Applying new lenses to urban agriculture: Urban Metabolism, Urban-Rural Linkages, and Urban Food Systems

Darleen van Dam
Enrico Gottero
Jan Eelco Jansma
Lucie Sovová
Lenneke Vaandrager

Numerous concepts are described in the scientific literature that can be associated with Urban Agriculture (UA). However, it is important to offer a novel perspective that enables decision-makers to formulate specific actions and policies to support the development of agriculture in cities and metropolitan areas. In this article, we explore Urban Metabolism (UM), Urban-Rural Linkages (URL), and Urban Food Systems (UFS) as lenses through which we can observe the contributions of UA to urban and peri-urban development.

The relevance of these three concepts is evident as they address crucial areas in UA-related studies and are connected to some key issues such as food security, resource utilization, and the challenge of bridging socio-economic activities within and across diverse regions. The three concepts and their relationships have been discussed in detail in the context of the EFUA project (see Gottero et al., 2022). In this article we show how these concepts extend our understanding of UA and its impacts, highlighting specific aspects that go beyond the benefits discussed earlier in this magazine and enabling contribution to today's policy debates on urban sustainability.

Unveiling resource efficiency

Urban Metabolism (UM) is a perspective that focuses on efficient resource utilization and waste management in cities. It is particularly relevant to UA, where both material and energy inputs and outputs are considered (see Box 1). UA contributes to UM by reducing the energy required to transport food, thereby reducing the reliance on fossil fuels. Additionally, UA plays a vital role in recycling organic waste through composting. As such, UA initiatives promote resource conservation, environmental sustainability, and resilience in urban areas. By integrating UM principles into UA, cities can foster a healthier and more sustainable relationship between urban systems and agriculture, ultimately benefiting both the environment and the community.

Box 1: Urban Metabolism

Urban Metabolism (UM) includes energy and material flows of urban environments. It promotes a circular economy, such as recycling and closing nutrient cycles, and can therefore be seen as connected to resource efficiency and climate adaptation. Types of UA that are classed as 'zero acreage farming', like high-tech farming and indoor farming, impact UM, as does composting.

MicroFlavours, an urban farm in Brussels, provides an example of how UA can contribute to UM. MicroFlavours specializes in the production of microgreens and vegetable shoots and is located in the cellars of a former brewery. To establish a sustainable and self-sufficient food chain, MicroFlavours uses hydroponic systems in a controlled environment, thereby utilizing fewer resources and being energy-efficient.

Strengthening socio-economic connections

The concept of Urban-Rural Linkages (URL; see Box 2) emphasizes connections between urban and rural areas. Initiatives that promote URL create opportunities for urban residents to actively engage in agricultural activities, thereby fostering a sense of community, promoting food sovereignty, and creating new business for urban farmers. By strengthening URL, UA can help to generate income and employment opportunities. UA also facilitates the flow of goods, services, and knowledge between urban and rural practices, and promotes social cohesion, economic growth, and sustainable development in both urban and rural environments.

Box 2: Urban-Rural Linkages

The concept of Urban-Rural Linkages (URL) concentrates on connecting socio-economic activities between urban and peri-urban areas. Forms of UA that exploit proximity to consumers, like urban farms, offer diverse agri-food products and several public services. These initiatives focus on bridging rural and urban spheres, with local food production and aligned services as the carrier. By maintaining landscape features and providing job opportunities, urban farms can also address urban issues such as cultural heritage and local economy.

Oogstappel, an organic and community-supported farm in the Antwerp region of Belgium, serves as an example of how UA promotes URL. Oogstappel facilitates URL through the sale of vegetables and fruit directly at a market in the city. Additionally, Oogstappel offers a box scheme with a diverse selection of seasonal products. The annual subscription model, known as a harvest share, provides income guarantee for the farmers while ensuring a steady supply of fresh produce for urban residents. This direct connection between the farm and the city bridges the divide between food production and consumption, as well as between the rural and the urban.

Nurturing sustainable food security

The Urban Food System (UFS) lens (see Box 3) focuses on the connection between various aspects of the food system within city regions. A local reconnection between food production, distribution, and consumption reduces the reliance on long-distance food transportation, promotes access to healthy food options, and mitigates environmental impacts of the food system. Therefore, the UFS concept sheds light on the contribution of UA to sustainable agricultural production and its benefits regarding the consumption of locally sourced and nutritious food. Moreover, the UFS approach fosters education and raises awareness about sustainable food practices, thus promoting healthier and more sustainable lifestyles among urban dwellers.

UA Concepts and their Relation to Benefits

Figure 1 summarizes the relationships between UM, URL and UFS on the one hand, and the diverse benefits of UA on the other hand (see Gottero et al., 2022). Through these relationships, we can detect a range of practical strategies that can help achieve sustainability goals in cities. While there is inherent overlap between the three concepts and their associated benefits, the benefits can serve as starting points when decision-makers seek to tackle specific issues in urban and peri-urban environments. For instance, the improvement of UM can be initiated by focussing on environment and climate benefits (e.g., by monitoring indicators regarding carbon emissions of urban food systems).

