European Parliament

Urban farming: A gateway to greater food security?

Summary

This foresight analysis identifies trends, uncertainties and potential disruptions around urban farming. Access to investment funding, careful risk management and a supportive regulatory and policy environment are critical to future development, especially at local or sub-national level.

Background

The Parc des Expositions in Paris hosts the largest rooftop farm in Europe, spreading across 14 000 square metres. This project is one of the many urban agriculture initiatives that have developed across the globe in recent years, in an attempt to provide a more sustainable, healthier, and circular alternative to modern food supply chains.

'Urban farming' is the practice of **agriculture within cities and their immediate vicinity**. Anchored in the urban ecosystem, it produces primarily **for local consumption**. The practice has a long history, dating back to Mesopotamia in 4000 BCE. In modern times, urban farming has resurfaced during crises, as with 'Dig for Victory' campaigns during the Second World War. Urban farms come in various forms, including vertical farming (also known as 'plant factories') and rooftop farming. They embrace several technological innovations, such as hydroponics, aquaponics, and LED lighting. Often profit-driven, urban farms usually operate on a smaller scale than modern industrial farms. A difference from urban gardening (e.g. community gardens) is that urban farms combine economic interests with societal benefits. Studies suggest urban farming may account for 1-5 % of annual global food production.

Distinguishing features of urban farming include innovation, resource efficiency, health and social benefits, circularity, biodiversity preservation, and a local production chain. These tie into several United Nations (UN) Sustainable Development Goals, in particular climate action, sustainable cities, and health and wellbeing. Urban farms could offer the prospect of healthier and greener cities in advanced economies. In spite of the challenges facing their development, they may also have the potential to increase the EU's strategic autonomy and enhance food security.

Main trends

In 2030, the world's population will rise to 8.6 billion. By 2050, it will reach 9 billion, with two-thirds living in cities. This suggests a need to increase global food production by more than 50 % – when arable land capacity is unlikely to increase by more than 12 %. Moreover, land-competition from urbanisation means that agricultural land is shrinking, especially in peri-urban areas. How will future food demand be met?

Climate change and the side effects of certain agricultural practices create interlinked challenges: rising temperatures, extreme weather conditions, diminishing resources, soil degradation, biodiversity loss, and pollution from pesticides. According to the World Bank, agriculture uses 70 % of the world's freshwater, and the UN Food and Agriculture Organization reports that it accounted for 37 % of the total land area in 2017. Food production is responsible for around one quarter of greenhouse gas emissions. All this poses challenges for the long-term viability of global food systems.

Food and drink-related scandals have multiplied. In Asia alone, media reported 400 food and drinks scandals in 2016 and 2017. Examples include the melamine milk scandal in China in 2008 and the Fipronil case in 2017, which affected both Europe and Asia. As a result, citizens have become more aware – and more sceptical – about food safety. The 2019 EFSA Special Barometer Report on EU food safety suggests that 43 % of EU citizens believe food is full of harmful substances, and for one in five Europeans, food safety was their main concern when buying products. A 2019 Market Brief from the European Commission

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identifies health concerns as a main driver for organic product consumption in the EU. Demand has steadily increased since 2010; the EU has become the world's second biggest consumer of organic products, with retail sales of €34.3 billion in 2017.

Technological innovation and artificial intelligence are changing the way crops are cultivated. New forms of agriculture are challenging conventional practices, embracing (bio)technology for greater resource efficiency. Key innovations include sensor technology, crop tracking, and light-emitting diode (LED) grow lights.

Key uncertainties

Hope or hype? Urban farming has the potential to offer sustainable, high-tech, and knowledge-based agriculture. Factors such as the level of public and private investment will have an impact on the progress of an activity still in its infancy. Several parameters affect project viability: set-up costs, farmers' skill set, availability of qualified labour, and access to and affordability of urban spaces. Not all of the technologies associated with urban farming have matured, and the diversity of the crops grown can be limited. In such circumstances, investment in research and development, and subsidies can be decisive in becoming competitive. This in turn raises questions about sustainability and circularity: the resource efficiency of some practices could be improved, and urban waste is a complex issue.

Social impacts? 68 % of the global population will live in cities by 2050, so competition for space will increase. Currently, most urban farming projects need large surfaces and are located on the outskirts of cities, in former industrial zones or abandoned warehouses. Gentrification of such spaces, driven by housing needs, may create land-use conflicts between urban farms and inhabitants. Lower-income citizens are more vulnerable and more at risk of being displaced. Government measures will influence who gains and who loses from such conflicts. The implications for rural areas, in particular for smallholder farms, also need consideration. On the one hand, urban farms could help redefine the traditional urban-rural divide; on the other, they could disrupt small farms, introducing tensions and competition for resources.

Will international crises stimulate urban farming? The Covid-19 pandemic has highlighted the fragilities of international food supply chains. Current food security strategies rely heavily on imports and trade agreements. In 2019, the EU imported agrifood worth €119.3 billion. The USA, Brazil, Ukraine, and China accounted for 30 % of this. Similarly, China imported 98.5 million tons of soybean between 2019 and 2020, mostly from Brazil and the USA. In times of conflict and political tension, urban farming could reduce dependence on international supply chains and thus enhance food security.

Possible disruptions

Possible health and environmental hazards due to polluted air, water, and soil need to be taken seriously. Crops are exposed to urban soil and air pollutants (e.g. heavy metals, man-made chemicals). The use of pesticides and urban organic waste or wastewater in urban farming carries risks of unintentional exposure to harmful chemicals and pathogens, potentially threatening the health of workers, citizens, and the surrounding ecosystem. Large-scale contamination and sanitary scandals would quickly increase distrust among both citizens and investors. Logistics need careful attention, and well-designed risk management strategies need rigorous implementation. As many urban farming operations are modest scale start-ups, the creation of advisory services and funding incentives becomes especially important.

Regulatory frameworks have a key role in determining the future of urban farming. At the EU level, there is limited coordination across the different policies regarding urban agriculture. The Common Agricultural Policy neither specifically addresses nor allocates specific funds to urban farming. Nonetheless, European networks and research projects have developed to support and increase knowledge of urban farming: examples include the proGIreg and EFUA projects funded under Horizon 2020 and the Milan Urban Food Policy Pact. The EU's Farm to Fork Strategy has also identified urban food systems as a key area for research and innovation, as part of the Horizon Europe framework.

Competitiveness remains a primary challenge. This involves both lower prices and greater citizen awareness and acceptance. Urban farming faces several obstacles; if it overcomes them, it could realise its potential to address the food needs of urban areas.