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Water security for the planet

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THE EUROPEAN WATER RESILIENCE STRATEGY CALL FOR EVIDENCE

Water4All's Position

July 2026

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Europe faces an unprecedented opportunity to redefine how research and innovation contribute to long-term water resilience, competitiveness and strategic autonomy. As the European Commission prepares the future Ocean and Water Research and Innovation Strategy, **the challenge is not only to identify future research priorities, but also to design a governance framework capable of addressing increasingly interconnected water-related challenges while maximising the impact of European investments**.

In this context, Water4All believes that the main challenge lies in the **Europe's ability to build a more integrated water R&I landscape without losing the thematic excellence, long-term coordination and critical mass needed to address the specific challenges of freshwater systems**. Water4All believes these two objectives are fully complementary.

This position paper presents Water4All's vision for a future European water R&I landscape by outlining the need for a dedicated freshwater research and innovation capacity, identifying the key R&I priorities for water resilience, and proposing stronger strategic links with related domains through a source-to-sea approach.

THE NEED FOR A DEDICATED FRESHWATER R&I CAPACITY

Freshwater as a distinct European research, innovation and policy domain

Freshwater is one of Europe's most strategic natural assets. It underpins environmental sustainability, economic competitiveness, public health, food and energy security, industrial production, and societal resilience. As recognised by the European Water Resilience Strategy, Europe's ability to achieve its climate, environmental and competitiveness objectives increasingly depends on securing resilient freshwater systems.

While freshwater is intrinsically connected to oceans and other components of the water cycle, it constitutes a distinct research, innovation and policy domain. **Freshwater governance, legislation, monitoring systems, infrastructures, users and scientific communities differ fundamentally from those of marine environments, while responding to specific societal needs related to drinking water, sanitation, agriculture, industry and inland ecosystems**. These characteristics require dedicated scientific coordination, long-term investment and innovation efforts that cannot be fully addressed through broader or sector-specific initiatives alone.

At the same time, freshwater challenges have become increasingly interconnected. Climate change, pollution, biodiversity loss, ageing infrastructure and growing competition between water uses require integrated solutions across sectors and governance levels. **Yet research and innovation remain fragmented, often addressing individual policy objectives such as climate adaptation, biodiversity, agriculture or urban resilience, without fully recognising freshwater as the integrating element that connects them.**

Europe therefore needs a dedicated freshwater research and innovation capacity within the next Framework Programme to provide the long-term coordination required to overcome this fragmentation. Such a capacity should accelerate the development, demonstration and deployment of innovative solutions, strengthen cooperation between Member States and international partners, and reinforce the science-policy interface supporting the implementation of water related policies and strategies.

Maintaining a dedicated freshwater focus should not come at the expense of integration. On the contrary, a future European freshwater research and innovation capacity should be designed to work in close coordination with complementary domains including marine waters, biodiversity, cities, agriculture and health, through a source-to-sea and cross-sectoral approach.

Strategic research and innovation priorities for Europe's water resilience

The Water4All Partnership has made a significant contribution to defining Europe's research and innovation agenda for water through its latest Strategic Research and Innovation Agenda (SRIA) 2026-2027. Building on extensive literature reviews, foresight exercises and consultations with researchers, policymakers, water managers, industry, and civil society, the SRIA of Water4All identifies the key research and innovation priorities needed to strengthen Europe's water resilience. Organised around five strategic themes: circular economy, biodiversity and ecosystems, integrated water management, water and health, and water infrastructures, it moves beyond identifying knowledge gaps to defining strategic R&I priorities that support the implementation of European policy objectives

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Taking into consideration the priorities set out in the SRIA and recognising the need to reinforce the connections between freshwater R&I and other strategic domains, Water4All recommends that the future European investments support R&I at the interface between water, cities, agriculture, ecosystems, industry and health. Particular attention should be given to integrated approaches that accelerate innovation uptake and address interdependencies across sectors.
The following priorities are considered particularly strategic:

