Suggested measurement for participants on a scale of 1-10:**

The number of interested participants in community programmes organised by the urban farm in a year, divided by three times the number of programmes. (Note: If the farm primarily functions as a community space, the calculated value may exceed 10. In this case, enter 10).

- **Proposal for the volunteer hours indicator on a scale of 1-10:**

The number of volunteer hours worked in connection with the operation of the urban farm in a given year as a percentage of the total working hours (the sum of volunteer and employee hours) in the same period, divided by ten and multiplied by two. (Note: If the farm is organised primarily on a voluntary basis, the calculated value may exceed 10. In this case, enter 10).

In the evaluation system presented, the answers given by the urban farm to specific questions based on three evaluation criteria – economic, environmental and social – are quantified. In most cases, the scores available for specific questions are designed to be independent of the farm's operating volume; i.e. they are determined as a percentage of a given indicator for the farm. This evaluation system assesses the relative usefulness of the farm – i.e. the nature of its operation – rather than its total volume. The available score in this evaluation system is 10 points per question and 30 points per criterion (30 points for economic impacts, 30 points for environmental impacts and 30 points for social impacts). The primary purpose of the assessment in this case is to determine, when comparing several farms, which farm has the most sustainable, community-oriented and environmentally conscious operating structure in relation to its own volume. This method ensures that a smaller, community farm can compete with a larger commercial farm if it performs better in terms of relative utility.

Visual representation of indicator evaluation

The results of the evaluation according to each criterion can be clearly illustrated using a radial (also known as a spider web or radar) diagram. (Figure 9) The radial diagram, with axes scaled to 10 units, is divided into three main segments, each corresponding to one of the three main evaluation criteria (environmental, economic, social), allowing us to see the evaluation of all three impacts in a single figure. Each main segment is divided into smaller segments, each corresponding to one indicator. For each question, starting from the origin, the part of the given circle corresponding to the score achieved is marked with a different colour. Conclusions can be drawn from the sizes of the coloured areas obtained. A large area close to the circle with a score of 10 indicates that the farm or pilot project under review has achieved a high overall score in all three main dimensions of sustainability, i.e. the programme can be considered successful. A small area close to the origin (centre point) indicates that the farm scored low on most of the criteria examined, i.e. its performance is low. A symmetrical, near-circular shape indicates balanced farm performance, suggesting integrated sustainability implementation. An asymmetrical, protruding shape (e.g. a funnel) indicates uneven performance; for example, if the social slice is large and the economic slice is small, this indicates that the farm operates primarily as a social centre without significant economic returns.

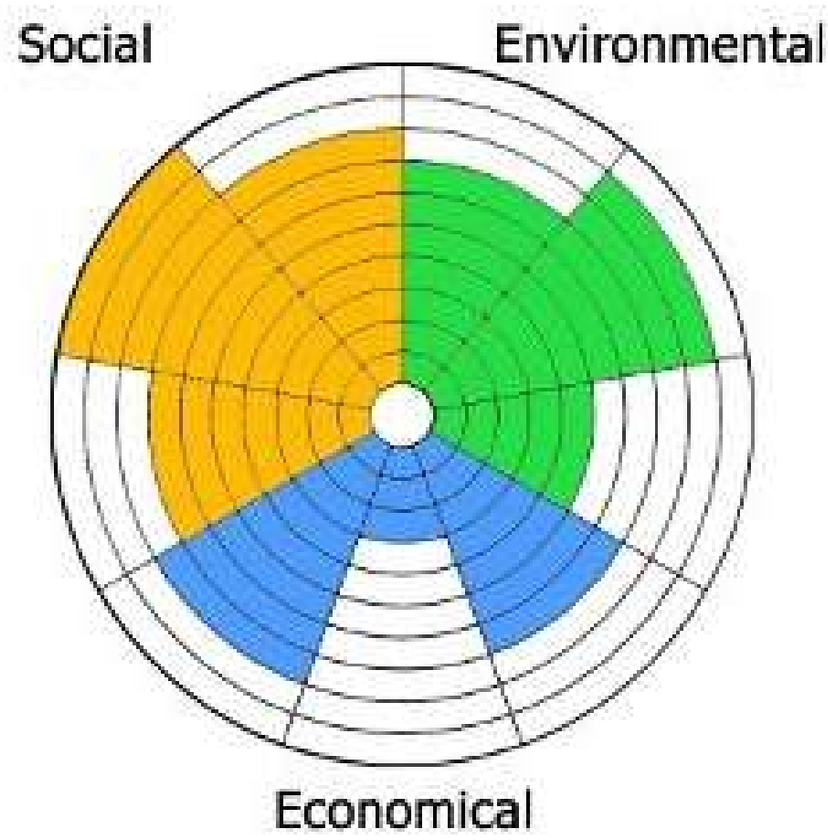
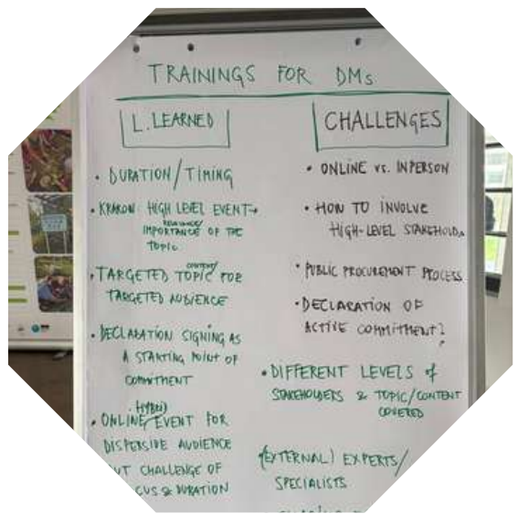


Figure 9: Radial diagram for assessing the environmental, economic and social impacts of urban farms

Periodically carrying out the assessment (preferably for calendar years) enables monitoring the impact of changes in the operation of a given urban farm. The impact of the changes on achieving sustainability goals can be assessed.

Note: In some cases, in addition to assessing the sustainability of the urban farm's mode of operation, it may be necessary to assess the absolute impact (volume) of the activities carried out. The suggested questions can also be used in this case, but instead of scores given as percentages, the absolute value of the given quantity should be provided in the answer. Example: the mass of food produced annually, the volume of rainwater utilised annually, the annual statistical number of employees, etc.



4.3.2 Data collection and analysis

Data collection methods

To monitor farm operations and verify the achievement of specific development goals, it is necessary to collect and document data. Data collection and documentation must be a planned and conscious activity, with methods and level of detail adapted to the nature and volume of the activity.

The following methods are worth applying:

- **Labour and financial documents**: Working hours, employee statistics, economic efficiency and return on investment data through existing mandatory records.

- **GIS mapping (Geographic Information System)**: In the case of an urban farm, GIS can be used to map crop areas, water use, soil quality and sunlight exposure. Composting points, irrigation systems and potential sources of pollution can be marked on the maps. This visual approach helps to identify problem areas, such as overly shaded plots, poorly located compost bins and unused parking spaces. GIS data can be integrated with other data, such as crop yields, to help understand how environmental factors affect production.

- **Surveys**: Surveys are the most important tools for measuring social utility. There are two main types: Participant surveys capture the motivations, satisfaction and experiences of farm users. Community surveys collect neighbourhood opinions on environmental impact, accessibility and perceptions, especially valuable during planning.

- **Production logs**: Record crop types, sowing/harvesting dates, yields, water and energy use and financial flows to assess productivity and profitability.

Data processing and analysis

Collected data enables evaluation of:

- **Environmental benefits** through GIS analysis of water use, composting efficiency and estimated CO_2 sequestration.

- **Economic performance** by analysing production logs to calculate profitability, return on investment and efficient crop choices.

- **Social benefits** via survey data on participation, education and community satisfaction.

Processing reports and feedback

Regular reporting (annual or semi-annual) summarises key performance indicators such as yields, profits, resource use and community engagement.

