



SUPPORTING STAKEHOLDERS FOR ADAPTIVE, RESILIENT AND SUSTAINABLE WATER MANAGEMENT

THE PROJECT AT A GLANCE

Title: SUPPORTING STAKEHOLDERS FOR ADAPTIVE, RESILIENT AND SUSTAINABLE WATER MANAGEMENT (STARS4WATER)

Instrument: HORIZON-CL6-2021-CLIMATE-01 , EUROPEAN RESEARCH EXECUTIVE AGENCY

Total Cost: 4,584,730 €

EC Contribution: 4,580,979 €

Duration: 48 MONTHS

Start Date: October 1st, 2022

Consortium: 21 partners from 10 countries

Project Coordinator: Stichting Deltares

Project Web Site: www.stars4water.eu (under construction); <https://cordis.europa.eu/project/id/101059372>

Key Words: Water resources, Catchment scale water management, Climate change adaptation, Water-climate interactions, Risk and vulnerabilities assessment, Data-driven models, Decision making tools, Information systems, Stakeholders engagement, River Basin Organisation. Living-lab approach

THE CHALLENGE

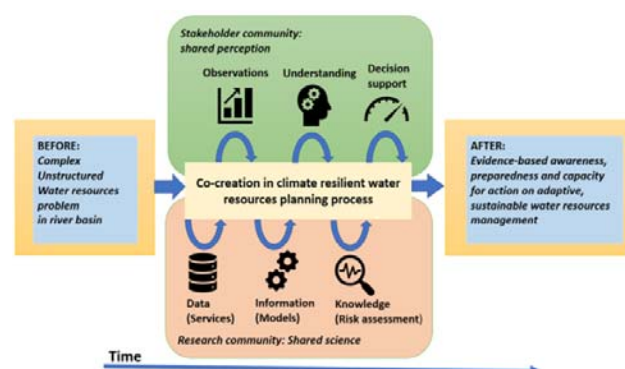
Worldwide freshwater resources are under increasing pressures of rapidly intensifying climate change effects, putting the availability and quality of water resources and socio-economic developments at risk. Better quantitative assessments and projections of the impacts and water-related risks for society, ecology and economic sectors are needed. River basin organisations need to be prepared!

New datasets and models offer possibilities for improved understanding and projections on water resources availability and vulnerabilities, while the new insights on the links between water, nature, and society call for a broader set of tools to be used for decision-making on water management. Recent advancements have opened new approaches in modelling, combining process-based or empirical modelling with new data techniques, like machine learning discovery techniques, resulting in hybrid approaches. Recent global observation studies and data collections, in cooperation with relevant EU earth observation initiatives, have created new climate data services and provide significant potential for improving the accuracy and spatial resolution of models. Yet, it is noted that these advancements are mainly still in the scientific domain. These novel tools (data-driven models, advanced data services, digital dashboards, etc.) are not yet fully matured and integrated in the current river basin management tools and decision-making processes. Their uptake and use by water resources planners and the stakeholders at the basin level are underexploited, even in frontrunner basins like the Rhine or Danube.

THE STARS4WATER CONTRIBUTION

STARS4Water aims to improve the understanding of climate change impacts on water resources availability and the vulnerabilities for ecosystems, society and the economy at river basin scale, including two distinctive elements: first, the need for an international stakeholder community to address their specific needs and requirements. Second, the development and application of innovative data services, models, tools.

STARS4Water will develop and deliver new data services and data driven models for better decision-making support on planning actions for adaptive, resilient and sustainable management of fresh water resources, which will be co-designed with stakeholders to meet their needs, ensuring their relevance and uptake beyond the lifetime of the project. Following a process of co-creation we aim to capacitate stakeholders with next generation river basin tools and build a strong Community of Practice.



STARS4WATER SPECIFIC OBJECTIVES

STARS4Water will build the next generation river basin tools and services that support decision-making on water resources management in **7 River Basin Hubs**. These river basin hubs serve as living labs for co-creation of data services and tools with stakeholder communities and as accelerators for further up-scaling of these services and tools to other river basins worldwide.

The 7 river basin hubs represent a regionally diverse portfolio of climate vulnerabilities and adaptation needs across sectors and include the basins of: Drammen (NO), East Anglia (UK), Rhine (international), Danube (international), Seine (FR), Duero (ES), Messara (GR). Each river basin hub has a direct beneficiary River Basin organisation (RBO) that will be the primary user of the products and services of the project (but not limited to them) and who has strong institutional connections and relationships with other governmental organisations, non-governmental organisations (e.g. water utilities, nature conservation organisations, civil society organisations) and private sector organisations (e.g. farmers associations, food and beverage industry, energy sector), who can also become users of the products and services when interested.



