

# Water resilience is built with better water governance

Europe is increasingly experiencing severe droughts and floods due to climate change, and despite decades of efforts to curb pollution, the health of water ecosystems continues to decline. Addressing water resilience should be a priority for the new European Parliament, the new Commission, and the Member States. Water resilience consists of the capacity of our socio-ecological systems, especially aquatic ecosystems and the communities that rely on high-quality and sufficient water supplies, to manage change—either by resisting, adapting, or transforming in response to it.

Strengthening of Europe's water resilience requires improved water governance. The institutional frameworks of today and the interaction between different sectors and actors have to be enhanced as the use, development and protection of waters demand our careful consideration. Recent research has identified governance practices and innovative instruments, approaches and arrangements that can support water resilience, with EU-wide scaling up potential.

## Key messages

- Water resilience is critical for the core aims of the EU. Water should be a strategic priority in the work of the new European Parliament, the Commission, and the Member States.
- Water resilience requires a cross-sectoral regulatory approach. More attention should be paid to water use and impacts in the agriculture, industry and energy production sectors and their water-intensive value chains to reach the Water Framework Directive's water status objectives and to advance systemic adaptation to climate change. Regulation should be able to impose requirements not only on new but also on existing activities impacting waters.
- Water resilience is founded on collaboration between the public sector, private sector, civil society and research and education. Participatory and collaborative approaches support vertical integration across multiple levels of governance and horizontal coherence and coordination across policy sectors. Power and capacity of actors, diversity of knowledge systems and coordination across jurisdictional and geographical boundaries are critical factors in their effectiveness. Social innovation and digital solutions facilitate data exchange, streamline decision-making, and promote inclusive participation from all stakeholders.
- Water resilience is best financed with a diversity of funding sources, consolidating water charges and tariffs that incentivise efficient water use, and leveraging private finance through public-private partnerships or blended finance solutions.
- Increasing Europe's water resilience requires reflective approaches, such as greater use of monitoring and evaluation of policies and their implementation. Incorporating the trade-offs and synergies among water, food, energy and ecosystems in monitoring and evaluation enable better understanding of the impacts of management decisions. Commonly agreed indicators, supporting data, and the use of open and accessible digital platforms can improve the flow of information to a wide range of decision-making actors including the wider public. It can also help holding decision makers accountable, and raise awareness, acceptance, and uptake of more sustainable water use and management practices.





## Water rising on the EU agenda

The EU Water Framework Directive (WFD) (2000/60/EC) that sets the central institutional frameworks for water in the EU has been in force for over 20 years, but with limited success in achieving its objectives of water protection and restoration, sustainable water use, and good water status<sup>1</sup>. The challenges have been deemed to relate to its implementation and governance, including lack of funding, delays in planning, and insufficient integration of environmental objectives in sectoral policies<sup>2</sup>. The growing impacts of climate change, with weather extremes and long-term hydrological changes, are further exposing the insufficiency of the current WFD arrangements in ensuring water resilience<sup>3</sup>.

To improve European water policy and water resilience, the European Economic and Social Committee (EESC) adopted a Declaration for an EU Blue Deal in 2023<sup>4</sup>. The EU Blue Deal emphasises proper governance of all freshwater resources through a river basin approach involving all relevant stakeholders and calls for the alignment of water and other EU policies, such as agricultural policy and the restoration of water ecosystems. Whilst its status is currently unclear, the proposal of a Water Resilience Initiative by the European Commission in 2023 aims to ensure access to water for citizens, nature and the economy, tackle floods and droughts, and identify and assess how best to manage climate risks across EU policies, similarly identifying water governance as a critical enabling factor for water resilience<sup>5</sup>.

## Water resilience requires coordinated and context specific solutions

To improve water resilience in the EU, coordinated actions between local, national and regional levels of water governance are needed. Key challenges include how to align water and other policies such as the Common Agricultural Policy and how to implement the river basin approach taking into consideration upstream and downstream water uses and users. Water resilience requires context-specific solutions – river basins, water bodies and communities dependent on them are all different. The ecological status of waters may be good or poor and the different hydrological systems and freshwater ecosystems are affected differently by water use sectors and the impacts of climate change. Water governance solutions must enable the socio-ecological systems to either resist, adapt to changes or to transform.