Continuous feedback review–through surveys, discussions and observations–supports improvement, ensuring farms respond to community needs and adapt to environmental, economic and social challenges. Based on the experience and data collected, the farm's operations must be continuously modified and improved – an adaptive management approach should be undertaken. It should however not be a one-off process, but a cyclical approach in which data collection and analysis are continually present. This method ensures that the urban farm remains sustainable and successful in the long term in a dynamically changing urban environment.

4.3.3 Risk management

Effective risk management

Risk management is a critical component of the UFSLU model, ensuring that urban farming initiatives can adapt to uncertainties and remain resilient in the face of challenges.

Because urban farms operate within dynamic ecological, social and economic systems, they are exposed to multiple risks that may compromise their effectiveness, sustainability or long-term viability. These risks are often interconnected – for example, a climate-related event such as a drought may trigger financial challenges through reduced yields, which in turn can weaken community participation and confidence.

Identifying potential risks early on allows project partners to prepare proactive strategies rather than reacting only once problems arise. A structured risk management process provides clarity on who is responsible for addressing each type of risk and **which mitigation measures** are most effective.

Effective risk management contributes to building **trust and legitimacy**. Communities are more likely to engage with and support urban farming initiatives if they see that risks are acknowledged openly and addressed transparently. Similarly, funders and policymakers are more willing to provide long-term support to projects that demonstrate foresight, preparedness and accountability.

Risk Matrix

This matrix (Table 6) provides a strategic overview of key risks that may affect the operation of urban farms. Each risk is pre-assessed by its Likelihood (L) and Severity (S) on a scale from 1 (Low) to 5 (High). The Mitigation Strategy column summarises core actions that can be undertaken to avoid or mitigate the risks. Cities that are developing an urban farm are welcome to use the below table to create their own risk management document, adapt the Likelihood (L) and Severity (S) values to their local conditions, and propose their own mitigation strategies.

Table 6: Risk Matrix

Risk (Short Description)	L	S	Key Mitigation Strategy
Environmental & Climate Risks			
Extreme weather (storms, floods)	3	5	Raised beds, drainage, windbreaks, insurance
Heatwaves	4	5	Shade structures, resilient crops
Drought/water scarcity	4	4	Rainwater harvesting, drip irrigation
Soil contamination	3	5	Testing, phytoremediation
Financial Risks			
Loss of municipal funding	3	4	Diversify funding sources
Rising operational costs	4	4	Efficiency, circular economy practices
Uncertain, time-limited grants	3	3	Contingency reserves, phased implementation
Social Risks			
Volunteer fatigue	4	3	Recognition, events, role rotation
Exclusion of vulnerable groups	3	4	Inclusive outreach and partnerships
Community conflict	3	4	Mediation and shared governance

Institutional & Governance Risks			
Unclear roles/responsibilities	3	5	MoUs and governance charters
Political change	3	5	Cross-party advocacy
Bureaucratic delays	4	4	One-stop contact points
Market Risks			
Price competition	4	4	Branding, storytelling
Demand volatility	3	4	CSA and subscription models
Distribution barriers	3	3	Partnerships with restaurants, schools
Low consumer awareness	3	4	Awareness and education campaigns
Operational Risks			
Lack of technical skills	4	4	Training and workshops
Infrastructure failure	3	4	Maintenance plans
Leadership gaps	3	4	Defined roles and succession plans
Legal & Regulatory Risks			
Zoning non-compliance	3	5	Integration into spatial planning
Food safety non-compliance	3	5	Scaled hygiene protocols
Unclear land tenure	3	4	Long-term leases, land trusts

Technological Risks			
Technology failure	3	4	Maintenance schedule and backups
High-cost barriers	4	3	Shared ownership or leasing
Skill gaps	3	3	Training and mentoring

Health & Safety Risks			
Tool or machinery accidents	4	4	PPE and safety training
Heat stress	4	5	Shade, hydration, rest scheduling
Soil or water contamination	3	5	Testing and clean sources
Zoonotic diseases	2	4	Biosecurity measures, vet checks

Reputational Risks			
Unmet expectations	3	4	Transparent communication
Negative media coverage	2	5	Crisis communication plan
Greenwashing accusations	2	4	Certification and accountability

Resilience Risks			
Lack of adaptability	3	5	Contingency planning
No succession planning	3	4	Mentorship and continuity plans
Weak community participation	4	4	Co-creation and inclusion

5 Findings

This chapter provides a presentation of the pilots implemented in 5 CE cities within CoFarm4Cities project, exploring their main characteristics and the project objectives set for them. In addition, guidelines for USFLU model users are provided to support future implementations of the urban farms. Building on the implementation steps outlined in Chapter 4, this chapter synthesises the experience gained during the pilot actions and highlights the solutions derived from them.

5.1 Solutions

This chapter briefly presents five urban farm pilots in the cities participated in the CoFarm4Cities project. It focuses on the main characteristics and primary objectives of the pilot implementations.

5.1.1 Local Farmers' Community Based Urban Farming (Óbuda)

The concept of establishing an urban farm emerged from the Integrated Urban Development Strategy of Óbuda-Békásmegyer, which identified abandoned agricultural land on the district's outskirts and highlighted the need to curb urban sprawl despite limited infrastructure development opportunities.

The initiative resulted in the creation of Budapest's first municipally owned, community-based urban farm, serving as a demonstrative pilot for integrated peri-urban land use. The project showcases the transformation of underutilised municipal property into a multifunctional space that combines **1. environmental responsibility applying circular and climate-friendly solutions, 2. economic viability and 3. social inclusion**.

The urban farm in Csúcshegy, Óbuda-Békásmegyer contributes to community building through community-based agriculture and supports the preservation of the area's natural, low-density character, thus mitigating urbanisation pressures related to the urban sprawl. From an economic perspective, the reuse of abandoned land for agricultural production increases the value of municipally owned property, while also generating positive environmental, economic and land-use impacts on the surrounding areas.

The farm operates as a non-profit, community-based production unit that is operationally self-sustaining. It is essentially small-scale, aiming at full or partial self-sufficiency for residential users, as well as educational and tertiary purposes for institutional stakeholders. It applies ecologically sustainable and nature-friendly farming methods, complemented by educational and knowledge-sharing activities that promote sustainable agricultural practices. Financial sustainability is ensured through a combination of limited municipal funding, institutional contributions, association fees, event revenues and available grant funding.

Key elements of the solution

5.1.1.1 A climate and environmentally friendly urban farm

The pilot integrates a permaculture-based approach to achieve environmental sustainability, with a strong focus on soil health, water conservation and biodiversity. To improve soil quality, synthetic inputs are avoided and replaced by composting, companion planting and mulching practices.

Due to the lack of drinking water infrastructure and the site's location on a sensitive water base, rainwater harvesting is applied to support irrigation and reduce dependence on external water sources. Mulching contributes to moisture retention, while targeted irrigation systems optimise water distribution. The landscape is designed to slow, spread and sink water, ensuring effective absorption. A key lesson learned from the permaculture-based approach was the importance of involving a permaculture expert from the earliest stages of the project, ideally during the planning phase.

As nature-based solutions, the pilot applies regenerative farming approach as well as sustainable technical measures and methods were used, including solar-powered lighting, to reduce electricity consumption and support low-impact operation. Natural ecosystem and biodiversity is enhanced through the careful selection of plant species and the provision of microhabitats that support local fauna.

5.1.1.2 A non-profit, self-sustaining urban farm

The urban farm operates under a community-based economic model, managed by an association composed of the gardeners themselves. The Municipality provides the land free of charge through a commodatum (loan for use) agreement, while the association is responsible for the farm's daily operations and maintenance, governed by a formal cooperation agreement. A key element of financial sustainability is the mandatory membership fee collected from all association members. These fees cover essential operational costs such as utilities and small-scale infrastructure investments, ensuring that the farm remains financially viable while benefiting from in-kind municipal support (including partial covering of utility expenses during the first year, contracting a farm manager to ensure efficient operation and community engagement). As the farm minimizes expenses through the free land provision and community-driven cultivation, the financial model becomes more sustainable over time. The mandatory membership fees support ongoing operational costs, while permaculture practices, such as organic fertilization, rainwater harvesting, and mulching, reduce the need for external inputs. The installation of renewable energy solutions like solar-powered lighting and low-maintenance landscape designs further contribute to financial sustainability.

