This project has received funding from the European Union's Horizon EUROPE research and innovation program under grant agreement No. 101086512.

This project was funded by UK Research and Innovation (UKRI) under the UK government's Horizon Europe funding guarantee [grant number 10066637].

Call: HORIZON-CL6-2022-GOVERNANCE-01
Project 101086512

INN WATER

Promoting social innovation to renew
multi-level and cross sector water governance

D6.9: Policy Brief - year 1

Gustav THUNGREN
(Stockholm International Water Institute)

Delivery date: 29/02/2024

Disclaimer

This document reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

Intellectual Property Rights

Project Consortium

Document information

Programme	HORIZON Research and Innovation Action - HORIZON-CL6-2022-GOVERNANCE-01-06
Grant Agreement N°	101086512
Project Acronym	**InnWater**
Project full name	Promoting social INNovation to renew multi-level and cross sector WATER governance
Start of the project	1 March 2023
Duration	36 months
Project coordination	Natacha Amorsi, Office International de l'Eau , OiEau
Deliverable	**D6.9: Policy Brief – Year 1**
Work Package	**WP6: Impact Maximization**
Task	**Task 6.4: Policy & regulation recommendations**
Lead Beneficiary	Stockholm International Water Institute (SIWI)
Author(s)	Gustav THUNGREN (SIWI)
Contributor(s)	Ramon DOMENECH (WAREG), Joana DIAZ (EURECAT)
Quality check	Juan Restrepo (ETIFOR), Joana DIAZ (EURECAT)
Planned Delivery Date	29/02/2024
Actual Delivery Date	29/02/2024
Citation	Thungren, G, (2024): Europe at a fork in the river – a changing water context, Deliverable D6.9, Public, EU Horizon InnWater Project, Grant agreement No. 101086512
Dissemination Level	**Public**

Revision history

Version	Date	Author(s)/Contributor(s)	Comments
V1	06/12/2023	Gustav Thungren (SIWI)	Initial Structure presented.
V2.	15/01/2024	Gustav Thungren (SIWI)	Structure expanded upon for initial feedback. Call for contributions from co-author made.
V.3	30/01/2024	Gustav Thungren (SIWI), Ramon Domenech (WAREG), Joana Diaz (EURECAT)	First Draft delivered to co-authors.
V.4	11/02/2024	Gustav Thungren (SIWI), Julie Magnier & Natacha Amorsi (OiEau)	Second draft delivered to OiEau.
V5.	20/02/2024	Gustav Thungren (SIWI), Juan Restrepo (Etifor), Joana Díaz (Eurecat)	Third draft delivered for quality control.
FV	29/02/2024	Natacha Amorsi (OiEau)	Final draft submitted.

Related deliverables

3.1 Citizen Engagement in the 21st Century

5.1 Preliminary Pilot Site Implementation Guide

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

PB	Policy brief
WP	Work Package

EXECUTIVE SUMMARY

This policy brief (PB), part of Task T6.4 Policy & Regulation Recommendations Regulation in Work Package (WP) 6 – Impact Maximization of the InnWater project, aims to disseminate relevant findings to policymakers at local, national, and EU levels. As part of the broader objective to foster sustainable multi-level and cross-sector water governance through social innovation and tailored governance tools, this deliverable seeks to provide targeted policy and regulatory pathways for improvements and innovations in water governance to achieve EU policy objectives.

The PB builds on InnWater deliverables, specifically leveraging Deliverables 3.1 Citizen Engagement in the 21st Century[1] and the 5.1 Preliminary Pilot Site Implementation Guide[2]. Additionally, insights from the WaterGovernance2027 synergy group, which includes three Horizon Europe projects[3], informed the content. A literature review on water challenges in Europe supplemented project deliverables.

The PB highlights the pressing global challenges and their influence on local and regional water governance. It emphasizes the changing conditions for governance actors due to shifting water contexts and shows how the InnWater's tools and services can help to address these challenges and achieve the EU related directives and policy aims.

The PB aligns with the broader objectives of the InnWater project to foster replicable and sustainable water governance informed by local contexts, through social innovation and tailored tools.

[1] Elelman, R, (2023): Citizen Engagement in the 21st Century, Deliverable D3.1, Public, EU Horizon InnWater Project, Grant agreement No. 101086512

[2] Couldrick, L, (2023): Preliminary Pilot Site Implementation Guide, Deliverable D5.1, Sensitive, EU Horizon InnWater Project, Grant agreement No. 101086512

[3] InnWater, GOVAQUA and RETOUCH NEXUS, HORIZON-CL6-2022-GOVERNANCE-01-06 - Water governance, economic and financial sustainability of water systems

1. INTRODUCTION AND BACKGROUND

1.1 InnWater in brief

InnWater aims at fostering sustainable multi-level and cross sector water governance through social innovation and a set of governance tools adapted for local needs. To this end, InnWater is developing a set of tools and services for the benefit of water stakeholders, including a governance assessment matrix, guidance for stakeholders' engagement, as well as simulations linking water resources management and economics activities. To achieve its goals, InnWater engages with pilot site communities, co-developing tools to address specific water challenges like pricing policies, water quality, and infrastructure investment. The project hosts regular meetings and webinars to facilitate stakeholder collaboration and tool refinement across five pilot sites in diverse EU regions (see figure 1), focusing on local context-driven application and policy development. The effort is supported by EU's Horizon Europe program and aims to create replicable water governance models, with outcomes informing policy at various scales.

