First Open Tender for Innovations

Case Study #3: Main River Basin

Supplementary information

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The Case Study "Main River Basin"

The Main River is a major European waterway, located in the heart of Europe. It is the largest eastern tributary to the Rhine River and connects the North Sea to the Black Sea via the Main-Danube canal, bridging the European water divide. The Main River basin is a densely populated and intensively used area of about 25,000 km², which is already subject to significant challenges and competitions for its water, land and energy. The effects of climate change are expected to lead to a strong increase of summer droughts and heatwaves due to significantly higher temperatures and a strong decrease of summer precipitation. At the same time, the risk of winter floods increases significantly due to heavier precipitation in this season. This will have considerable consequences for almost all actors in agriculture, forestry, water and energy management. A fundamental and forward-looking revision of available resource management measures is essential for ensuring a climate change resilient development of the Main region. On the basis of an excellent database of authorities and enterprises at the regional scale as well as already existing own simulations with process-based, spatially distributed models, the ARSINOE systems innovation approach is transferred to the region.

The Living Lab "Main River Basin"

The inclusion of a diverse set of stakeholders from the Main River basin in the project is a key element of ARSINOE and the case study. In a Living Lab, we bring together people affected by climate change and central to adaptation in the region. The results of the debates in the Living Lab inform our understanding of the region and the innovations we seek with this tender for innovations.

In the Living Lab we discussed key challenges arising from climate change and how they are interlinked to develop a joint understanding of current and future challenges in the Main River basin. Subsequently we imagined what a climate-resilient future in the region might be like in 2050 and we formulated a vision for the region. In this tender for innovations, we want to contribute to solving the identified problems and to making the vision a reality. The key challenge describes what we focus on in this first tender for innovations.

Below you can familiarise yourself with the challenges stakeholders identified as well as with their vision of 2050. In the end, we outline the key challenge for this first tender for innovations.

The Problem Statement by Stakeholders

Climate change poses major challenges in the region and is likely to exacerbate competition for water, land and energy resources. This will have considerable consequences for agriculture, forestry, water and energy management. Governance does not address challenges in holistic ways at present and might not do so in the future unless processes are revised. As such, the region is at risk for being pushed beyond its resilience thresholds and will need a new level of responsiveness to cope with climate change. A fundamental and forward-looking revision of available resource management measures is essential for ensuring a climate change resilient development of the region. A revision of methods must take place and new methods may need to be developed. Currently, most adaptation

measures are sector-focused but the challenges are interconnected. Therefore, a common strategy is urgently needed that takes the interconnectedness of sectors and challenges into account. The co-design and co-production of science-driven social, cross-sectoral and governance innovations, as well as technical innovations, is required to build new and climate resilient transformation pathways. A systemic transformation of the region requires time and broad societal support, which must be taken into account when formulating development paths, but must not be a reason to postpone changes. While climate adaptation is being driven forward, climate protection must not be lost sight of. Interactions between the two fields of action must be taken into account and synergies exploited.

The Vision of a climate-resilient Future

In 2050 changes in land-use, water-management and cooperation between different sectors as well as societal changes have occurred. The landscape of the region covered by the Living Lab is characterised by a mix of urban centres and smaller towns, healthy forests, agricultural areas and areas used for energy production. Water bodies have been returned to their natural state. Forests have been preserved and converted to be more resilient to the changing climate. Game populations in forests are well-managed. Forests serve multiple purposes. They store water and provide fresh and cool air. Forests provide timber and serve as recreational spaces. Agroforestry helps protecting soils and contributes to biodiversity. Sustainable agricultural practices are the norm. Crops and cultivation methods are adapted to sites and where resource-efficient agriculture is not possible, sites are transformed and used for other purposes. There is no more intensive animal husbandry. Land take and soil sealing are limited and where necessary reversed. Settlement development prioritises the use and transformation of existing structures over developing new areas. In urban areas blue and green infrastructure compliment grey infrastructure. These changes in land-use result in a high-quality soil, limited risk of soil erosion and improved water-absorption and retention. Energy comes from renewable sources. The energy system has been decentralised: energy is produced, stored and used locally. Energy efficiency has increased. The region benefits from a healthy water balance, the goals of the Water Framework Directive are met and the value of water is recognised. Cascading water-use is the norm and re-use systems are installed at different levels (household, buildings, settlements). Water quality is established according to its use, this allows an efficient use of water and energy resources. Groundwater is primarily used for public water supply. Public water supply is prioritised over other purposes e. g. when establishing water rights. Water for public water supply primarily stems from local sources. Interconnections between water suppliers and long-distance water supply contribute to security of supply. Water is reused, treated locally, and used efficiently. The energy for water treatment comes from renewable sources, whereas rainwater is absorbed and retained by soil or specific systems for water retention. There is a separate sewerage system so that rainwater that reaches the sewer system is not mixed with waste water and can be stored or returned to the natural water cycle. The state of the water balance is transparent and all water-users are aware of the challenges and possible measures for different situations. Different actors are aware of their impact on natural resources and their dependence on them and of their impact on other sectors in the region. They act accordingly: They use resources efficiently and consider the long-term-impact of their actions and communicate with those affected by their actions. Sustainability and resource-efficiency are well-understood and used

as guiding principles. Actors who implement measures that benefit climate resilience, for example by contributing to the water balance, water quality, biodiversity or soil quality, are rewarded and supported. Resource-management is interdisciplinary. Governance is transparent, quick and decisions are based on a reliable and simple legal footing. Governance structures and regulatory frameworks are conducive to increasing climate-resilience. Permission-processes are not impacted by politics. Standards for resource-efficiency and protection are controlled. Consumption patterns reflect the shift to resource-efficiency. Regionally produced goods are valued more highly than others. Prices reflect the environmental costs of products: Water withdrawal fees are established. Producers and consumers consider the water and carbon footprints of products.

The Key Challenge for the first Tender for Innovations

The key challenge for the first tender for innovations is preserving the region's water balance and ensuring sustainable resource management. Different climate adaptation measures, changes in land-use, changes in governance structures and shifts in consumption could contribute to solving this challenge. Many measures are known but are not being implemented widely enough or with sufficient speed. Implementation requires the motivation and cooperation of different actors, knowledge sharing between sectors and a conducive framework. The creation of these conditions requires education and capacity building to support social or behavioural change or new governance structures. Other areas of action may include but are not limited to water retention in soils and in built environments, changing water-use, changing how water is valued, saving water or designing water management systems that contribute to efficiency, consider the needs of and interlinkages between sectors as well as conflicts. We seek social and governance innovations as well as concepts for structural and nature-based solutions in a water-management context. Innovations should result in measurable positive impacts and include a plan for evaluation.