5.1.1.3 A diverse and solidarity-based urban farm

The urban farm emphasizes social sustainability through inclusive community engagement and educational outreach. Local residents were invited to become plot holders via a three-month recriutment process facilitated by the Municipality, including joint site visits to help shape the final community. The farm is managed by a farm manager, who not only brings professional expertise but also plays a key role in fostering community development. Regular community events, training sessions, and awareness-raising activities are held monthly, ensuring ongoing engagement with the farm community consisting of local residents. The farm also occasionally opens its gates for broader public participation, offering designated days for residents to donate compost and engage with the community.

Education is a core aspect of the farm's social sustainability. All plot holders participate in an intensive training program focused on urban permaculture, sustainable ecosystems, and nature-based food production. In addition, both plot holders and interested local residents are trained in proper composting practices.

The site is designed to be inclusive, offering tailored opportunities for vulnerable groups, including individuals with physical or mental disabilities. Raised garden beds and a therapeutic garden have been established to stimulate the senses and support sensory needs. Barrier-free access is ensured across the farm, making it accessible to people with limited mobility and parents with strollers. This inclusivity extends to creating a meaningful space for those who may experience social isolation due to the peri-urban location, offering opportunities for social interaction and community-building. The farm also aims to offer practical benefits, such as shared equipment, to local gardeners and continues to engage the community through participatory activities.

The upscalability of the solution is supported by the fact that concrete concept for the expansion of the farm already exist at the pilot site. Subject to obtaining the necessary institutional and financial approval, these plans may enter the implementation phase in the near future.

Overall, the solution contributes to regenerative, climate-conscious, economically viable and socially inclusive urban development, offering a replicable and upscalable model that supports sustainable land use and counters urban sprawl across the region.

5.1.2 Testing circularity, social cohesion, education based UF scenario (Turin)

The pilot Cascina Falchera builds on an already established urban farm site, which has been further developed and enhanced through the CoFarm4Cities project, and is a unique example of a multifunctional urban farm in the Metropolitan area of Turin. Implementation via CoFarm4Cities project aimed to create a space where all individuals of the community – schools, young people, children and adults – can be part of urban Community Gardens, a space to protect and foster biodiversity starting from the community.

The pilot site is used from different angles as a lively example of various modalities of agriculture and circularity practices, and offers new opportunities to produce and consume locally-produced organic vegetables and fruits on a private level. The focus point is to provide fresh fruits and vegetables to residents who do not have easy access to these products or the economic means to purchase them. For the future, it represents a big potential for an internal restaurant that will be set up in the farmhouse, where it will be possible to use locally-produced ingredients, reducing food waste while showcasing different ways to consume such fresh products.

Key elements of the solution

5.1.2.1 Protection and enhancement of peri-urban landscape, soils and biodiversity

The Cascina Falchera pilot transitions from intensive monoculture to sustainable, environmentally responsible farming. Soil quality was restored through mechanical aeration and organic amendments, while sustainable cultivation practices–minimum tillage, organic fertilisation, mulching, and pest management–are applied in the urban garden. On the main agricultural land, crop rotation with ancient wheat and maize varieties, combined with cover crops, supports soil fertility and ecosystem resilience.

Water management leverages the historic spring-fed irrigation channel and an automated drip system that adjusts to seasonal conditions, optimising efficiency and minimising waste. Environmental and ecological monitoring, supported by the University of Turin, ensures alignment with biodiversity and green infrastructure goals. Land is allocated to buffer strips, food forests, shrubs and tree lines, while native crop varieties are reintroduced, enhancing genetic diversity and local ecosystem resilience. All measures collectively promote sustainable food production, soil and water quality, and overall environmental and community well-being.

5.1.2.2 Circular solutions at Cascina Falchera

The Cascina Falchera pilot applies a circular economy approach to create a resilient and self-sustaining urban farm. The economic model combines diversified revenue streams, including socially differentiated plot fees, sales of seedlings, short food supply chains with local actors, and income from educational activities. Initial investment and operational costs are supported by EU funds and private foundations, while local employment is generated through garden management, maintenance, and training roles.

Resource used within the farm follows circular principles: vegetable seeds are collected and reused for subsequent planting cycles, and crop residues and food waste are composted to produce nutrient-rich soil amendments. Automated irrigation and expert guidance support efficient, low-impact operations. Training programs and workshops engage the community in circular farming practices, seed conservation, and sustainable land management.

By integrating indigenous seed varieties, circular resource management, community involvement, and educational initiatives, the pilot ensures both environmental sustainability and long-term economic viability, strengthening the farm's role as a social, educational, and ecological asset.

5.1.2.3 Social inclusion, environmental education and community well-being

A central element of the Cascina Falchera pilot is the active involvement of the community in decision-making and agricultural practices, fostering a sense of belonging and enabling locally adapted solutions. Communal gardening sessions engage families, friends, and youth volunteers in maintaining shared areas and exchanging knowledge, while a year-round calendar of educational and social activities targets children, schools, and broader community groups. Collaboration with ITER and local educators provides hands-on learning experiences in agriculture, biology, and ecology, and workshops on sustainable farming, organic gardening, and environmental stewardship reinforce practical skills.

The farm dedicates plots to NGOs and vulnerable groups, including people with disabilities, unemployed individuals, young families, and other disadvantaged citizens, offering reduced fees and access incentives. Guidelines on sustainable and safe gardening practices ensure environmental protection and community well-being, complemented by monthly recreational and health promotion activities. These initiatives collectively strengthen social inclusion, environmental awareness, and community cohesion.

Overall, the combines permaculture-based farming, circular resource management, diversified revenue streams, and active community engagement to create a resilient, sustainable, and socially inclusive urban farm that supports biodiversity, environmental education, and local well-being.

5.1.3 Testing a mixed-use UF scenario (Krakow)

The Krakow pilot within the CoFarm4Cities project represents a mixed-use urban farming model developed on municipal land, integrating environmental sustainability, social inclusion, and economic viability. The initiative transforms underutilized urban green space into a new gardening model that combines allotment gardening with a community-managed mini urban farm, led primarily by allotment holders. This new model contributes to sustainable land use, urban resilience, and improved quality of life for residents.

The project is aligned with the city's strategic framework, particularly the "Directions for the development and management of green areas in Krakow for the years 2019–2030", and reflects broader European objectives such as the EU Green Deal and Agenda 2030.

The pilot site, located on Orla Street, is managed through a collaborative governance model involving the Kraków Municipal Green Authority (ZZM) and a selected non-governmental organization acting as the site operator.

The Krakow CoFarm4Cities pilot represents a holistic approach to urban farming that integrates environmental responsibility, economic feasibility, and social inclusion. By transforming municipal land into a vibrant community-managed space, the project contributes to sustainable urban development, enhances biodiversity, and strengthens local communities.

The solution offers a replicable model for cities seeking to promote resilient food systems, multifunctional land use, and inclusive urban environments.

Key elements of the solution

5.1.3.1 Food Sovereignity at the Individual Level

The Krakow mixed-use urban farm strengthens food sovereignty by enabling individuals and households to actively participate in food production. Residents cultivate their own plots, gaining direct access to fresh, chemical-free produce while increasing their awareness of sustainable food systems.

The model promotes self-sufficiency at a small scale, allowing participants to partially meet their own food needs while developing practical skills in organic agriculture. Through composting, seed-saving, and low-input cultivation methods, gardeners reduce dependency on external food supply chains.

Educational activities, including workshops on sustainable agriculture and cooperation with schools and universities, further reinforce knowledge transfer and empower citizens to make informed food choices. The pilot also serves as a demonstration site, promoting urban agriculture as a viable component of resilient local food systems.

5.1.3.2 New Economically Sustainable Model of Management

The Krakow pilot introduces a hybrid and scalable management model that combines municipal support with community-based operation. The land is publicly owned and provided by the municipality, while daily management is delegated to an NGO acting as the site operator.

