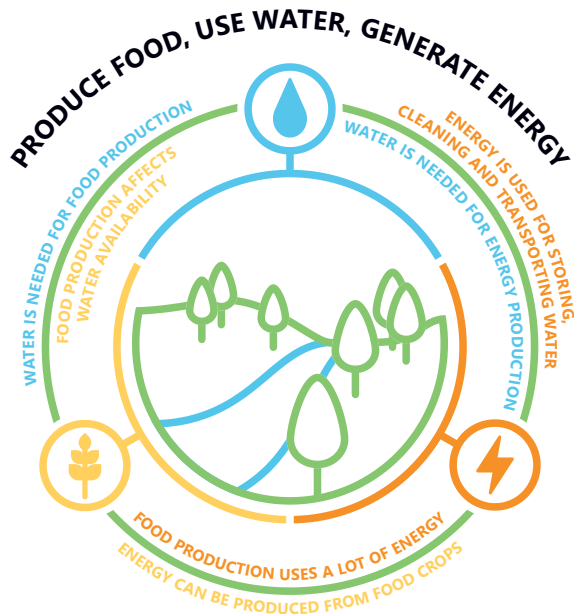



# URBAN SUSTAINABILITY STRATEGIES IN THE NEXUS OF FOOD, WATER AND ENERGY

INGO ZASADA, ALEXANDRA DOERNBERG, ANNETTE PIORR, FEE NANETT TRAU



Schematic representation of the Food-Water-Energy-Nexus

 Cities and urban regions in Europe and worldwide are increasingly facing the challenges of urbanization, the growing concentration of the population and of economic activities as well as climate change adaptation. This implies an increasing consumption of food, water and energy resources, thus leading to shortages and scarcity of these resources and jeopardising a sustainable and climate-friendly urban regional development. In the recent past, the so-called Food-Water-Energy (FWE)-Nexus representing the interactions between these systems has created attention in science, policy and society as an opportunity for potential efficiency gains and synergy effects. In the past, very different technical solutions and innovations have been advanced in the FWE-Nexus.

Funded through the Sustainable Urbanisation Global Initiative (SUGI) / Food-Water-Energy Nexus, the joint research project SUNEX is striving to capture the systems' interdependencies through an integrated modelling framework and monitoring network. The approach will be applied to the four case study cities Berlin, Bristol, Doha and Vienna, featuring different socio-economic and climatic conditions, consumption patterns, and local and remote FWE resource shares. SUNEX aims to support the decision-making process by formulating sustainable urban FWE-Nexus strategies in consideration of the cities' different consumption patterns and limited resources. The FWE-Nexus concept will serve as central approach to ensure coherent solutions on sustainable use and management.

In the SUNEX project, ZALF is cooperating with research groups, companies and public bodies in Austria, the UK, Qatar

SUNEX aims to develop an integrated systems approach to support the local decision-making process in formulating inclusive urban Food Water Energy (FWE)-Nexus strategies. The applied Nexus-approach relies on empirical urban data, stakeholder dialogue and consistent development scenarios to address and understand the complex interlinkages between the three systems (agriculture / food production, water, energy) and to maximize their synergies. SUNEX offers a modelling framework aimed at managing limited urban resources in order to achieve sustainable urban transformation in social, economic and environmental aspects.

and the US. In the case study region Berlin-Brandenburg, we pursue an approach that takes the food system as a starting point and analyses potential efficiency gains and synergies at the interfaces to the water and energy system along the entire food chain (agricultural production, processing, distribution, consumption and disposal). The research project will be carried out in close consultation with practice partners and policy stakeholders to ensure a sufficient regional embedding and support for the decision-making processes.

---

**Project:** Formulating Sustainable Urban FWE Strategy by Optimizing the Synergies Between Food, Water and Energy Systems (SUNEX) **Term:** 2018–2021 **Sponsor:** BMBF **Lead at ZALF:** Anette Piorr (apiorr@zalf.de) **Partner:** AIT Austrian Institute of Technology, QEERI, UWE, ROC-Connect Inc., Ministry of Municipality and Environment Qatar, Bristol Water Ltd.  
<http://sunex-project.eu/wp/>