- **Water-smart**, including AI, Earth Observation, sensors, digital twins and integrated data systems, to improve monitoring, modelling, forecasting and decision-making across scales.
- **Circular and competitive economy** that enhance water-use efficiency, resource recovery (water, energy, nutrients and materials) and safe water reuse in urban and industrial systems.
- **Water for biodiversity and ecosystems**, including large-scale deployment of nature-based and hybrid grey-green solutions to strengthen climate adaptation, biodiversity and water security.
- **Integrated water management**, combining hydrological, ecological, economic and social dimensions to support long-term planning, evaluate trade-offs and operationalise nexus approaches.
- **Innovative governance and stakeholder participation**, including adaptive water allocation, conjunctive surface and groundwater management, and socially acceptable governance frameworks under increasing competition for water resources.
- **Water and Health**, monitoring and mitigation of emerging contaminants and pathogens, through improved monitoring methods and the development of cost-effective, low-carbon technologies for the removal of contaminants, pathogens and antimicrobial resistance of freshwaters.
- **Resilient water infrastructures,** supporting the transition towards more flexible, decentralised, circular and climate-resilient infrastructures while renewing Europe's ageing assets.

These priorities are organised around the interactions between water and other strategic sectors. rather than around traditional disciplinary boundaries. They reflect the need to connect scientific excellence with policy implementation, technological innovation and market deployment, while strengthening coherence across European research and innovation investments. By prioritising these interaction spaces, Horizon Europe 2028-2034 can accelerate the delivery of integrated solutions that simultaneously contribute to water resilience, competitiveness, environmental protection and societal well-being.

BUILDING AN INTEGRATED EUROPEAN R&I LANDSCAPE

Strengthening strategic coordination across European R&I water communities

Europe's freshwater systems are intrinsically connected to coastal waters, marine ecosystems and the wider water cycle. They are equally interconnected with agriculture, cities, energy, biodiversity, public health and industrial production. Addressing Europe's water resilience therefore requires a genuine source-to-sea perspective that recognises these physical, ecological and socio-economic interdependencies.

However, adopting a source-to-sea approach should not lead to the dilution of freshwater research and innovation within broader thematic frameworks. On the contrary, effective integration requires strong and coordinated communities with complementary expertise. **Maintaining dedicated communities allows Europe to preserve the critical mass, scientific excellence and long-term coordination needed to address the specific challenges of each domain while strengthening collaboration across them.**

Horizon Europe 2028-2034 should therefore strengthen strategic coordination between complementary research and innovation communities. A future European water R&I landscape should facilitate joint programming, coordinated strategic agendas, interoperable data infrastructures, shared research infrastructures, common demonstration activities and strengthened science-policy interfaces across freshwater, marine, biodiversity, agriculture, urban and health communities. Such coordination should build on existing European Partnerships, Missions and research infrastructures, capitalising on their respective expertise while avoiding duplication of efforts.

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Cross-sectorial transformative pathways for water resilience

Europe's freshwater systems are under unprecedented and interconnected pressures, requiring a coordinated research and innovation effort that goes beyond existing sectoral approaches. The European Water Resilience Strategy (EWRS) is scoping directly to the "heart" of enhancing the efforts and R&I tools needed to face the challenges and solve the problems related to the water cycle. Based on the Water4All SRIA, the following opportunities for transformational development offer a possibility to structure a future R&I strategy, efficient to improve European resilience against "threats" such as, among other thing, hydrometeorological extremes, water scarcity, deterioration of water quality.

1. Water security[1]
2. Monitoring, modelling and digital
3. Nature, ecosystems and circular economy
4. Governance
5. Implementation

These transformation opportunities are detailed in annex to this document.

Although water is connecting society, economics and the environment, **research and innovation mostly remain focused on optimizing known solutions instead of aspiring out-of-the-box, transformative paradigm shifts.** Existing initiatives often address individual components – such as water quality, climate adaptation, biodiversity or urban resilience – without fully recognising surface and subsurface parts of the freshwater cycle as the integrating element that connects them and provides opportunities for conjunctive use of groundwater and surface water. **Implementing a transformative European implementation roadmap for the Water Resilience Strategy requires coherent research and the willingness to prioritize ideas that are explicitly aiming at systemic improvements. A key to that is integrating research and innovation across disciplines, sectors and governance levels in a multi-actor transdisciplinary setup**. This will catalyse the development and implementation of transformative and integrative communities that can propose new business opportunities and societal activity in various fields, e.g. real-time monitoring and modelling technologies, inclusive decision making, nature-based solutions, digital tools, enhanced water treatment and reuse technologies, ecosystem restoration approaches and adaptive governance models capable of addressing multiple pressures simultaneously.