The long-term economic model is based on plot subscription fees paid by gardeners, complemented by revenues from educational activities, workshops, and community events. This diversified approach enhances financial resilience and reduces reliance on external funding.

Operational efficiency is achieved through shared infrastructure, community engagement, and the use of locally available resources. The involvement of volunteers and collective work further reduces costs while strengthening ownership among participants.

The model also creates opportunities for local employment, particularly through the role of a site coordinator or urban farm manager. Over time, the site aims to achieve financial self-sufficiency while maintaining affordability and accessibility.

5.1.3.3 Socially Inclusive and Community-Oriented Urban Farm

The Krakow mixed-use urban farm is designed as an inclusive space that fosters community integration, social cohesion, and equal access to green infrastructure.

The project actively involves a wide range of stakeholders, including local residents, schools, universities, and civil society organisations. It prioritises the inclusion of vulnerable groups such as elderly people, youth, individuals with disabilities, migrants, unemployed persons, and families with children.

Participation is supported through preferential access to plots, targeted workshops, and community events that encourage interaction and mutual support. The farm serves as a platform for building social connections, reducing isolation, and strengthening neighbourhood ties.

In addition to food production, the site offers recreational and educational opportunities that contribute to physical and mental well-being. Public events, open days, and co-creation activities further enhance community engagement and acceptance.

5.1.4 Testing public orcharg and bio-waste resue based UF scenario (Zagreb)

The urban orchard in Brestje, the neighborhood in the eastern district of Sesvete in Zagreb, established in the framework of CoFarm4Cities, has been a new addition to the urban gardens project, implemented in the city of Zagreb since 2013, with great success and great interest of the citizens.

To make a step forward and enrich the existing scheme, the city began implementing urban orchards as a crossover between a public park and an edible forest. The Brestje orchard is the second one in Zagreb.

The project provides the local people with the opportunity to spend time in natural surroundings, which has been proven beneficial to both mental and physical health. Although Brestje is a neighborhood with a lot of greenery, there aren't many public green areas for the residents, and most of the greenery is either undeveloped and inaccessible, or on private plots. The orchard provides a space for socializing, food production, relaxation and education, and a community is built with the help of public and inclusive green spaces.

Key elements of the solution

5.1.4.1 A new green/edible community space in the neighbourhood

The urban farm in Zagreb is conceived as a public green space with the orchard containing different varieties of fruit trees (apples, pears, cherries, currants, aronia...), a multifunctional lawn as the main space for standard park activities (play, recreation, rest and relaxation) and biodiversity meadows which attracts pollinating insects and birds and adds to the overall biodiversity of the area.

The equipment in the urban orchard (benches and trash cans) further enhance the leisurely character of this area, making it a green outdoor living room for the community living in a green area with limited public green spaces, as the majority of green surfaces are either inaccessible or private. It’s situated in a residential area, dominated by single-family homes, and next to the elementary school and kindergarten. The community was included through involvement of the school and kindergarten children into the planning of the orchard, and they take major part in maintenance and in use of the fruits for school lunch.

5.1.4.2 Outdoor learning area for the school and kindergarten

The school next to the pilot action has been involved in the implementation since the beginning of the project. The children have participated in the workshops that have provided the city and the landscape architect with the input and ideas about the wishes of the local community for this space that was just an empty field before.

The school has had difficulty in growing plants and trees in the school garden, as that land is prone to flooding and the soil is of low quality. The new area is enabling the school to conduct part of the teaching programme outside.

5.1.4.3 Waste reduction and compost production

Another element of the pilot action was the composting device that runs on electrical power and can turn food remains into high-quality compost in 24 hours. This device is used to manage school and kindergarten food waste into compost for school garden and for the urban gardens in the vicinity.

The composting device has been installed and is in use, as a great help to the school kitchen which has had a surplus of biowaste that was unfit to be turned into compost in the usual way. The composting machine provides an opportunity to transform the food scraps into compost by undergoing a process that includes beneficial microorganisms and moderate heat, so the food is turned into high quality compost within 24 hours.

5.1.5 Testing school program based UF scenario (Ljubljana)

The Ljubljana pilot shows how urban farms can support education for schools and local communities. At the Rakova Jelša allotment area, the city created the Mini Urban Farm Rakova Jelša as part of its strategy to promote urban farming and food self-sufficiency.

The farm provides educational programs mainly for primary school teachers and mentors, helping them gain knowledge to develop school gardens. It also serves as a hands-on learning space for children, where they explore plant life cycles, biodiversity, crop rotation, and sustainable practices like composting. They learn basic gardening skills and understand the connections between food production, nature, and climate.

The Mini Urban Farm is a dynamic learning environment for both students and residents, encouraging healthy eating and strengthening community ties. School gardens play a key role by allowing students to apply what they learn and by spreading awareness about food production and self-sufficiency.

Together, the Mini Urban Farm, school gardens, and six educational modules create a comprehensive system that addresses food production, sustainability, biodiversity, waste reduction, social skills, mobility, and energy. The project is part of Ljubljana's 2021–2027 strategy for rural development and urban farming.

Key elements of the solution

5.1.5.1 Holistic approach to food production on local government level

Section for Rural development within City of Ljubljana developed different mechanism to achieve as high as possible level of food self-sufficiency. Until 2010, the focus was on support to farmers on the field of primarily production and supplementary activities on the farm, but since 2010, it focused also on urban farming in the form of allotment gardens. In order to enable local farmers to sell their products within so-called short supply chains, many activities were directed into connection between local farmers and public institutions, mainly schools and kindergartens. It soon became clear that it is not enough to connect different sides; it is also important do educate both sides so that they understand the needs of each other. First, we approached the food organisers and cooks in order to create a demand for locally produced food in public procurement. We made some progress but it was not enough. We realised that the education of the youngest citizens in needed in order to achieve a proper demand and attitude towards locally produced food. In connection to Department of Education, a programme of school gardens was again introduced to schools and efforts toward holistic approach were made with six modules.

5.1.5.2 Active inclusion of food production as a tool for many other activities in school curriculum

If we want school gardens as well as Mini Urban Farm Rakova Jelša to become a productive part of educational process, they have to be a part of wider horizontal curriculum of school education. Many school subject can be a part of gardening education from chemistry, home economics, physics, language, development of motor skills. School gardens must become a laboratory for different activities from circular economy (composting), to cooking classes, learning about biodiversity etc. Integrating the topic into the educational process allows students to learn about the origins of the food they eat, understand the benefits of local production and its impact on community independence, environmental protection, and a healthy lifestyle.

5.1.5.3 Empowering educatorn and reconnecting students with local food production

Successful implementation of such programmes depends on committed and motivated teachers and mentors who understand their long-term value. Beyond formal curricula, it is essential to engage educators who are willing to invest time and effort, and to support them with the necessary knowledge and tools. This enables them to effectively transfer both theoretical and practical understanding of food production to children, and potentially also to their families. At the same time, reconnecting students with active food production is crucial for balanced development.

Practical, hands-on experiences complement theoretical learning and help children build a positive relationship with food, nature, and sustainability. When they know how much effort must be put into growing one radish, they will not throw it away next time, if they experience, by collecting, the amount of wasted food they will think twice before they throw something away. Urban school gardens provide an ideal environment for this integrated approach. In addition to learning about gardening and sustainable practices, students develop important social skills such as cooperation, responsibility, communication, and conflict resolution.

Working together in a garden fosters a sense of community, peer connection, and intergenerational cooperation, which contributes to students' personal development.

5.2 Guidelines for UFSLU model users to support future implementations

Following the implementation of pilot actions, CoFarm4Cities project partners reconvened in September 2025 to jointly assess, compare and evaluate their results. This process aimed not only to highlight successes but also to critically examine barriers and challenges encountered along the way and to extract transferable lessons that will guide future urban farming initiatives across Central Europe.

