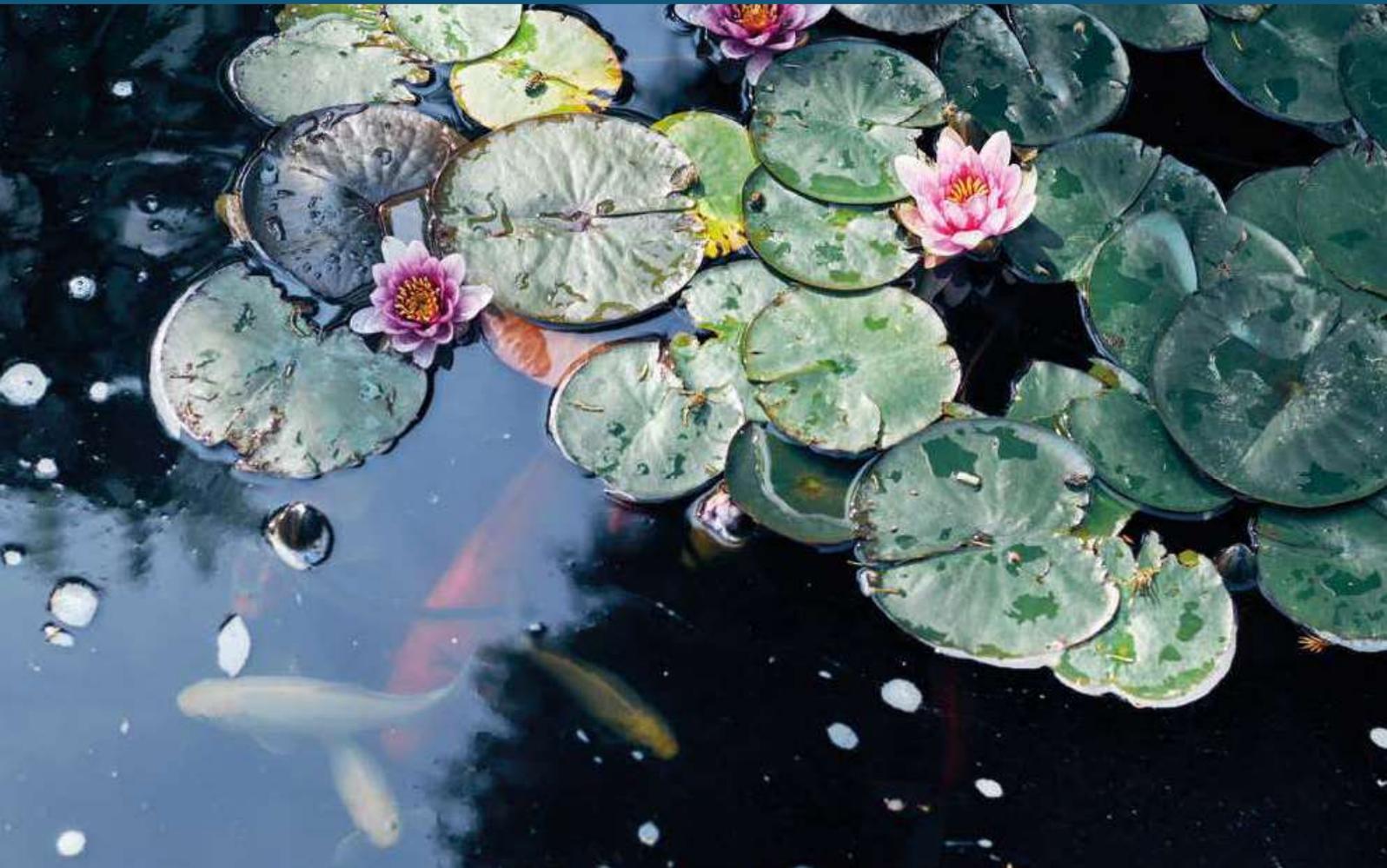


# FUNDED PROJECTS BOOKLET

## WATER4ALL 2023 JOINT TRANSNATIONAL CALL

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Aquatic Ecosystem Services



Co-funded by  
the European Union

# INTRODUCTION

**T**he Water4All partnership -Water Security for the Planet- started in 2022 under the auspices of the European Union Horizon Europe programme for research and innovation, to concentrate research and innovation on water in Europe and beyond. **Water4All's Vision is to boost the systemic transformations while fostering matchmaking between problem owners and solution providers to ensure water security for all in the long term.**

Alongside other activities, Water4All implements a series of annual Joint Transnational Calls by pooling national financial resources with the participation of ministries, funding authorities and funding organisations. These calls primarily aim to strengthening the Research, Development & Innovation (RD&I) collaboration in the field of water, and producing and sharing top-class water-related knowledge and data.

The 2023 Joint Transnational Call on Aquatic Ecosystem Services is the second call. It was implemented by 36 funding partner organisations from 30 countries, with financial support from the European Union. At the end of a two-step evaluation process, 23 excellent RD&I projects, including nine projects coordinated by early-career researchers, were selected for funding for a total amount of nearly 27 million euros.