In order to allow all actors and stakeholders to participate in and benefit from the proposed transformation pathways, the following cross-cutting enablers need to be considered:

I - Explicit focus on integrating the research and innovation agenda across all 3 axes of sustainable development (Society, Economy, Environment)
II - Describing a clear value proposition that goes beyond business as usual for keeping European water systems sustainable and resilient under current and future challenges.
III - Dedicated support of the whole R&I chain from field monitoring (RIs, WOLLs, operational networks, etc.) to data and evidence driven research and testing of innovative solutions, including practical validation facilities.

Key European policies including the Water Framework Directive, the Groundwater Directive, the European Water Resilience Strategy, the Nature Restoration Regulation, the EU Biodiversity Strategy, the Climate Adaptation Strategy, the Zero Pollution Action Plan and the EU Missions to Restore our Ocean and Waters, Climate Adaptation, and Climate-Neutral and Smart Cities can serve as an initial set of references to ensure that the R&I strategy is aligned with the policy goals. An additional dimension should address economic and societal benefits of financing solutions for the Resilience Strategy.

Water4All fully supports this integrated vision. The Partnership already collaborates with complementary European initiatives and is progressively developing activities that naturally bridge freshwater with other strategic domains, including marine waters, biodiversity, climate adaptation, urban resilience and digitalisation. Building on these experiences, the next framework Programme should encourage structured mechanisms for cross-communities collaboration, including joint foresight exercises, coordinated calls where appropriate, common demonstrators, interoperable FAIR data systems and coordinated policy support activities.

1- Water security as per Definition of UN Member States (all EU Member States have agreed to this definition in 2012): "The capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. »

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CONCLUSIONS

Europe's future competitiveness, resilience and strategic autonomy will increasingly depend on its capacity to protect, restore and sustainably manage freshwater systems. Achieving this ambition requires a coordinated European research and innovation architecture capable of addressing the complexity and interconnectedness of water-related challenges while accelerating the uptake of innovative solutions.

Water4All believes that these objectives are best achieved by combining a dedicated freshwater research and innovation capacity with stronger strategic coordination across complementary domains through a source-tosea and cross-sectoral approach. The next Framework Programme should strengthen cooperation between specialised research and innovation communities, building on their respective expertise while creating the interfaces needed to tackle Europe's most pressing water challenges.

Horizone Europe 2028-2034 should therefore maintain a appropriate European instrument capable of ensuring the long-term coordination of freshwater research and innovation. Embedded within an integrated European water R&I ecosystem through a source-to-sea approach, built on existing achievements and communities, such an instrument should provide the strategic continuity, critical mass and collaborative framework needed to transform scientific excellence into innovative solutions, support evidence-based policymaking, strengthen European competitiveness and secure Europe's water resilience for future generations.
Europe's challenge is not to choose between thematic excellence and integration, but to organise both within a coherent European research and innovation landscape.

ANNEX: DETAILED OPPORTUNITIES FOR TRANSFORMATIONAL DEVELOPEMENT

1. Water security

- Understanding and protecting the full water cycle as a global common and shared foundation for European water resilience and security

2. Monitoring, modelling and digital

- Advancing integrated hydrological monitoring and modelling and conjunctive use of groundwater and surface water to mitigate and adapt to climate change impacts, adopting the land-sea continuum concept.
- Providing scientific foundation and appropriate infrastructure to strengthen water resilience and predictive integrated monitoring and modelling at river basin scale across Europe including transboundary river basins and aquifers.
- Integrating Europe's modelling, forecasting and service delivery capacity to overcome fragmentation
- Leveraging digital transformation, Big Data and AI including digital twins for analysis and foresight to inform citizens and experts

3. Nature, ecosystems and circular economy

- Proposing integrated solutions to protect water quality, biodiversity and ecosystems
- Advancing a water-efficient circular economy
- Strengthening optimal combinations of nature-based and technical solutions for water along the full water cycle

4. Governance

- Understanding and addressing externalities in the climate-water-energy-agriculture-healthdisaster risk reduction nexus
- Offering governance models that integrate public administration, private sector and the public in decision making at river basin scales
- Continuing updates, upgrades and harmonization of the water-related legislation in EU.

5. Implementation

- Creating conditions for Innovation and transfer of new solutions to operationalize the Water Resilience Strategy
- Integrating common policies for mitigating climate change and adapting to the consequences of climate change.

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