This chapter summarises the **recommendations for UFSLU model users (follower cities)** in the areas of Legal and Regulatory Framework, Environmental Sustainability, Economic Sustainability, Social Sustainability. These recommendations were developed on the basis of the identified best practices and enabling conditions, obstacles and implementation barriers, and lessons learned from practice (all included in CoFarm4Cities deliverable D 1.4.1)

The comparative analysis of the five pilots revealed that they encountered the same or very similar obstacles and best practices, resulting in shared lessons learned. To avoid repetition, the UFSLU model therefore presents a consolidated set of recommendations.

UFSLU model users are encouraged to review all the recommendations below, while placing particular emphasis on those areas in which they feel the least confident or experienced.

5.2.1 Legal and regulatory framework of an urban farm

Urban planning instruments and local regulations

1. Lock urban farming (UF) into the spatial plan – explicitly

- Create a UF land-use category in the spatial plan so pilots aren't "exceptions." Include sub-zones for community plots, educational gardens, orchards and small commercial UF.
- Permit lightweight structures (tool sheds, containers, shade, water tanks, compost bays) and on-site sales points/market days as by-right uses in UF zones to avoid case-by-case waivers.

2. Adopt one citywide ordinance for community/plot gardens (not district-by-district)

- Pass a uniform ordinance that sets: eligibility, allocation, pricing, plot rules, shared infrastructure, composting norms and conflict resolution – independent of city districts.
- Include standard templates (leases/Licenses to Occupy) with clear tenure terms and water/land-use rights for horticulture (irrigation, rainwater capture).

3. Water rights made easy

- Pre-agree a default irrigation pathway per UF zone (e.g. municipal hydrant, shallow well where legal, or rainwater tanks with defined sizing).

- Publish a plain-language guide to water licences/permissions and when they're needed; recognise rainwater systems as a preferred/low-bureaucracy option where national law allows.

4. Green public procurement & HACCP: enable school use of garden produce

- **Issue a city guidance note for schools aligning:**

- EU School Scheme and local procurement so schools can prioritise local/seasonal and educational-garden produce (within thresholds).

- HACCP-lite pathways for low-risk items (whole fruit/veg, herbs) with teacher training and traceability forms.

- Reference JRC work on sustainable food procurement criteria and EU materials on school meals to design compliant specs.

5. Participatory planning baked into regulation

- Require early public involvement when designating UF zones and when drafting garden rules – e.g. a 30-day comment period and one co-design workshop per new UF site.

6. Business use of compost & bio-waste – clarify the rules

- In your ordinance, specify allowed inputs, processing device specs, quality standards (e.g. end-of-waste criteria if applicable), sale/donation rules and record-keeping for the compost product.

- Tie it to city circular economy goals and make UF sites eligible for small-scale bio-waste pilots.

7. Site selection “go/no-go” checklist – use before committing

- Require a pre-feasibility sheet: legal land status, UF-compatible zoning, water access path, soil quality, sun/wind, access and neighbours, school/market proximity and biodiversity targets (orchard/meadow).

8. Reserve UF in new neighborhoods

- In local detailed plans, require at least one UF cluster per new neighborhood (e.g. 1–2% of land or 1 m² UF per resident), with education space.
- Tie UF delivery to developer obligations (similar to green/open-space standards).

Site ownership and management agreements

1. Formalise Stable Ownership Models

- Secure multi-year lease/land-use agreements (min. 5–10 years) with UF-specific clauses: water rights, composting, events, sales, school activities.
- Use land registry verification as a precondition before funding or implementation.

2. Standardise UF Legal Agreement Templates

- Create a template UF land-use contract adaptable to public land/ Private land/ Mixed governance.
- Include rights to: Temporary structures, Rainwater systems, public events & open days, Education & market activities.

3. Empower NGOs / Cooperatives Early

- Work with existing NGOs experienced in gardening or social farming to avoid delays from founding new legal entities.
- If a new entity is required, appoint an interim caretaker body (municipal dept. or partner NGO) to manage the site until the NGO is operational.
- Provide capacity-building: governance, accounting, HACCP, community engagement.

4. Inventory & Match Existing Land First

- Before opening new UF areas, prioritise existing city allotment areas, brownfields earmarked for green recovery, school yards and peri-urban municipal lands
- Conduct a UF Land Audit: ownership, soil, access, tenure potential.

Cooperation agreements with authorities/agencies/NGOs

1. Establish a Dedicated UF Coordinator/Office

- **Appoint a single coordination person or unit inside the municipality to:**

- Bridge departments (land, water, education, environment).
- Be the central contact for NGOs, schools, farmers.
- Oversee partnerships and resolve conflicts.

Without this, fragmentation continues and cooperation relies on informal relations.

2. Organise Regular Cooperation Mechanisms

- Weekly or monthly coordination meetings among stakeholders to address practical issues early.

3. Increase Access to Land – New Property Sources to address the demand gap

- Map all underused and derelict municipal land suitable for gardens/orchards.
- Promote interim use zoning → land waiting for development can host UF for 3–5 years.

4. Introduce Partnership Incentives

- Provide fee reductions or exemptions for NGOs and schools using land for public-interest gardening.
- Formalise volunteer and social inclusion programs through agreements with social departments.

Specific legislation or permits (e.g. water, sales)

1. Introduce Simplify & Recognise “Temporary UF Infrastructure” in Zoning Laws

- Amend urban/local plans to allow containers, sheds, compost bays, water tanks and simple shading structures as temporary installations, exempt from complex building permits.
- Introduce a “light agricultural infrastructure” category with simplified administrative notification instead of permits.

2. Establish a “UF Permit Pack”/One-Stop Desk

- **Bundle permits for:**

- Site use, temporary structures.
- Water connection/rainwater system.
- Electricity (if essential).
- Market or event authorisation.
- Compost or bio-waste processing.
- Educational use.

- **Create a single municipal contact to coordinate between utility, planning and environmental departments.**

3. Prioritise Alternative Water Solutions (Avoiding Licensing Burdens)

- **Promote:**

- Rainwater harvesting systems (tanks, cisterns).
- Existing shared water points (schools, public facilities).
- Metered hydrants with seasonal access.

This reduces dependency on formal water licences and allows operation under simpler rules.

4. Legal Guidance for NGOs & Operators

- **Municipalities may provide templates and technical guidance for:**

- Water license requests.
- Portable building placement.
- Emergency and risk management plans.
- Sales permits.

5. Start Permit Procedures Early (Pre-Project Phase)

- Water and energy permits can take 6–12 months – must be prepared during land negotiations, not after site launch.
- Include permit readiness in feasibility and land selection criteria.

Alignment with municipal/regional strategies

1. Formal Recognition of Urban Farming in Core Planning Documents

- **Amend Spatial and other Plans to:**

- Create “Urban Agriculture/Green Production Zone”.
- Protect land from conversion.
- Permit essential UF functions (education, composting, social use).

Strategy alignment must be codified in land-use plan regulations, not just policy papers.

2. Embed UF in Key Municipal Strategies

- **Ensure UF is explicitly included in:**

- Climate & SECAP plans – as nature-based solution.
- Food policy/food security frameworks.
- Circular economy & waste strategies – for composting and bio-waste.
- Social inclusion/health strategies – UF as tool for youth, seniors, mental health

3. Clear Internal Governance & Education

- Educate municipal departments on UF’s strategic value to ensure consistent decision-making.
- Establish interdepartmental task forces linking Planning, Environment, Health, Education, Social Affairs.

4. Benchmark Against Leading Cities

- **Encourage cities to reference:**

- Milan Urban Food Policy Pact indicators.
- Ljubljana’s Rural Development and Urban Farming Strategy 2021–2027.

5.2.2 Environmental sustainability of an urban farm

Soil management

1. Conduct Baseline and Seasonal Soil Analysis

- Implement mandatory soil testing at project start and annually thereafter.
- Use results to design a soil improvement plan (pH correction, organic matter targets, erosion control).

2. Introduce Expert-Led Soil & Compost Training Programs

- Organise annual workshops with agronomists, permaculture designers, or soil scientists.
- Teach: Proper compost production/use, Crop rotation planning, Cover cropping & mulching, Soil life (microbiology, fungi, earthworms).

3. Develop Local Circular Soil Resource Chains

- **Encourage use of:**

- Local manure producers (horse stables, nearby farms).
- Municipal bio-waste compost plants.
- Green waste from parks (leaves, grass clippings).

