REXUS Project Pilot Areas:
The Isonzo/Soča River

Overcoming transboundary management challenges by applying the integrating Water-Energy-Food-Climate Nexus

Assessing the Water-Energy-Food-Climate Nexus in transboundary river basins represents a significant challenge. In these contexts, there is heterogeneity in environmental data, flood risk management plans, climate change assessment methodologies, and resource views of the nexus, which often prevents the implementation of effective basin-scale strategies. The case study of the Isonzo river basin, which crosses between Italy and Slovenia, represents an exciting ground to demonstrate the effectiveness of the solutions developed in the REXUS project. It also presents an opportunity for the District Basin Authority of the Eastern Alps (AAWA) River District, to understand the impact of the Water-Energy-Food-Climate Nexus in its basin planning activities following Directives 2007/60/EC and 2000/60/EC.

General Characterization

- **Transboundary River** originates in the Alpine Valley of Trenta in Slovenia. It flows into the Adriatic Sea, with a delta near Monfalcone (Italy)
- **Total surface area of the basin:** Approx. 3400 km².
- **Water management in Slovenia:** The basin is strongly affected by presence of diffused karst
- **Water management in Italy:** It depends on the fact that the flows of the Isonzo river are regulated by the artificial barriers built on Slovenian territory between Most na Soči and Solkan for hydroelectric purposes.
- **The mountainous section** of the Isonzo/Soča ends at Solkan-Salcano (Nova Gorica), on the border between Italy and Slovenia.
- **Regulation System:** The management of the Solkan dam has a significant influence on the Italian part's flood management and irrigation system.
- **Issues:** The basin presents flood risk areas according to 2007/60/EC.
- **Challenges:** There is a lack of shared framework focusing on nexus issues for the whole basin.

REXUS Goals

- Provide valuable scenarios to estimate the impact of climate change on the area and current strategies (e.g., flood prevention, etc.), also in the view of the next updates of the current management plans.
- Finding and testing best solutions/best practices to ensure sustainability, e.g., flood risk reduction measures, including environmental value within projects, and transition of Nature-based Solutions approach, instead of standard grey infrastructure.
- Find a balance between various water uses (flood/food/energy), e.g., a balance between flood security and economic development.
- Estimate the future behaviour of the economy to help decision-makers (Socio-economic Assessment).

How will REXUS work?

- **Improve Transboundary Management:** In Italy, the flow of the Isonzo river depends on the management of the large Slovenian Salcano dam at the border. Therefore, the direction of the Salkan dam directly affects irrigation, water supply, and flood risk on the Italian side.
- **Accounting and Efficient Resource Allocation:** Agriculture and hydropower production are crucial activities for the basin economy in both countries. However, they also represent the central pressures on water resources.
- **Participatory approach:** A comprehensive vision of the basin is urgently needed, mainly because of climate changes, which are expected to affect the WEF resources of both nations significantly and could create fractures in the current agreements.
- **Promote progress** in line with the Water Framework Directive 2000/60/EC and Floods Directive 2007/60/EC. The participation of AAWA in the project will strengthen its capacity in hydrologic and hydraulic modeling for flood risk mapping and drought. In particular, AAWA will be involved in Use case design, Stakeholder engagement user requirements, the validation scenario and evaluation methodology, demonstrations, and testing.

Future perspective: Call to Action

"It is important to identify barriers to the implementation of policy actions and political resistance mechanisms resulting from institutional fragmentation. It is also necessary to define water management strategies for policymakers, analysing priorities, pressures, synergies, and trade-offs, especially between energy production, irrigation, and flood risk reduction. Finally, REXUS will propose transboundary water management strategies and tools to assess the effects of climate change, estimating how resources and flood management will be affected and how to NbS approaches; these tools will consider ecosystem services to support management strategies."

Autorità di Bacino Distrettuale delle Alpi Orientali (AAWA)

Autorità di bacino distrettuale delle Alpi Orientali

Country pilots Regional Team

District Basin Authority of the Eastern Alps (AAWA) will be the REXUS partner responsible as domain expert of the Isonzo River Basin pilot area and the primary stakeholder. AAWA is a Public Body accountable for managing the rivers in the Eastern Alps river basin district, which covers the northeast regions of Italy and the transboundary river basins between Austria, Slovenia, and Switzerland. AAWA is in charge of the catchment planning, including remedial measures to reduce hydraulic and geological risks and the protection and sustainable use of water resources. It coordinates the activities to be implemented on a basin-scale, such as safeguarding the quality and quantity of water resources, attaining the best possible balance among the contrasting water use, study the schemes necessary to prevent, in particular, disastrous events- droughts and floods.

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