



## First Open Tender for Innovations

### Case Study #4: Ohrid and Prespa Lakes North Macedonian Demarcation

Supplementary information

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## The Case Study Ohrid and Prespa Lakes – Description

This case study is focused on enhancing the climate resilience of the environmental, economic, and social sectors that are reliant on water use, with the potential to impact human health and the vulnerability of all economic sectors. The CS aims to contribute to ensuring a balanced utilisation of available water resources and to bridge the gap between the social and economic aspects when confronting the impacts of climate change on the transboundary surface water ecosystems of the Ohrid and Prespa lakes.

The Prespa lakes system comprises two freshwater lakes: the larger is shared between North Macedonia, Albania, and Greece, while the smaller lies between Greece and Albania. Lake Ohrid is situated in the southwestern part of the Republic of North Macedonia, bordering the Republic of Albania. Approximately two-thirds of the lake's area is within North Macedonian territory, with the remaining third in Albania. The Ohrid and Prespa lakes are acknowledged as some of the most ecologically valuable aquatic regions in Europe, hosting diverse ecosystems of significant conservation value.

The local industry is predominantly composed of small to medium-sized enterprises (SMEs) specialising in textiles, food, tobacco, and construction materials. All socio-economic sectors in the region are deeply intertwined with the water regime of the greater Ohrid/Prespa area, rendering them highly susceptible to the water scarcity issues exacerbated by climate change.

There is an imperative need for a holistic, optimised, cross-sectoral approach that encompasses economic and social considerations for the assessment and establishment of climate adaptiveness related to water dependence of multiple sectors. This approach will facilitate conditions conducive to transboundary integrated actions, ensuring the sustainability and resilience of these vital ecosystems.

### The Living Lab Ohrid and Prespa Lakes

The Stakeholder Impact Assessment (SIA) within this case study was conducted over three sessions, each comprising national workshops followed by joint international discussions. This approach operationalised the Living Lab methodology by first addressing issues and formulating statements at the national level in the three countries, and subsequently synthesising these perspectives into a cohesive transboundary stance.

The initial focus of the Living Lab was on the impact of climate change on water scarcity, evidenced by the decreasing water levels in the two interconnected lakes.

During the workshops, participants delved into the following core themes:

- Observable indicators of climate change, such as the reduction in precipitation and the increase in air temperature.
- The current status of the lakes, surface water, and groundwater bodies.
- Sectors at risk in both the short and long term, including biodiversity, agriculture, tourism, and hydroelectric power generation.
- The causes and consequences of water scarcity.

Participants in the Living Lab represented a diverse cross-section of sectors and governance levels. Their insights were often sector-specific, highlighting two main aspects: the dependency of their sector on water resources, and the impact of their sector on water

use and availability. Nonetheless, there was a unanimous recognition of the critical need for cross-sectoral and transboundary integration in the management of these shared water resources.

Although the workshops successfully pinpointed weaknesses in the current water management practices, a universally acknowledged concern was the lack of comprehensive data on water quantity, particularly groundwater levels. This data deficit is seen as a significant barrier to effective planning and management.

## The Problem Statement by Stakeholders

Climate change presents significant challenges within the transboundary region of Ohrid and Prespa Lakes, intensifying competition for water across all dependent sectors. This competition threatens to impact biodiversity, agriculture, forestry, aquatic systems, and the management of clean energy sources such as hydroelectric power. Consequently, the region faces the risk of exceeding its resilience capacities and requires enhanced adaptive strategies to manage the effects of climate change. A comprehensive and proactive overhaul of resource management practices is imperative to foster a development trajectory that is resilient to climate change. This includes revising and potentially innovating methods to measure and monitor water status and availability. The collaborative design and production of innovations that are technologically advanced, scientifically informed, socially driven, applicable across multiple sectors, and beneficial for governance are essential to forge new pathways for climate-resilient transformation.

In alignment with the ARSINOE project's approach and the specific objectives of Case Study 4, the first Living Lab session resulted in the articulation of the following Problem Statement:

*“Improvement of integrated water monitoring and management across social, economic and environmental sectors towards strengthened climate resilience.”*

The integration of adaptive capacity at sectoral, national, and transboundary levels is crucial. Sectoral and national integration begins with problem identification, while transboundary integration depends on achieving coherence and alignment.

Once sectoral problem statements were articulated, they were synthesized at the national level and subsequently compiled into a transboundary context. This process ensured the development of a unified problem statement that is relevant and applicable to all stakeholders, avoiding isolated and fragmented approaches.