This ties urban farming to circular economy objectives.

4. Design Smart Terrain & Water Structures

- **Where terrain is sloped or eroded:**

- Introduce terraces, swales, infiltration basins, living hedges.
- Apply landscape architecture principles to slow and sink water into soil.

5. Establish Efficient Composting Infrastructure

- Build community compost stations or micro-compost hubs.
- Define management roles (who turns, who monitors).
- Encourage on-site composting with correct ratios (carbon/nitrogen balance)

Water management

1. Maximize Rainwater Harvesting Capacity

- Install roofs, pergolas, shelters specifically designed to catch water.
- Use modular tanks or underground cisterns to store water for dry periods.
- Promote a “rain-first” policy – tap water only as backup.

2. Implement Precision & Climate-Smart Irrigation

- Standardise drip irrigation systems with timers and meteo-based automation.
- Include humidity sensors where possible to reduce human error.
- Offer subsidies or grant support for installation (investment is high, but long-term savings are significant)

3. Promote Passive Water Retention Techniques

- Mulching (wood chips, straw, compost) as mandatory training topic.
- Landscape interventions: Swales, Terracing, Rain gardens/infiltration basins.

4. Alternative Water Source Strategy

- Prioritise sites with existing access to wells or municipal water points.
- Explore co-use agreements with schools, sports centres, or community facilities for water sharing.

5. Capacity Building & User Support

- **Provide hands-on workshops on:**

- Installing & repairing irrigation systems.
- Water monitoring & drought planning.
- Harvesting and storing rainwater safely.

- **Create simple visual manuals for garden users: "How to use rainwater instead of tap water".**

6. Infrastructure Protection

- Secure tanks and solar systems with fencing or locked enclosures.
- Foster community ownership to reduce vandalism risk.

Biodiversity and environmental quality

1. Design for Biodiversity from the Start

- Use microclimate-appropriate species and soil-adapted seed mixes (local ecotypes, not generic wildflower blends).
- Develop biodiversity zoning plans within every UF site: Productive area (crops), Pollinator strips, Wet/dry ecological niches, Wild zones (no management).

2. Promote Polyculture, Crop Rotation & Permaculture

- Encourage polyculture and intercropping to attract beneficial insects.
- Integrate permaculture guilds (fruit + herb + flower combinations) that support each other.
- Train gardeners in rotational planning for both productivity and species continuity.

3. Create Dedicated Habitats for Wildlife

- Retain fallen trees/logs (“habitat wood”) on site to support fungi, insects, birds.
- Install: Insect hotels, Bird and bat shelters, Small water basins for amphibians & pollinators.

4. Improve Communication & Maintenance Protocols

- Establish clear guidelines for municipal maintenance teams:

- No mowing of corridors before seed maturity
- Signs indicating “Biodiversity Area – Do Not Cut”

- Use signage to explain wild areas to the public and gardeners (“This area is for pollinators”).

5. Adaptive Climate Planting (“Smart Farming”)

- Adjust planting choices annually based on expected climate trends (heat-tolerant, drought-resistant species).
- Introduce resilient perennial systems (fruit shrubs, wild herbs) to reduce replanting needs.

6. Integrate Rain Gardens & Water-Based Biodiversity

- Use rain gardens to capture stormwater and create moist habitats.
- Combine biodiversity goals with water management (e.g. wet meadow zones).

Circular economy and waste management

1. Establish Structured Composting Systems

- Install modular compost stations with separate bays for: Fresh waste, Maturation, Ready compost
- Provide tools (forks, thermometers) and visual instruction boards.

2. Mandatory Compost Training for All Users

- Organise seasonal workshops & live demonstrations.
- Share simple guides: “green/brown balance”, “how to avoid smell”, “how to speed up compost”.
- Introduce "Compost Ambassadors" – trained volunteers responsible for oversight.

3. Integrate Municipal Support & Collection

- Create partnerships with municipal services to handle excess organic waste (large branches, woody material).
- If collection is impossible, apply “Take your waste home” policy (with rules).

4. Support Full Circular Use – Beyond Compost

- Encourage transformation of surplus produce into: Preserves (jams, pickles), Drying/fermentation workshops, Community meals & “zero waste” events.
- Create exchange tables for unwanted harvests.

5. Create Clear Rules for Waste Responsibility

- Display rules: What can be composted? What must be taken home? Who turns the compost?
- Assign on-site waste managers (or NGOs) to prevent contamination.

6. Link Waste to Education & Social Impact

- **Use circular activities as learning modules:**

- Schools: “From peel to soil” program.
- Community: Shared fermentation workshops.
- Events: Zero Waste Garden Days.

Environmental monitoring

1. Institutionalise Regular Environmental Monitoring

- Conduct soil analysis at least twice per year (spring + autumn).
- Include water and air quality checks where relevant.
- Use monitoring to track progress, not just detect risks.

2. Create Partnerships with Universities & Research Institutions

- Offer thesis and internship opportunities at UF sites.
- Involve students in sampling, biodiversity tracking and climate data analysis.
- Establish UF sites as “Living Laboratories” for environmental innovation.

3. Develop a Simple UF Monitoring Protocol/Toolkit

- Provide a standardised toolkit including: Soil sampling guides, Biodiversity observation sheets, Rain/irrigation logging forms, Compost temperature & moisture logs.
- Collect data in a shared municipal database to inform long-term strategy.

4. Enforce Eco-Rules with Data

- Link monitoring results to plot renewal or sanctions (e.g. revoke plots if chemicals used illegally).
- Establish “eco-standards contract” or include in common rules: gardeners commit to pesticide-free cultivation.

5. Use Technology Wisely

- **Expand use of:**

- Meteo stations (humidity, rainfall, UV, frost alerts).
- Low-cost soil sensors (moisture, temperature).
- Mobile apps/QR codes for submitting field observations.

6. Educational Integration & Transparency

- Publish monitoring results in simple visual formats (notice boards, dashboards).
- Organise annual “Eco Health Check Days” with workshops based on monitoring outcomes.

5.2.3 Economic sustainability of an urban farm

Business model

1. Develop a Multi-Stream Revenue Model

- **Combine:**

- Food Sales (fresh produce, seedlings, value-added products).
- Educational services (workshops, school programs, guided tours)
- Events & Social Functions (farm festivals, team-building).
- Grants & Sponsorships (CSR, local businesses, EU funds).

A diversified farm is a resilient farm.

2. Shift from Individual Rental to Collective Management

- Sign land-use contracts with associations, cooperatives, or NGOs, not individuals.
- This allows: Economic planning, Collective purchasing, Shared marketing and responsibility.

3. Map and Engage the Demand Side

- **Conduct market and community demand assessment:**

- Do locals want vegetables, workshops, events, or CSA boxes?

- **Match production and services to local needs.**

4. Promote Economic Multi-Functionality

- Encourage Urban Farms to act as: Micro-market, Training center, Biodiversity lab, Social therapy space.
  More services = more income streams.

5. Encourage Partnerships and Sponsorships

- Seek local SMEs (garden stores, restaurants, eco brands) as sponsors.

- Offer visibility benefits in gardens in exchange for support (signboards, events).

Funding sources

1. Adopt a Mixed-Finance Model (3-Pillar Funding)

- **Urban Farms should combine:**

- Public Base Funding – City budget/social services.
- Own Income – Membership fees, produce sales, workshops.
- External Funds – EU calls, CSR partnerships, foundations.

2. Practice Early & Strategic Budgeting

- Prepare annual and multi-year financial plans including buffer for unexpected costs.

- Integrate UF activities into school or community programs to access their budget lines.

3. Maintain an Innovation Reserve Fund

- Always allocate 5–10% of income (funds or fees) into a reserve for Emergencies, New pilot projects, Infrastructure upgrades.

4. Use Grants to Buy Knowledge, Not Just Infrastructure

- Apply external funds to bring in experts, trainers and monitoring capacity.
- Fund capacity-building, not only physical equipment.