The STARS4Water has 5 Specific Objectives:

1. Provide stakeholders with **new generation data services and data-driven models tailored** to their needs and requirements

- New data services and data-driven models will be developed in the 7 river Basin hubs, advanced to TRL 5-6. Each of the new data services and modeling tools will be validated in at least one of the River Basin hubs

2. Improve accuracy and resolution of **regional-scale projections** of water resources availability, from 10 to 1 km² grids

- Application of data science techniques, using the full potential of data from existing monitoring and observation frameworks. The improved future projections will be made available through a portal of a metadata platform

3. Enhance the **knowledge base** and the scientific underpinning of climate risks and impacts, in various **scenarios and time horizons**

- The new data services and tools will be applied in projections of climate and socio-economic changes under 3 scenarios (2030-2050). The projections will be used to define the safe operating space for water availability and ecological requirements, enabling the stakeholders to define actions for sustainable management and climate resilience

4. Improve **stakeholders' decision-making** through the development of dashboards: **co-designed & co-developed information systems**

- The dashboards will present climate impacts on water resources and hydrological extremes at river basin scale, to support stakeholders in better assessments of strategies by incorporating decision-support indicators on safe operating space, extreme events, water-energy-food nexus, water supply impacts

5. Promote **uptake and transferability of the data services & tools** through guidance documents and capacity building activities

- Uptake will be achieved through establishing a network of water planners and practitioners (Community of Practice) and data service platforms, starting from the 7 river hubs. Complemented by the STARS4Water Academy and Stakeholders Forum

EXPECTED OUTCOMES AND PROJECT IMPACT

The project will have substantial impact on the following expected outcomes:

- i) Enhancement of the knowledge base regarding water related climate change impacts, vulnerability, risk and adaptation assessments in Europe and abroad;
- ii) Improved understanding of future water vulnerabilities, including both water quantity and quality aspects, by better considering the interactions among climate change and variability, land surface and groundwater hydrology, water engineering, and human systems, including societal adaptations to water scarcity;
- iii) Supporting decision makers defining the safe operating space in terms of water quantity and availability, i.e., defining sustainable water management and climate change adaptation measures, meeting growing water supply, food, and energy needs, and controlling the high inter-annual variability in water availability;
- iv) Improving Member States' preparedness for climate change impacts with respect to floods and droughts and support more accurate decision making for flood and drought risk reduction and response;
- v) Improved knowledge of ecological flows in the context of the Water Framework Directive and especially of the impacts of management, infrastructure and climate on ecological flows; improve prediction of drought events and water scarcity and enhance the assessment of the impacts of drought on water quality and biodiversity;
- vi) Foster commitments between climate change and water scientists, monitoring services, industry, water utilities and other socioeconomic communities to collect, standardize, and widely disseminate information on water use in different sectors;
- vii) Minimise the disparities associated with data collection and reporting between researchers and data agencies, enhance the interoperability, in particular through the mainstreaming of community-accepted standards, metadata schemas, and data management best practices in line with the FAIR principles, between data providers and data users and strengthen coordination among various monitoring services.

❖ **THE CONSORTIUM:** The project consortium consists of 21 partners representing 10 EU countries from 4 continents.

Stichting Deltares (Deltares) – Coordinator

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Institut National de Recherche pour l' Agriculture, l' Alimentation et l' Environnement (INRAE)	Szkola Glowna Gospodarstwa Wiejskiego (SGGW)
VANDERSAT BV	Region of Kriti
Universitaet fuer Bodenkultur Wien (BOKU)	Anglian Water Services Ltd (AWS)
Agencia Estatal Consejo Superior de Investigaciones Cientificas (GSIC-IGME)	Bundesanstalt fuer Gewaesserkunde (BfG)
Universidad Complutense de Madrid (UCM)	Directorate for Protection and Management of Aquatic Environment of the Hellenic Ministry of Environment & Energy (HMEE)
Institutul National de Cercetaredezvoltare Pentru Geologie si Geoecologie Marina (GEOECOMAR)	Syndicat mixte de l'Etablissement Public territorial de Bassin Seine Grands Lacs (EPTB)
Ministerie van Infrastructuur en Waterstaat (RWS)	Regia Autonoma Administratia Fluviala a Dunarii de Jos Galati (LDRA)
Forschungszentrum Julich GmbH (FZJ)	Confederation Hidrografica del Duero (CHD)
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