Pilot Site #1: France, La Réunion Island
Economic focus
Pilot Site #2: Italy, Middle Brenta Basin
Ecosystem services & Drinking water sector focuses
Pilot Site #3: Spain, Figueres
Water scarcity focus
Pilot Site #4: United Kingdom, West Country
Water quality focus
Pilot Site #5: Hungary, Middle Tisza
Water allocation focus

Figure 1: InnWater Pilot Sites map

1.2 The context of the Policy Brief

As part of Task T6.4 Policy & Regulation Recommendations Regulation, three PBs (deliverables D6.9-6.11) will be produced to disseminate the results of InnWater project as per Work Package 6 – Impact Maximization. The PBs seek to synthesize relevant findings per year from the project and target policymakers at the local, national, international and EU levels. Altogether, the PBs will provide targeted policy and regulatory pathways and recommendations for improvements and innovations in water governance to achieve EU policy objectives and elaborate ways forward to mainstream and expand applications of the water governance toolbox and platforms developed in the InnWater project. The first brief targets local and national decision-makers, focused on specific water policy challenges as experienced in the Pilot Site areas and their

changing nature due to local and global water challenges. This will also support governance actors in the Pilot Site areas to identify and contextualize water challenges as well as policy relevant applications for the tools and models developed in InnWater, and likewise allow local governance actors elsewhere in Europe to replicate the suite of InnWater solutions for their specific context.

This deliverable represents the long version of the InnWater first PB. A short version will be designed by OiEau as a WP6 Impact maximisation action to provide a dedicated communication material to be more easily promoted. Both versions will be available on InnWater website[4].

1.3 Structure of the document

Following this introduction, section 2 presents the method followed to produce PB1 and section 3 presents the finished PB1.

2. METHOD

Following discussions with the InnWater project partners, this PB aims at highlighting the changing conditions for local and regional water governance actors emanating from a changing water context due to pressing global challenges. To achieve its aim, the paper has built on the activities and deliverables of the InnWater Project. It has also benefited from activities associated with the WaterGovernance2027 synergy group, which gathers three Horizon Europe projects (GOVAQUA, RETOUCH NEXUS & InnWater; HORIZON-CL6-2022-GOVERNANCE-01-06 - Water governance, economic and financial sustainability of water systems).

The PB incorporates the knowledge exchanged during first stage stakeholder engagement workshops and meetings with the consortium partners in relation to participative governance. These face-to-face insights are complemented with a review of citizen engagement practices and challenges compiled under Deliverable 3.1 Citizen Engagement in the 21st Century; and with Deliverable 5.1 Preliminary Pilot Site Implementation Guide.

Given the early stages of the InnWater project, a literature review on water challenges in Europe was undertaken to complement deliverables.

[4] www.innwater.eu

3. EUROPE AT A FORK IN THE RIVER – A CHANGING WATER CONTEXT

3.1 Water challenges in Europe

In an increasingly interconnected world, wherein global meets local, water remains the lifeblood of our socio-ecological systems, the vital resource supporting agriculture, energy, and other crucial sectors, meanwhile transcending national and regional boundaries.

Yet, **global and European water systems are under unparalleled pressure from human activity,** with the quantity and timing of atmospheric and terrestrial freshwater flows altered through and due to water extraction and infrastructure, land use and land cover change, and climate change. The momentous impact of human actions threatens Earth´s climate and ecosystems and has caused a transgression of the planetary boundary on freshwater, which defines the "safe operating space for humanity"[5][6]. In Europe alone, 20% of the territory faces water stress and 30% of the population is affected on average every year[7], whereas groundwater aquifers in Europe are set to lose 84 billion tonnes of water per year– or roughly equal to the annual flow of the Rhine River[8].

There are signals that the pressure on water systems is causing water cycle changes, including severe river flow regime alterations and increases in the severity, frequency, and duration of floods and drought conditions [9]. The resilience of aquatic ecosystems is already lowered from significant losses in environments and biodiversity – globally, freshwater systems have already lost 84% of their population since the 1970s [10]. In terms of water quality, only 40% of European surface waters are considered to be of good ecological status or potential and 38% achieved good chemical status [11]. 2023 was the hottest observed year on record, with drought warning conditions experienced in 45% of the EU during the month of June and close to 1.5 ° C warmer than pre-industrial levels. Climate impacts increase the uncertainty and vulnerability for extreme weather events, for example through flash floods or droughts, but likewise, the long-term supply of water and groundwater abstraction may further challenge the supply of public water, agricultural and energy sectors [12] (Elsner, 2023; Copernicus, 2024). This altered and lower resilience of European water systems may cause sudden and irreversible changes in