5. Expand Private & CSR Partnerships

- Engage companies (food, eco-brands, banks) to finance: School gardens, Tool donations, Educational programs.
- Offer recognition (naming rights, events) in return.

6. Introduce Membership or Community Participation Fees

- Even symbolic contributions teach responsibility and reduce dependency.
- Use volunteering in exchange for reduced fees.

Job creation

1. Recognise and Formalise New Green Professions

- Define core UF roles and include them in municipal labor frameworks: Urban Farm Manager, Social/Therapeutic Gardener, Environmental Educator, Compost & Circular Economy Specialist
- Advocate at national and municipal levels for official job classification and funding.

2. Embed Job Roles into Business Plans

- UF site may include minimum staffing in the financial model (e.g. 1 manager + part-time educator).
- Combine revenue (sales, workshops) with municipal co-funding to support salaries.

3. Develop Training & Certification Pathways

- Partner with universities, agricultural colleges, vocational centers to create
  - UF internships & apprenticeships
  - Certificate programs in social farming, permaculture, circular agriculture
- Lobby Ministries of Education/Labor to include UF in curricula.

4. Secure Hybrid Employment Models to make staff employment more resilient

- **Combine:**

- Base funding (city/social services).
- Revenue from educational programs (schools, workshops).
- Sponsored contracts (CSR, NGOs).

5. Support Seniors and Skilled Gardeners as Mentors

- Engage retired horticulturists, park workers, allotment leaders as paid mentors or part-time staff.
- Recognise intergenerational knowledge as a key job asset.

6. Structured Volunteer Programs (Not Replacement for Jobs)

- Create volunteer frameworks with insurance, training and recognition.
- Use volunteers for support tasks, not key operational roles.

Cost reduction and efficiency

1. Strengthen Community-Based Management

- Educate and train users to take responsibility for maintenance tasks.
- Introduce reward or benefit systems (discounts, priority plot selection) for active contributors.

2. Invest in Sustainable Infrastructure

- Focus funding on infrastructure that reduces operational costs long-term: Rainwater harvesting, Solar-powered irrigation, Shared tool sheds & seed banks.
- Avoid large one-time investments (e.g. deep wells) unless absolutely necessary.

3. Use Crop Strategy for Cost Efficiency

- Prioritise high-value, short-storage crops (lettuce, herbs, raspberries) that retain quality in ultra-local chains.
- Grow seed-saving varieties to build self-sufficiency and reduce purchasing costs.

4. Develop Municipal Seed & Material Banks

- Create city-supported seed libraries and compost hubs to support gardeners and lower input costs.

5. Plan for Contingency Costs

- Include repair/emergency funds in financial planning.
- Negotiate insurance or reserve funds to cover extreme weather or infrastructure failures.

Long-term financial independence

1. Develop a Robust, Diversified Business Model – see details at question “Business model”

2. Introduce Paid Events & Experience Economy

- Host chargeable events like harvest festivals, cooking workshops, nature therapy, eco-markets.
- Offer eco-tourism packages, team-building activities, volunteer tourism.

3. Plan for Seasonal Continuity

- **Organise:**

- Summer caretaking teams (students, volunteers, hired seasonal staff).
- Winter workshops to maintain year-round engagement.

4. Advocate for Local Food Policy Integration

- **Embed UF in local food strategies & procurement frameworks:**

- Link with school canteens, hospitals, local markets.

- **Position UF as a recognised food producer, not only green space.**

5. Establish Insurance and Financial Reserves

- Secure liability insurance and emergency funds for infrastructure repair, climate events, vandalism.
- Create a reserve fund financed from annual income (5–10% retention).

6. Context-Based Planning

- Build farms where demand is high and community commitment is strong.
- Conduct demand analysis before establishment to ensure users and consumers exist.

5.2.4 Social sustainability of an urban farm

Community involvement

1. Formalise Community Structures

- Encourage gardeners to organise into an association or committee to run events and reduce reliance on municipal staff.
- Create community leadership roles (event coordinator, children's mentor, communication lead).

2. Engage Schools and Educational Institutions

- Partner with schools early for regular visits, garden lessons, student volunteering.
- Develop "School Garden Ambassador" programs to sustain involvement even during holidays.

3. Organise Open Days for Wider Residents

- Invite non-gardeners to discovery days, volunteer sessions, seasonal markets, cultural events.
- Use storytelling, tastings, music and crafts to attract diverse audiences.

4. Start Stakeholder Engagement Early

- Involve local communities from the planning phase, not after construction.
- Use participatory design workshops to build ownership from the beginning.

5. Invest in Edutainment & Social Programming

- Combine education with fun (games, cooking, nature trails, family challenges).
- Provide intergenerational activities to bridge age gaps (youth + seniors).

6. Use Multi-Channel Communication

- Maintain: Community bulletin boards on-site, Messaging apps / digital platforms, Local radio/newspapers & social media presence.

Education and awareness

1. Integrate Urban Farming into School Curriculum

- Collaborate with education authorities to include UF in subjects such as: Science & ecology, Health & nutrition, Social responsibility.
- Provide curriculum-ready teaching materials and learning modules.

2. Use Expert Educators and Facilitators

- Involve agronomists, ecologists, chefs, or artists to lead engaging sessions.
- Make education fun and inspirational, not only instructional.

3. Organise Logistics for School Participation

- Provide transport solutions: School buses, Car sharing / electric mobility.
- Coordinate schedules with schools one year in advance.

4. Create Inclusive and Attractive Learning Materials

- Develop: Illustrated learning kits, Self-guided tours / QR codes.

5. Promote Food & Urban Farming as a Strategic City Topic

- Advocate for recognition of food education as a horizontal municipal priority (like climate, mobility, health).

Vulnerable groups and inclusion

1. Secure Transport Solutions

- Seek extra funding or sponsorships to provide transportation for vulnerable participants.
- Collaborate with: Social services, Rehabilitation centers, Local transport providers (municipal buses, NGOs).

2. Offer Inclusive Design

- Continue adapting infrastructure: Raised beds, Wide, accessible paths, Shaded rest areas, Accessible toilets.

3. Create Targeted Programs

- Design specific gardening programs for: Elderly, Persons with disabilities, Refugees, low-income families, Mental health and social integration participants.

4. Build Partnerships with Social Institutions

- Formalise collaboration through Memorandum of Understandings with rehabilitation centers, disability associations, care homes, including joint planning of visits and staff involvement.

Well-being and health benefits

1. Build Weather-Resilient Infrastructure

- Secure funding or sponsorships for shelters or pergolas and shaded resting areas, that enables gardens to function in heat, rain and long seasons.

2. Improve Accessibility & Transport

- Partner with private or municipal mobility services to ensure: Shuttle transport, Shared rides, Inclusive mobility options for seniors and disabled participants.

3. Expand Whole-School Participation

- Integrate outdoor gardening into daily school schedules (Physical education, Health curriculum).

4. Use ‘Local First’ Food Policy

- **Encourage school canteens and institutions to adopt:**

- 0 km Menus
- “Grow & Eat” initiatives

5. Develop Health-Oriented Programs

- Introduce structured well-being activities such as Garden yoga, Therapy gardening sessions, Cooking & nutrition workshops.

Community acceptance/resistance

1. Launch Transparent Communication from the Start

- **Clearly explain:**

- Purpose of the UF site.
- Community benefits (food, green space, health).
- Participation opportunities.

- **Use local bulletins, notice boards, flyers and local radio – not only digital media.**

2. Organise Regular, Small-Scale Activities

- Instead of a few large events, host frequent mini activities such as Planting mornings, Tea in the garden, Harvest tastings, Children's crafts.

- Frequent presence maintains visibility and trust.

3. Highlight Local Benefits

- Promote advantages such as: Cleaner, greener neighbourhood, Fresh food access, Children's education, Community safety through activity.

4. Train and Empower Residents

- Provide training to locals so they become ambassadors, not just beneficiaries.

- Educate residents on basic gardening to reduce scepticism.

5. Address Social Resistance with Empathy

- Recognise local struggles (housing, poverty).
- Include social services or housing councils in project discussions to align priorities.

