Uniwersytet Wrocławski

FOCUSE

Food production and provisioning through **C**ircular **U**rban **S**ystems in **E**uropean Cities

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Dut call 2022

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The DUT partnership is supported by the EC and co-financed under the 'Horizon Europe' program (HORIZON-CL5-2021-D2-01-16) based on grant agreement no. 101069506

Project implementation: 1.02.2024-31.01.2027
Budget: 1,096,456 Euros
UWr: 1,125,906.50 PLN

Main R&I approach:
Research-oriented approach (ROA)

Main Transition Pathway:
PED Transition Pathway
15mC Transition Pathway
CUE Transition Pathway

Key words:
urban agriculture, circular economy, urban symbiosis, systems thinking, urban planning

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Call topics:

- PED topic 1: Energy communities – energy transition driven by civil society
- PED topic 2: Energy flexibility strategies
- PED topic 3: Energy efficiency in existing urban structures
- 15mC topic 1: Strengthen the mix of urban functions and services
- 15mC topic 2: Foster sustainable options for personal mobility and logistics in urban outskirts
- 15mC topic 3: (Re)imagine urban public spaces and streets for vibrant, sustainable neighborhoods
- **CUE topic 1: Urban resource sharing and circularity**
- CUE topic 2: Nature-based solutions
- **CUE topic 3: Urban food systems**

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The project aligns with the Priority Research Area of the University of Wrocław **'Human-City and Environment'** and involves multi-faceted research on the important societal issue of food production in urban areas with sustainable resource use and the implementation of a zero-waste economy.

This research has international and cross-sectoral significance in creating model, new branches of ecosystem services essential for the functioning of cities with a low carbon and water footprint.

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- IVL — IVL Swedish Environmental Research Institute (IVL), Sweden
- UoB — University of Bologna (UoB), Italy
- UAB — Universitat Autónoma de Barcelona (UAB),Spain
- KTH — KTH Royal Institute of Technology (KTH), Sweden
- IS — Stockholms Stad (Invest Stockholm) (IS), Sweden
- GA — Grönska Stadsodling (GA), Sweden
- UWR — **University of Wrocław (UWR), Poland**
- WM — Wrocław Miasto (WM), Poland – partner samofinansujący się
- SM — Skellefteå Municipality (SM), Sweden

LIDER - Sweden

Swedish Environmental Research Institute (IVL)

- IVL Swedish Environmental Research Institute is an independent, non-profit research organization managed by a foundation, which was established by the Swedish government and industry in 1966. It brings together the largest group of environmental experts in Sweden, employing around 400 scientists focused on solving environmental problems worldwide.

- It is the leader of a project funded by Vinnova, covering the topic of urban agriculture. Other research, funded by Formas, focuses on a detailed evaluation of the hydroponic system (in collaboration with Grönska Stadsodling)

- IVL leads the CircVertFarm project, which aims to develop and analyze more economically efficient vertical farming systems.

IVL co-leads a project funded by the Belmont Foundation, JUST GROW, focusing on developing food systems for urban vertical farms through symbiotic development, promoting closed-loop production methods..

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LIDER - Sweden

Swedish Environmental Research Institute (IVL)

projekty w zakresie produkcji żywności

- Improving the resource and energy-efficiency of vertical farming: extending practical and theoretical research to implementation for a more sustainable vertical farming industry. Project Leader, Funded by Formas- Från forskning till tillämpning för ett hållbart samhälle, (2023-2025), Budget ***4 MSEK***
- Improving the resource-efficiency and environmental performance of urban-vertical farms through circular-based production methods. Project Leader, Funded by Formas- Climate gains through resource efficiency, (2023-2026) Budget ***8 MSEK***
- Exploring the Viability and Sustainability of Vertical Farming Systems in Retail Environments. Project Leader, Funded by Hakan Swenson Stiftelse. (2023-2025) Budget ***2.8 MSEK***
- JUST GROW: Co-designing justice-centric indicators and governance principles to intensify urban agriculture sustainably and equitably. (Lead: Univ. Rhode Island, Others: Japan, Germany, Norway, Netherlands, IVL (Sweden) *Budget* ***16 MSEK***
- Urban farming for resilient and sustainable food production in urban areas. Project Leader, Funded by Vinnova Innovations for Sustainable Society, (2020-2023) Budget ***4.3 MSEK***
- Assessing and Improving the Sustainability of Urban Vertical farming Systems. Project Leader, Funded by Formas-Increased mobility between academy and practice, (2020-2023) Budget ***1 MSEK***

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KTH

KTH Royal Institute of Technology

- KTH (Royal Institute of Technology) directs the Sustainable Urban Food Laboratory (SUF-Lab), which has been and currently is leading several research projects aimed at improving resource efficiency and circularity of urban agriculture systems.