The existing water governance instruments, approaches, and arrangements in place in the EU and the Member states need to be carefully evaluated, whether they serve the purpose of enhancing water resilience. Recent research conducted in three Horizon Europe projects GOVAQUA, InnWater and RETOUCH NEXUS has identified cutting-edge water governance practices with EU-wide scaling up potential.

## Cutting-edge water governance practices with EU-wide scaling up potential

### REGULATORY MIX ACROSS SECTORS

- Water allocation mechanisms define who can abstract and use water, how much and under what conditions<sup>6</sup>. Due to the impacts of climate change, countries and regions should be able to regulate and prioritize water uses in times of water scarcity. For example, Spain and Romania have prepared drought management mechanisms for this purpose, including agricultural water use<sup>7</sup>.
- Water should be seen as a key element in the implementation of the newly adopted Nature Restoration Law. Furthermore, ecological flows are essential for the aquatic ecosystems to provide ecosystem services and are linked to physical alterations of water, such as water abstraction and the operation of hydropower dams<sup>8</sup>. With regard to the latter, Sweden attempts to bring all existing hydropower permits in line with modern environmental requirements<sup>9</sup>.
- Value chains of large companies are regulated in the newly adopted Directive on Corporate Sustainability Due Diligence<sup>10</sup>. At the Member State level, France provides an example of the value chain regulation. In France companies are required to prepare a plan in which they map and assess value chain risks including those related to water and plan actions to mitigate serious impacts. Furthermore, French courts can assess complaints concerning the failures to comply with the planning obligation and hold the companies liable for the resulting damage<sup>11</sup>.

### MULTI-LEVEL ARRANGEMENTS

- As encouraged by the EU, most member states have developed a multi-level approach to water governance, however, its implementation at regional and local level often remains a challenge. Power-related factors and the diversity of knowledge systems affect how knowledge from different stakeholders is co-produced and integrated into decision-making. Institutional interplay, such as the coordination across jurisdictional and geographical boundaries, and resources available, such as information and time, emerge as key factors regarding the legitimacy and effectiveness of collaborative approaches. It is essential to understand the interdependency of these factors and how they manifest in different local contexts of participation and collaboration.
- Some EU countries have adopted a multi-level approach to managing water abstraction permits and allocations. Instead of centralising all powers, state authorities devolve responsibilities to water user associations – keeping the possibility to intervene if users fail to reduce pressures. In Spain, groundwater user associations have successfully collaborated with river basin organisations to mitigate overpumping and monitor illegal abstraction<sup>12</sup>. In France, agricultural water user associations have an important role in collecting information on irrigators' water use and ensuring that allocations meet the requirements of the collective abstraction permit<sup>13</sup>.

### COLLABORATIVE APPROACHES

- Going beyond the mandated participatory planning of the WFD, river contracts (Italy, Belgium, and France)<sup>14</sup>, water forums (Ireland)<sup>15</sup>, watershed visions (Finland)<sup>16</sup> and the Catchment Based Approach and Catchment Partnerships (the UK)<sup>17</sup>, are examples of collaborative multi-stakeholder approaches that engage stakeholders in the given river basins and catchments to set a common vision and work towards shared aims. Alignment and coordination with public sector processes, clear mandates, roles and responsibilities between different stakeholders, and sustainable funding mechanisms have been identified as necessary for their success.
- Social innovation refers to the design and implementation of innovative solutions which ultimately aim to improve the welfare and wellbeing of individuals and communities. In water governance, social innovation means tackling societal, water-related challenges by combining the technological and non-technological dimensions (governance, capacity building and economic) of innovation. These complementary dimensions cut across organizational, sectoral and disciplinary boundaries<sup>18</sup>. Demonstration and pilot sites and Living Labs<sup>19</sup> are among social innovation methodologies gaining increasing popularity in tackling water governance challenges across Europe.