## OBJECTIVES OF THE 2023 JOINT TRANSNATIONAL CALL

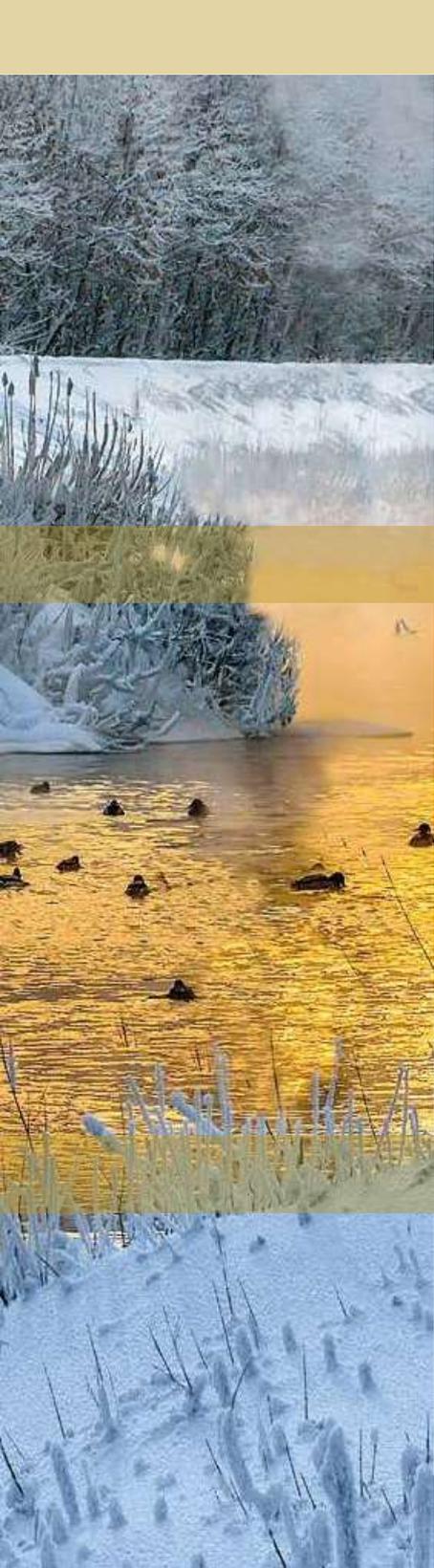
Ecosystems provide what are known as ecosystem service, which offer environmental, health, social, and economic benefits to humans. These services fall into several categories: provisioning services (e.g., food and water production), regulating services (e.g., flow regulation during floods), supporting services (e.g., nutrient cycling and retention), and cultural services (e.g., navigation, swimming). Ecosystem services and water security are closely related, as healthy ecosystems are essential to ensure water quality and availability, and their degradation however, climate change, pollution, overexploitation threaten their ability to provide these services. Adaptation and restoration measures are needed to maintain their functioning. Integrating ecosystem services into decision-making is crucial for human well-being and economic prosperity. However, there are gaps in the assessment and monitoring of aquatic ecosystem services, and transboundary regulations do not always take these services into account.

The Water4All 2023 Joint Transnational Call and its early-career researcher modality aimed to support research and innovation for a better understanding of the status of ecosystem services at varying spatial and temporal scales, underlying pressure factors and integration in the management of water resources. The call sought to deliver knowledge, models, approaches, tools, and methodologies to **integrate ecosystem services** into water resource governance and management at all levels, adapting to global changes; **enhance the mitigation, adaptation, and resilience** of aquatic ecosystems and their ecosystem services; **support EU and international water and biodiversity policies**; **Increase stakeholder, community, and societal participation** in co-designing water governance and management systems; and **promote comprehensive approaches** to valuing ecosystem services, emphasizing mapping and assessment to achieve policy goals.



## THEMES OF THE JOINT TRANSNATIONAL CALL

The general theme of the call was “Ecosystem Services” with a focus on aquatic ecosystems, including inland surface water, groundwater, transitional and coastal water, with water security as a top priority. The 23 research projects of excellence funded under the 2023 Joint Transnational Call and its early-career researcher modality address at least one of the following topics and subtopics.



### Topic 1 Mapping, monitoring, and assessment for a better understanding of ecosystem services in a context of changes, from local to global change

- 1.1 Enhancing the added value of data on the state and trends of ecosystem services: promoting meta-analyses across scales and syntheses of existing data sets.
- 1.2 Supporting a transnational network of harmonized monitoring schemes building upon the work conducted under other initiatives and previous EU projects.
- 1.3 Developing, testing, and comparing methodologies for the biophysical and monetary valuation of ecosystem services in aquatic ecosystems, including intrinsic social and economic values.
- 1.4 Identifying operational ecosystem services metrics that consider the interactions between people and ecosystems.