- The Project Leader (IVL) collaborates with KTH and serves as a board member of Stadsodla Stockholm (Urban Farming Stockholm).

IS

Stockholms Stad (Invest Stockholm)

- The Department of Sustainable Development, Environmental Science, and Engineering (SEED) conducts research focused on sustainable urban development in Stockholm. Among other topics, the department conducts research on industrial ecology, urban and industrial symbiosis, urban agriculture, novel food resources (such as algae), and methods for assessing sustainable development in food production.

UAB

Universitat Autònoma de Barcelona

- The research group Sostenipra operates within the Institute of Environmental Science and Technology at the Autonomous University of Barcelona (ICTA-UAB), which has held the prestigious "María de Maeztu" Excellence Unit accreditation since 2020, awarded by the Spanish Ministry.

- This group has extensive experience in urban agriculture and its sustainable development. They have also gained significant expertise in managing integrated rooftop greenhouses (iRTGs).

- Since 2015, ICTA-UAB has conducted several experiments with hydroponic cultivation on rooftops, effectively demonstrating the technical, environmental, economic, and social implications of modern nutrient and water management practices. As a result, they have access to significant infrastructure, including fully equipped integrated rooftop greenhouses.

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UniBo

University of Bologna

- The Department of Agricultural and Food Sciences (DISTAL) at the University of Bologna (UniBO) plays a national leadership role in research, education, and advisory services in the fields of horticulture, crop production, sustainable agricultural systems, environment, and applied plant ecology.

- In 2010, within DISTAL at the University of Bologna, the RESCUE-AB team was established. They coordinate the H2020 project "Food Systems in European Cities" (FoodE; 2020-2024) and participate as partners in several international projects focused on urban agriculture and promoting sustainable food production systems. These projects include Erasmus+ "Local Food Trace" (LOFT, 2022-2025), HORIZON-RIA "Integrated and Circular Technologies for Sustainable Food Systems in Urban Regions in Africa" (INCiTiES-FOOD, 2023-2026), and Erasmus+ "BEST Microgardens - Fighting Food Uncertainty through Promoting Organic Microgardens in Europe" (BEST Microgardens, 2021-2024).

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GA

Grönska Stadsodling

- Grönska Stadsodling is a Swedish technology company specializing in indoor vertical farming.
- Grönska started operating in 2015 in the basement of a building, developing indoor vertical farming systems. From 2019 to 2022, the company operated one of the largest commercial vertical farms in Europe. Currently, Grönska focuses on modular units of vertical farming deployed in various locations.
- In the project, scientists specializing in research and development related to closed-loop systems, resource efficiency, and system design will participate. Their work has contributed to the development of Grönska's current "Grow-Off" modules.
- The GA partner will be responsible for experimental research at test fields located in Stockholm (WP3 and WP5) to investigate the profitability of various circular food production business models in urban settings.

WRO

Miasto Wrocław (Wrocław Municipality) - projects

- **Grow Green** – funded by the EU Horizon 2020 program, focusing on demonstrating innovative nature-based solutions in cities. Wrocław, as one of the leading cities, has implemented 8 NBS (Nature-Based Solutions) demonstration projects.

- **FoodSHIFT2030** - funded by the EU Horizon 2020 program, focuses on innovative approaches to food systems in cities. The project aims to develop a toolkit for low-emission food production in closed-loop systems. As part of this system, community gardens will be promoted, allowing residents direct access to green spaces and small-scale food production (vegetables and fruits).

- **Fair Local Green Deal** is a program initiated by ICLEI, coordinated and funded by the Porticus Foundation. The project aims to implement the provisions of the European Green Deal at the local level. One component of the Green Deal is the "Farm to Fork" strategy aimed at developing a healthy and environmentally friendly food system.