## ECONOMIC AND FINANCING INSTRUMENTS

- To address the funding gap in maintaining and improving the existing water infrastructures and implementing Nature Based Solutions, a mix of economic and financing instruments are needed. Water charges (levies) remain the most widely applied economic instruments. Other innovative schemes such as payment for ecosystem services, water markets, impact investments with blended finance and public-private partnerships hold promise. However, their application relies on careful consideration of multiple aspects, such as through public consultations, enhanced institutional capacities, and the existence of legal and regulatory frameworks.
- Hydroeconomic modelling integrates the temporal and spatial fluctuations of biophysical factors with socioeconomic dynamics, offering insights to guide water management decisions, contributing to an informed and enriched understanding of water resource planning<sup>20</sup>. It promotes the use of digital solutions to enable more efficient allocation of water resources and integration of the hydrologic impact of alternative measures (effects in the water cycle or local and basin resource availability)<sup>21</sup>. Computable General Equilibrium model associated with the System of Environmental-Economic Accounting for Water opens the possibility to model the interactions between water uses, energy production and economic activities, while addressing the issues related to the environmental impacts of these economic activities<sup>22</sup>.

## TOOLS FOR MONITORING AND EVALUATION

- In terms of monitoring and evaluation, systematizing knowledge and considering cross-sectoral interactions can help improve resilience. For example, more effort is required to identify indicators and create platforms that allow a frequent flow of information for the public. This is especially true at smaller scales as disaggregated information regarding water quantity and water quality is still limited or unavailable. Furthermore, understanding the trade-offs and synergies among the water, food, energy, and ecosystem sectors can help to fully understand the impact of multiple management decisions. These practices will allow policymakers and the public to make faster and better-informed decisions.
- Co-design and application of a range of data and digital solutions that span data collection (citizen science monitoring, IoT, and satellite remote sensing) to the processing, storage and use of information, support decision making for water resilience. For example, two such tools are developed in the GOVAQUA Living Labs, namely the IWAM tool which will integrate alternative water resources and a MOHICAN water accounting hydroeconomic model with dynamic responses from farmers to avoid future rebound effects in Spain<sup>23</sup>, and the Oxford Rivers Portal on water quality in the UK<sup>24</sup>.

## Taking the good practices forward

Innovative, multi-level, cross-sectoral and collaborative water governance is critical for enhancing water resilience. All the presented practices still require further assessment, development, and validation with stakeholders, but they already illustrate the diversity of actors involved and the richness of instruments, approaches and arrangements available to tackle Europe's water challenges.

Research continues to play a key role in water governance issue identification, providing data and analysis for policy making, supporting policy implementation, and tools and methods for monitoring and evaluation. The three Horizon Europe projects GOVAQUA, InnWater and RETOUCH NEXUS continue further validating the practices with impact in collaboration with stakeholders across Europe.

## Contacts

### GOVAQUA

Suvi Sojamo  
[suvi.sojamo@syke.fi](mailto:suvi.sojamo@syke.fi)

Antti Belinskij  
[antti.belinskij@syke.fi](mailto:antti.belinskij@syke.fi)

[www.syke.fi/projects/govaqua](http://www.syke.fi/projects/govaqua)

### InnWater

Natacha Amorsi  
[n.amorsi@oieau.fr](mailto:n.amorsi@oieau.fr)

Julie Magnier  
[j.magnier@oieau.fr](mailto:j.magnier@oieau.fr)

[www.innwater.eu](http://www.innwater.eu)

### RETOUCH NEXUS

Maria Vrachioli  
[maria.vrachioli@tum.de](mailto:maria.vrachioli@tum.de)

Juan-Pablo Henao  
[juanpablo.henao@tum.de](mailto:juanpablo.henao@tum.de)

[retouch-nexus.eu](http://retouch-nexus.eu)