6. Use Visual Transformation to Build Support

- Emphasise visible improvements (before/after photos, signage, storytelling).

5.2.5 Stakeholder involvement of an urban farm

Stakeholder Engagement Plan and related activities

1. Develop a single, structured Stakeholder Engagement Plan to organise involvement across project phases. An UF engagement plan should include:

- Stakeholder interests, roles and expectations in pilots.
- Dependencies, conflict and risk exposure.
- Communication frequency and preferred channels.
- Co-design interaction points tied to project stages.
- Action plan specifying engagement responsibility, resource contribution, readiness incentives, logistics, land interaction, communication channels.

2. Provide regular capacity building and training opportunities, so stakeholders act as active partners, e.g. in:

- Sustainable and climate-smart cultivation.
- Soil health, crop rotation and mulching.
- Composting and circular bio-waste integration.

- Governance, volunteer coordination and community oversight.
- Community events, school partnerships and low risk produce uptake.
- Food safety basics using HACCP-light for approved low-risk items.

3. Maintain inclusive and ongoing communication with stakeholders, using multi-channel strategies, such as:

- On-site bulletin boards, visual signage of results.
- Mini seasonal activities (planting, harvest tastings, discovery mornings).
- Community meetings, workshops and open days.
- Messaging groups, digital platforms and local media.
- Storytelling and visible UF transformation results to reduce scepticism.
- Targeted outreach to youth, seniors, migrants or low-income groups.

4. Maintain inclusive and continuous communication thru:

- Site bulletin boards, community meetings, open days and workshops.
- Digital platforms, messaging groups, local media, storytelling and visible results (harvests, improvements) to strengthen acceptance and widen participation.

6 Conclusion

Below, we summarise the broader role and future potential of urban farming in sustainable urban development,
combating urban sprawl and creating a more flexible and regenerative urban model. We show how urban farming can evolve from isolated initiatives into a structural, integrated tool in local, national and European policies and we present the adaptation, expansion and economic opportunities it offers, from green job creation to the implementation of circular economy principles. Our main goal is to highlight that urban management is not just a technical solution, but a social and governance process that redefines the relationship between citizens, markets and public institutions for a more resilient urban future.

6.1 Urban farming as a tool against sprawl

Urban sprawl, typically defined by low-density, car-dependent growth extending into peri-urban and rural areas, has led to the fragmentation of landscapes, the loss of fertile soils and the weakening of the urban–rural interface. In response to urbanisation and its pressing spatial and ecological challenges, urban farming emerges as an innovative and transformative tool, when strategically integrated into urban planning. Urban farming redefines the city as an active site of production rather than passive consumption, thereby reducing both the incentive and the necessity to expand outward.

By reclaiming underused spaces, such as rooftops, brownfields or vacant lots, initiatives like rooftop gardens, community gardens or vertical farms enable cities to produce food locally while preserving surrounding ecosystems. In this way, urban farming functions not merely as an environmental or food security tool, but as a spatial planning instrument that supports sustainability, ecological connectivity and a more balanced urban metabolism. This integrated model fosters self-sustaining neighborhoods and promotes growth through ecological regeneration and food resilience rather than spatial expansion.

On a more **holistic level**, urban farming also demonstrates a paradigm shift from the conventional ‘old’ model of urban sprawl, characterised by car dependency and land degradation, toward a regenerative new urban framework model grounded in local production, community engagement and circular urban economies.

6.2 Policy recommendations

Realising the transformative potential of urban farming requires coherent and multilevel policy frameworks capable of bridging local initiatives with national and European strategies. While many urban farming projects have emerged through bottom-up action, driven by citizens, community groups and social enterprises, their long-term viability depends on enabling governance structures that integrate them into broader urban, agricultural and climate agendas.

At the **local level**, municipalities serve as laboratories for innovation, where the incorporation of food production into zoning regulations, housing developments and climate adaptation strategies can translate policy into practice. Incentives for the temporary use of vacant land, the establishment of shared gardens in social housing and educational programs such as school-based farms can further embed food systems within everyday urban life.

National governments may play a pivotal role in aligning agricultural and urban development policies by providing targeted grants and tax incentives for initiatives like green roofs, aquaponics or vertical farming, while promoting circular economy initiatives that link waste management with local food supply chains. National legislation should also recognise urban farming as a legitimate agricultural activity, granting it access to existing support mechanisms, training and research programs.

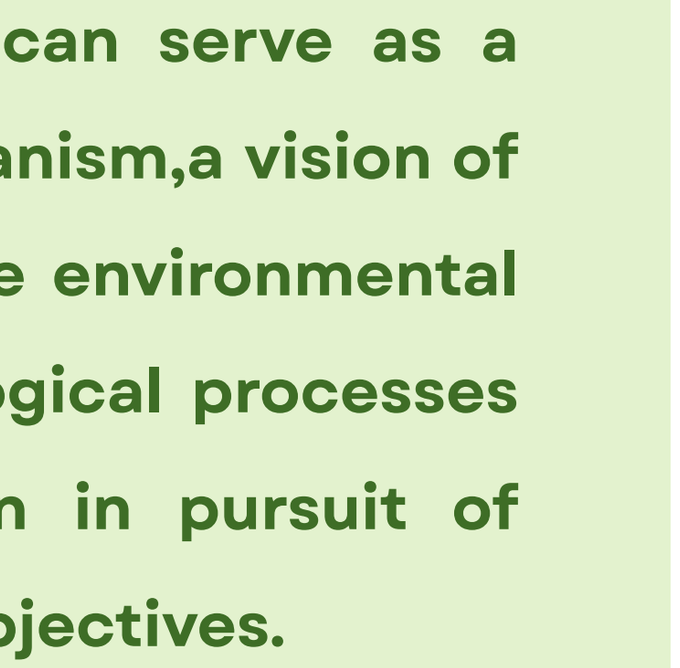
At the **European level**, urban farming aligns closely with the sustainability goals of the European Union, including objectives like the European Green Deal or the Farm to Fork Strategy. These existing objectives are offering a cross-sectoral tool for advancing climate adaptation, social inclusion and economic diversification. The European Union can further consolidate this agenda by embedding urban farming within existing funding streams, such as Interreg or Horizon Europe, to support pilot projects, transnational knowledge exchange and data-driven monitoring of impacts.

6.3 Opportunities to adapt and expand the model

The strength of urban farming lies in its adaptability. Rather than a fixed blueprint, USFLU model constitutes a flexible framework capable of evolving across Europe's diverse geographical, climatic and social contexts. The model encompasses a wide spectrum of forms, from small, community-driven gardens to technologically sophisticated vertical farms and from temporary land-use projects to permanent components of urban development plans. This flexibility is crucial, as each region presents distinct opportunities, with their own profile some land suits better greenhouse-based production, hydroponic systems or permaculture practices.

Scalability further enhances the model's potential. Urban farming can function as a network of interconnected, small-scale interventions, like school gardens, neighborhood compost hubs, aquaponic facilities and local markets, that collectively constitute a metropolitan food ecosystem. Expansion can occur both horizontally, through the replication and linkage of local initiatives into citywide or regional networks and vertically, through institutional integration into planning, procurement and resilience strategies. This integration can also link urban farming with the wider agricultural system to reinforce urban–rural synergies and promote a more balanced and circular food network.

Beyond its technical and ecological dimensions, urban farming carries profound societal value: it fosters education, social inclusion and opportunities for marginalised groups, including migrants, people with disabilities and at-risk populations. Ultimately, urban farming should be understood not merely as a technological intervention but as a governance process that redefines relationships between citizens, markets and public institutions. Its most successful expressions combine bottom-up civil initiative with top-down policy support, ensuring community ownership while embedding it as a stable, long-term element of sustainable urban development.



Looking ahead, urban farming can serve as a cornerstone of regenerative urbanism,a vision of cities that do not merely reduce environmental impact but actively repair ecological processes and strengthen social cohesion in pursuit of Europe's broader sustainability objectives.

7 Appendices

- **Annex A.1: Stakeholder Toolkit**
- **Urban school garden, a teacher's guide**