- On November 22, 2022, Wrocław became the eighth **Climate Resilience Hub of MCR2030 (MCR2030 Resilience Hub) in Europe**. The city aims to focus on nature-based solutions (NBS) as tools to build resilience against climate change.

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WRO

Miasto Wrocław - projekty

- **Making Cities Resilience 2030 Hub** - odporność i adaptacja do zmian klimatycznych - MCR2030 to inicjatywa uruchomiona przez Biuro Narodów Zjednoczonych mająca na celu wsparcie samorządów lokalnych w zwiększaniu ich odporności.

- 22 listopada 2022 roku Wrocław stał się ósmym **Hubem Odporności na Zmiany Klimatu MCR2030 (MCR2030 Resilience Hub)** w Europie. Aspiracją miasta jest skupienie się na rozwiązaniach opartych na przyrodzie (NBS) jako narzędziach pomagających budować odporność miasta na zmiany klimatu.

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PROJECT

The project focuses on integrating urban closed-loop food production systems.

POLAND – UWR/Wrocław Municipality

- In Poland, the research area includes residential districts of Wrocław: **Muchobór, Przedmieście Oławskie, and Nadodrze,** where the city authorities are currently focusing on revitalization efforts

- Research in Wrocław, based on various multi-scale and spatial contexts, will help identify a framework for assessing and classifying functional aspects and implementation opportunities of urban agriculture in closed-loop systems, utilizing sustainable energy and water resources.

- The research and development activities will focus on local management models for cities based on closed-loop urban agriculture models. These efforts aim to establish environmentally stable urban fabric resilient to climate change.

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TASKS:

University of Wrocław/Wrocław Municipality

Task 1: Current Systems, Context, and Resources

- Identification of current urban food production systems in the studied areas;
- Input-output systemu żywnościowego w regionach miejskich);
- Food consumption patterns;

Task 2: Envisioning Circular Food Systems Envisioning Circular Food Systems;

- Co-designing the circular urban food systems of the future;
- Resource infrastructure, synergies and system design;
- Urban morphology for circular urban food production
- Morphological comparison and typology for urban agricultural systems

Task 3: Circular Urban Farming and New Foods/Products

- Definition and set-up of farming systems for testing and integration within cities ;

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TASKS

University of Wrocław/Wrocław Municipality

Task 4: Conditions and Business Models for Circular Food Systems

- Societal and organizational barriers and opportunities;
- Policy analysis;
- Creating markets for circular urban food

Task 5: Sustainability and Viability of Circular-Urban Food Transitions

- Sustainability assessments of circular food production systems;
- Societal acceptance and perception of urban circular food systems;
- Urban metabolism analysis;
- Urban food system resilience assessments.

PROJECT RESULTS

- **External Communication Channels** (IVL, UW) M1-M36 A project webpage and social media accounts will be created to provide updates and post outputs.

- **Task Content Creation** (IVL, UW, UAB, UniBo, KTH, GA) M6-M34 Project newsletters will be shared via social media accounts. Online videos of potential and implemented circular urban food production systems, competition highlights and research lab environments will be created to reach a broader audience.

- **Elementary school challenge on 'future (circular) food'** (IVL, UW, UniBo, UAB, SM, IS) M8 M12 An elementary school drawing competition of future foods from urban areas employing wastes will be implemented in the consortium partner municipal schools.

PROJECT RESULTS

- **UrbanFarm Student challenge** (UniBo, IVL, UW, IS, SM, WM) M9-M14 A university student competition across Europe will be created (see WP2) for participants to design innovative, circular urban agriculture systems, by combining knowledge from architecture, innovative technologies, and the social sciences.

- **Museum Exhibition** (IVL, UW, UniBo, KTH, GA) M26-M30 An exhibition to communicate the project results at local museums (e.g. Stockholm Tekniska Museet) and municipalities will be undertaken.

- **Scientific and Popular Science Outreach** M6-M36 A special issue on circular food systems will be opened in a leading journal for (e.g. Journal of Industrial Ecology, Journal of Cleaner Production, or Resources, Conservation and Recycling) to promote urban-circular food production scholarship. A final scientific report and policy brief, launched to a broad audience, will target politicians, regulatory authorities, businesses and governments to inform them on the barriers and benefits of urban-circular food systems.

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