### Topic 2 Understanding and predicting multiple pressures (including anthropogenic pressures) - impact – response relationships in ecosystem services through advanced methods & techniques

- 2.1 Assessing the effect of different anthropogenic pressures from human activities and cumulative effects on ecosystems and ecosystem services.
- 2.2 Improving/Developing approaches aimed at improving our understanding of the impacts of policy interventions for the protection or restoration of ecosystem services at relevant temporal and spatial scales.
- 2.3 Developing innovative approaches for the restoration of aquatic systems (e.g. habitat dynamics, nutrient cycling, trophic relations, morphological conditions, river continuity and connectivity, sediment flows, hydraulic connectivity, groundwater flow, and ecological flow) and ecosystem services.
- 2.4 Analysing the potential for upscaling in space and time successful ecosystem services restoration approaches.

### Topic 3 New tools and solutions for a better integration of ecosystem services into the management of water resources

- 3.1 Innovative management and governance strategies for integrating ecosystem services into conservation policies and restoration measures.
- 3.2 Assessing the performance of different governance systems in supporting ecosystem services (resilience, adaptation to global changes, key lessons, failures) and of developing our understanding of existing barriers or resistance in the implementation of ecosystem services frameworks.

## Abstract

In the shadow of climate change, the increasing water scarcity makes it important to use water sparingly and judiciously, including irrigation. At the same time, in the European Union (EU-27) and the UK, more than 1.4 billion tons of manure are produced annually. In compliance with the circular economy concept, the slurry can be reused with separation technologies, dividing the raw material into a liquid and a solid fraction for irrigation and soil fertilization.

However, without treatment, chemical, biological, and hormonal contamination would pose significant anthropogenic pressure on the environment, which often disables direct use. One of these factors is the presence of natural and synthetic steroid hormones originating from the manure of farm animals with a possible impact on the agroecosystem and through environmental transport on human health.

To ensure the safe and sustainable use of slurry-based liquid and solid fractions, the issue of hormonally active compounds should be managed with newly developed, efficient, bio-based technologies and simultaneously monitored with effect-based tools.

BioTreatED provides a new concept for mitigating steroid hormones and hormonally active compounds in slurry-based separated fractions by applying a hormone-degrading microbial consortium and a comprehensive toolkit for monitoring agri- and aquatic ecosystems.

The multidisciplinary research proposal brings together seven research partners from Hungary, Norway, Poland, Portugal, Spain, and Turkey with complementary expertise from different fields to work jointly to increase the quality and availability of Aquatic Ecosystem Services by improving the safety of slurry-based irrigation water originating from the circular economy.

The project is strongly connected to the Water4All Joint Transnational Call as it aims to understand and predict multiple anthropogenic pressures in ecosystem services, performs comprehensive monitoring and mapping with advanced methods to increase our knowledge about the impact-response relationships and develop new tools and solutions for management of water resources.

The applied methods will strongly rely on Aquatic Ecosystem Services and, simultaneously, will improve these services with the insurance of a xenoestrogen-free natural aquatic environment, preserving and increasing biodiversity and protecting wild fish populations.

BioTreatED features a high degree of originality and novelty through the newly developed biotreatment methods and new approaches beyond the state-of-the-art methodologies for analysing hormonal activity. The project's expected outcome is not just the development of functional bacterial consortia but to further improve our knowledge about the environmental transportation and fate of steroid hormones and validate the biotreatment's success.

The safe and sustainable reuse of slurry-based materials would allow the spare of valuable freshwater resources for other (residential, industrial, agricultural) use; therefore, the proposed project could improve the adaptation capacity and resilience of the European community for extreme hydroclimatic events and would simultaneously decrease the anthropogenic pressure on arable lands, groundwaters and surface waters.

The new collaborative network can reach a high scientific, social and economic impact in compliance with the EU Biodiversity Strategy for 2030, the Circular Economy Action Plan, the EU Water Framework Directive, and the EU Habitats Directive.



### ► Project coordinator

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### ► Project partners

- NIBIO - NORWAY
- INSTITUTO POLITÉCNICO DE VIANA DO CASTELO - PORTUGAL
- FUNDACIÓN UNIVERSITARIA BALMES - SPAIN
- INSTYTUT UPRAWY NAWOŻENIA I GLEBOZNAWSTWA - PAŃSTWOWY INSTYTUT BADAWCZY - POLAND
- DOKUZ EYLÜL UNIVERSITY - TURKEY
- MIDDLE TISZA DISTRICT WATER DIRECTORATE - HUNGARY

### ► Funding organisations

NKFIH (HUNGARY) / RCN (NORWAY) / FCT (PORTUGAL) / AEI (SPAIN) / NCBR (POLAND) / TUBITAK (TURKEY)

### ► Duration

3 years

### ► Contact

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animal husbandry; dairying  
livestock raising; agricultural waste  
irrigation management  
microbiology  
nature-based solutions  
water and soil pollution

## KEYWORDS