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## References

- EC. Water Framework Directive. Website. Available at: [https://environment.ec.europa.eu/topics/water/water-framework-directive\\_en](https://environment.ec.europa.eu/topics/water/water-framework-directive_en). Last visited 11 June 2024.
- Voulvoulis, N., Arpon, K. D., & Giakoumis, T. (2017). The EU Water Framework Directive: From great expectations to problems with implementation. *Science of the Total Environment*, 575, 358–366.
- Belinskij A., Soininen N., Puharinen S.-T. & Veijalainen N. (2023) Climate change adaptation in water law: International, EU and Finnish perspectives. *RECIEL*. 2024; 33(1): 80–92. doi:10.1111/reel.12528.
- European Economic and Social Committee. EU Blue Deal. Website. Available at: <https://www.eesc.europa.eu/en/initiatives/eu-blue-deal>. Last visited 11 June 2024.
- EC (2023). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Commission work programme 2024. Delivering today and preparing for tomorrow. COM/2023/638 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2023%3A638%3AFIN>. Last visited 11 June 2024.
- Organisation for Economic Co-operation and Development (OECD) (2015). *Water Resources Allocation: Sharing Risks and Opportunities*. OECD Studies on Water, OECD Publishing, Paris. Available at: <https://www.oecd.org/fr/publications/water-resources-allocation-9789264229631-en.htm>. Last visited 11 June 2024.
- RG (Romanian Government) (2007). National Strategy for reduction of the effects of droughts on short-, medium-, and long-term. Bucharest, Official Gazette no 565/2007. Available at: <https://legislatie.just.ro/Public/DetaliuDocument/84536>. Last accessed 7 April 2022; SG (Spanish Government) (2024). Special Drought Plans in force (inter-community demarcations). Planes Especiales de Sequía vigentes (demarcaciones intercomunitarias). Available at: <https://www.miteco.gob.es/es/agua/temas/observatorio-nacional-de-la-sequia/planificacion-gestion-sequias/>. Last accessed 31 May 2024; See RETOUCH NEXUS case study in Spain <https://retouch-nexus.eu/case-studies-spain/>
- Kampa & Schmidt (2023): *Implementation of e-flows in the EU*. Developed under the Framework Contract 'Water for the Green Deal' – Implementation and development of the EU water and marine policies (09020200/2022/869340/SFRA/ENV.C.1). Specific Contract "Support to the Commission on water quantity management – follow up to the Fitness Check of EU water law conclusions, EU Strategy on Adaptation to Climate Change and Common Implementation Strategy Work Programme for the water directives (2022–2024).
- Swedish government (2020). Government decision on the National Plan for Modern Environmental Conditions for Hydropower. Regeringsbeslut, Nationell Plan för Moderna Miljövillkor. Available at: <https://www.havochvatten.se/download/18.1bd43926172bdc4d64881cc01708959747462/regeringsbeslut-nationell-plan-moderna-miljovillkor.pdf>. Last visited 11 June 2024.
- EC. Corporate sustainability due diligence. Website. Available at: [https://commission.europa.eu/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence\\_en](https://commission.europa.eu/business-economy-euro/doing-business-eu/corporate-sustainability-due-diligence_en). Last visited 11 June 2024.
- RF (République Française) (2017). Vigilance Law no. 2017–399 of 27 March 2017 on the duty of care of parent companies and ordering companies. Loi n° 2017–399 du 27 mars 2017 relative au devoir de vigilance des sociétés mères et des entreprises donneuses d'ordre.
- Molle, F. & Closas, A. (2020). Comanagement of groundwater: A review. *Wiley Interdisciplinary Reviews: Water*, 7(1), e1394.