## The Vision of a climate-resilient Future

The second national Living Lab synthesized three stakeholder narratives into a unified vision for the region's future over the next half-century. This shared vision encompasses:

- All the stakeholders see the long-term future (in the next 50 years) of the region, as a green, productive, protected and preserved ecological environment, balancing green productivity with economic and social advancement, while maintaining a positive demographic trend.
- Restored lakes and biodiversity, closely mirroring their pristine states.

- Comprehensive monitoring of water quality and quantity, with accessible data for all: from utilities and administrators to the general public, who collectively bear responsibility for water stewardship and participate in its planning and management.
- An economy characterized by non-polluting industries and water-conscious economic activities.
- Fostering green growth in traditional regional sectors like tourism and agriculture, thereby attracting and retaining youth with promising employment opportunities.
- An educational system that instils the value of water as a critical and finite resource.
- Modernized agriculture employing innovative technologies for crop selection and irrigation, ensuring sustainability.
- A commitment to biodiversity conservation, with ongoing transboundary efforts to catalogue and protect all species.
- Overall, a consensus among the groups points to sustainable green growth as the desired trajectory.

Considering this collective vision, the following innovation domains were identified for further exploration and development:

### **1.Improved water measurement and monitoring system, as a pre-condition for an effective management, planning and climate adaptivity**

The absence of a comprehensive measurement and monitoring system that encompasses all water bodies and the entire span of the watersheds hinders effective management of water scarcity. A comprehensive upgrade and modernization of the measurement and monitoring systems are crucial. This includes digitalization to provide a clear roadmap for resilient and sustainable future actions in response to climate change, impacting environmental, social, and economic sectors, including tourism and agriculture.

### **2. Raising awareness, education, and capacity building**

Initiatives to elevate regional awareness through education and capacity building are vital to prepare for and mitigate future challenges, ensuring a more resilient and sustainable region.

**3. Intelligent Agriculture/ Intelligent Farming as an opportunity for monitoring water consumption and water pollution to maintain a water balance.** Leveraging smart technologies to monitor water usage and pollution is essential for maintaining water balance and promoting sustainable agriculture, a significant challenge in the region.

**4. Development of sustainable tourism,** with preservation of the natural and cultural heritage in the UNESCO region.

### **5. Capacity Strengthening for Policy Transfer**

Enhancing the effectiveness of translating national plans and policies to the regional and municipal levels is necessary for cohesive action.

## **The key challenges for the 2<sup>nd</sup> Open Tender for Innovations**

The key challenges for the Open Tender announced by the CS4 (North Macedonian demarcation) are to provide innovative solutions that will:

- Integrate technological innovation in real-time data acquisition (accessible and useful for a diverse group of stakeholders) with social innovation that promote/trigger responsible water usage,
- Harmonize sectoral and transboundary development plans in a sustainable and synergistic manner, which is feasible only with a foundation of reliable/dependable data.

Therefore, innovative solutions to be proposed are expected to meet at least the following criteria:

- 1) to enhance climate adaptability and resilience across all sectors (environmental, social, and economic) that are vulnerable to anticipated water scarcity in the transboundary region of the lakes.
- 2) to lay the groundwork for the stakeholders' envisioned future of a climate-adapted, sustainable, and integrated water management system, realised through a digital twin model of the watersheds.

The CS4 team (North Macedonian demarcation) therefore seeks an innovation that will integrate technological and social elements and will be a leverage tool toward the goal of improved climate resilience in sectors related to water use and scarcity (environmental, economic, and social). This innovation should consider:

- the problem statement and the vision formulated by the stakeholders through the applied SIA, as well as
- the understanding that access to information is crucial for informed decision-making, management, planning, and the responsible use of resources.

The innovation should feature advanced technologies for accurate groundwater quantity measurement across extensive watershed areas, enabling the integration of real-time data into algorithms that correlate with Prespa lake water levels. Moreover, it should facilitate data accessibility (via visualization, mobile apps, communication platforms, alert systems, etc.) for stakeholders of all profiles (scientists, public authorities, industry, citizens, etc.) in all three countries. This approach is expected to booster an integrated and resilient water resource planning and management and to catalyse improved societal behaviour regarding the shared concern and stewardship of common water resources, by users across sectors and borders.

By combining technological and social innovation, a significant advancement can be made in the ongoing efforts to enhance the climate resilience of all sectors that rely on the availability of water in the transboundary region.

## Additional requirements for applicants of the 2nd Open Tender for Innovation

- Applicant organisation shall be an established legal entity whose date of registration is at least three years before the launch date of the open tender.
- Applicant organisation shall provide reference of the applied innovation (or variants thereof) in at least two practical examples.