Box 3: Urban Food Systems

The UFS concept is mainly connected to UA through food production. Urban farms link to elements of UFS such as food self-provisioning, food quality, alternative food networks, short supply food chains, as well as local and traditional agri-food products. UA initiatives' provision of locally grown food initiatives can also help to support greater self-sufficiency and overcome social issues such as food poverty.

By way of example, the DAM consortium operates multiple farms located in the peri-urban area of Milan, within the boundaries of the Milan Agricultural South Park (Parco Agricolo Sud di Milano). These urban farms collectively oversee 1,500 hectares of farmland, characterized by a mix of public and private ownership and cultivation of diverse local agri-food products, including rice, vegetables, horticultural crops, milk, meat, eggs, honey, and more. The agri-food products from these farms are sold directly on-site or through retail channels, and some are also supplied to school canteens as part of public procurement.

The DAM consortium exemplifies UFS because it has integrated various aspects of the food system, from production to distribution, within the peri-urban area of Milan. Urban farms within the DAM consortium enable the production of fresh and nutritious food in close proximity to urban populations.

Understanding UA-related concepts to leverage its potential and develop efficient policies

By including UA in urban agendas, policymakers can harness its benefits to address various urban challenges.

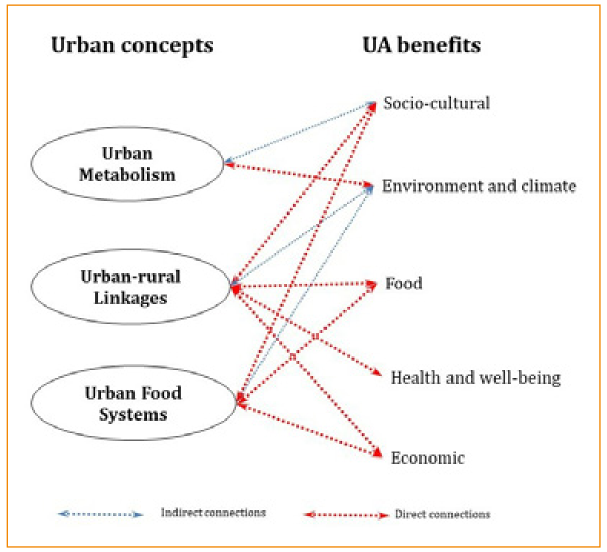

Figure 1: Possible direct (main) and indirect (secondary) connections, relations, and interconnections between urban concepts and UA benefits. (Source: Reworked from Gottero et al. 2022)

However, the benefits of UA are often not directly apparent. Explaining to policymakers the interplay between UA and the concepts of UM, URL, and UFS is essential. These concepts provide a holistic framework for understanding how specific issues can be addressed through UA. Policymakers who support activities related to sustainable land, circular economy, climate adaption, jobs and skills in the local economy, sustainable housing or air quality can particularly benefit from considering UA through all three concepts.

© Daniel Münderlein

As we move towards a more sustainable and resilient future, UA emerges as a transformative force that not only addresses the food-related challenges but also brings about positive social, economic, and environmental benefits in both urban and rural contexts. Policymakers have the opportunity to leverage the potential of UA by integrating it into urban agendas and utilizing its benefits across various sectors. Embracing UA and the interconnected concepts it supports is another key to achieving holistic urban-rural development and building thriving, sustainable cities for generations to come.

Darleen van Dam *is a Researcher at Wageningen Research who explores transition processes towards resilient and responsible food systems.*

Enrico Gottero *is an Architect and PhD in Spatial Planning and local development. He is currently working as a research assistant and lecturer in the field of urban and landscape planning at Politecnico di Torino, Interuniversity Department of Regional and Urban Studies and Planning (DIST).*

Jan Eelco Jansma *is an Action Researcher in the field of urban food planning and urban agriculture at Wageningen Research, Plant Research Group. He currently coordinates diverse local, national and EU research programmes in urban food innovation.*

Lucie Sovová *is a Lecturer at the Rural Sociology Group, Wageningen University, Centre for Space, Place and Society. Her research explores alternatives to the dominant economic theory and practice, particularly in the field of food and agriculture.*

Lenneke Vaandrager *is an Associate Professor in Health and Society at Wageningen University, Centre for Space, Place and Society. Her research focuses on analysis and contribution to the development of healthy settings.*

References

- Gottero E., Dam van D., Cassatella C., Jansma J.E., Sovova L., Vaandrager L. (2022), Report on links to other urban concepts, H2020 project n. 101000681, European Forum for a Comprehensive Vision on Urban Agriculture (EFUA), Deliverable D3.3, soon available from: https://cordis.europa.eu/project/id/101000681/results (last access: 10/05/2023).