- Rouillard, J. & Rinaudo, J. D. (2020). From State to user-based water allocations: An empirical analysis of institutions developed by agricultural user associations in France. *Agricultural Water Management*, 239, 106269.
- See e.g. <https://www.contrattidifiume.it/it/contratti-di-fiume/>, Cialdea, D., & Pompei, C. (2022). An overview of the River Contract tool: new aims in planning and protected areas issues. *European Planning Studies*, 30(4), 684–704.
- See e.g. <https://thewaterforum.ie/>.
- See e.g. Marttunen, M., Turunen, J., Kukkonen, M., Vilmi, A., Mustajoki, J., Huuki, H., ... & Hellsten, S. (2023). Oulujoen vesistöalueen vesistövisio – ARVOVESI-hankkeen tulokset. Suomen ympäristökeskuksen raportteja 8 | 2023. (The watershed vision of the Oulujoki watershed – Results of the ARVOVESI project. Report of the Finnish Environment Institute 8 | 2023) (Report in Finnish).
- See e.g. <https://catchmentbasedapproach.org/>; Collins, R., Johnson, D., Crilly, D., Rickard, A., Neal, L., Morse, A., ... & Holt, A. (2020). Collaborative water management across England – An overview of the Catchment Based Approach. *Environmental Science & Policy*, 112, 117–125.
- See <https://www.oecd.org/regional/leed/social-innovation.htm>; InnWater (2024) Social Innovation. InnWater Article 1. Available at: [https://www.innwater.eu/sites/default/files/delivrables/InnWater\\_Article\\_Social-Innov\\_VF1\\_0.pdf](https://www.innwater.eu/sites/default/files/delivrables/InnWater_Article_Social-Innov_VF1_0.pdf); Amorsi N. & Siauve S. (2018). Social Innovation factsheet on Monitoring "drinking water quality for improved health in Africa. AfriAlliance European project n° 689162, <https://afrialliance.org/knowledge-hub/afrialliance-socialinnovation/factsheets>
- InnWater Pilot sites, see <https://www.innwater.eu/pilot-sites/general-presentation>; RETOUCH NEXUS case studies, see <https://retouch-nexus.eu/case-studies/>; Water4All (2024) Atlas of Water-Oriented Living Labs. Available at: [https://watereurope.eu/wp-content/uploads/2024/05/Atlas-of-WOLLS-2024-Water4All\\_online.pdf](https://watereurope.eu/wp-content/uploads/2024/05/Atlas-of-WOLLS-2024-Water4All_online.pdf); GOVAQUA Living Labs, see [https://www.syke.fi/en-US/Research\\_\\_development/Research\\_and\\_development\\_projects/Projects/Governance\\_innovations\\_for\\_a\\_transition\\_to\\_sustainable\\_and\\_equitable\\_water\\_use\\_in\\_Europe\\_\\_GOVAQUA/Living\\_Labs](https://www.syke.fi/en-US/Research__development/Research_and_development_projects/Projects/Governance_innovations_for_a_transition_to_sustainable_and_equitable_water_use_in_Europe__GOVAQUA/Living_Labs).
- Harou, J. J., Pulido-Velazquez, M., Rosenberg, D. E., Medellín-Azuara, J., Lund, J. R., & Howitt, R. E. (2009). Hydro-economic models: Concepts, design, applications, and future prospects. *Journal of Hydrology*, 375(3–4), 627–643.
- Martínez-Dalmau J., Gutiérrez-Martín C., Kahil T. & Berbel, J. (2023) Impact of alternative water policies for drought adaptation in the Guadalquivir Mediterranean river basin, southern Spain. *J Hydrol Reg Stud* 47:101444. doi:10.1016/j.ejrh.2023.101444.
- See <https://www.innwater.eu/pilot-sites/ps1-reunion-island-fr>
- See [https://www.syke.fi/en-US/Research\\_\\_development/Research\\_and\\_development\\_projects/Projects/Governance\\_innovations\\_for\\_a\\_transition\\_to\\_sustainable\\_and\\_equitable\\_water\\_use\\_in\\_Europe\\_\\_GOVAQUA/Living\\_Labs](https://www.syke.fi/en-US/Research__development/Research_and_development_projects/Projects/Governance_innovations_for_a_transition_to_sustainable_and_equitable_water_use_in_Europe__GOVAQUA/Living_Labs).
- See <https://oxforddrivers.ceh.ac.uk/>.

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