[5] Porkka, M. et al. (2023). Global water cycle shifts far beyond pre-industrial conditions–planetary boundary for freshwater change transgressed. EarthArXiv eprints, X5BP8F.
[6] Richardson, K. et al. (2023). Earth beyond six of nine planetary boundaries. Science Advances, 9(37), eadh2458.
[7] European Environment Agency. (2021). Water resources across Europe — confronting water stress: an updated assessment (ISBN 978-92-9480-391-7). ISSN 1977-8449. doi:10.2800/320975
[8] Barnett, C. (2022, December 7). Europe's water crisis is much worse than we thought. National Geographic. Retrieved from https://www.nationalgeographic.co.uk/environment-and-conservation/2022/12/europes-water-crisis-is-much-worse-than-we-thought
[9] Porkka, M. et al. (2023).
[10] WWF. (2020). Living Planet Report 2020 - Bending the curve of biodiversity loss (R.E.A. Almond, M. Grooten, & T. Petersen, Eds.). WWF, Gland, Switzerland.
[11] European Environment Agency. (2018). European waters assessment of status and pressures 2018 (EEA Report No. 7/2018). ISBN 978-92-9213-947-6. ISSN 1977-8449. https://doi.org/10.2800/303664
[12] Elsner, G. (2023). Will Europe's next crisis be a water crisis?. European View, 22(2), 255-262.

environmental quality and the supply of natural resources from relatively small changes in external conditions [13]. **Considering the deeply embedded role water plays in socio-ecological systems, this gives rise to complex feedback effects impacting societies, economies, and the environment.** While some impacts on human wellbeing, cultural and natural values are immeasurable, it is estimated that droughts in Europe will give rise to economic damage of up to 9 billion EURO[14].

Responses to address sustainability problems exist from global, to EU, national and local level. Yet, at the midway point of Agenda 2030, it is clear that the Sustainable Development Goals (SDGs) are facing implementation issues**. Action on SDG 6 on Clean Water and Sanitation has been identified as a multiplier for positive change** across many SDGs, in areas such as health, nutrition, education and gender equality, beyond unstated beneficial connections to ecosystems and biodiversity. For a number of SDG targets, the local level provides better scope for identifying and solving problems, as it can be more resilient and politically sustainable with stakeholders recognizing a shared problem, seeing the mutual interdependence and appreciating the value of shared problem-solving [15][16].

Water-related challenges are specific to their local context and characteristics. They are driven, manifest and impact differently in different socio-economies, environments, hydrological conditions and geographies. They occur over different periods, seasons or stretches of time, and are affected by various scales or sectors. This means the costs and benefits are unevenly distributed across territories, boundaries and actors. This is also true for Europe, where water challenges are experienced unevenly, yet still experienced everywhere, somehow by all of us in different ways, and increasingly so.

The **five Pilot sites of the InnWater Project exemplify how these challenges manifest, impact the water systems and create second-order effects**. They are spread across Europe and its overseas territories, displaying a range of spatial areas and topography, contrasting areas and scales from large coastal regions to small islands and from river basins to landlocked lowland areas.

For example, the Pilot Site in Figueres in North-eastern Spain is under immense water stress, as climate impacts are exacerbated by increased seasonal water demand through activities in sectors such as tourism and agriculture. Overall, the southern regions of Europe are experiencing water stress to a higher extent than other parts of the continent[17], but also in Central Europe, recent water shortages and prolonged droughts have caused groundwater levels to remain at constant and perilously low levels since 2018 [18]. Water stress trends are likely to continue with

[13] European Environment Agency (2021), Water resources across Europe.
[14] Ibid.
[15] Bennich, T., et al. (2023). Recurring patterns of SDG interlinkages and how they can advance the 2030 Agenda. One Earth.
[16] Independent Group of Scientists appointed by the Secretary-General. (2023). Global Sustainable Development Report 2023: Times of crisis, times of change: Science for accelerating transformations to sustainable development. United Nations, New York.
[17] European Environment Agency (2021), Water resources across Europe.
[18] Graz University of Technology. (2023, January 25). Satellite data shows sustained severe drought in Europe. ScienceDaily. Retrieved from www.sciencedaily.com/releases/2023/01/230125104007.htm.

the increasing impacts of climate change. In the low-lying and flat Middle Tisza Pilot site, the water flow in the river is seeing substantial seasonal and yearly variation and significant water extremes – both experiencing increased floods as well as intensifying and recurring droughts.

The layers of complexity, uncertainty, system connectivity and context sensitivity are crucial to consider but difficult to abridge for concerted operative efforts to address water challenges, from global to local levels. Novel governance approaches to address water challenges have so far failed to buck the trends, yet as the characteristics of local water challenges are specific to the area, so are the solutions. **Local water governance, that is innovative and well-aligned to its own context, thereby plays a key role in addressing not only local but also global water challenges.**

3.2 Diversity of Governance challenges associated to water

Box 1: Water Governance

Water governance, defined as "the range of political, institutional and administrative rules, practices and processes (formal and informal) through which decisions are taken and implemented, stakeholders can articulate their interests and have their concerns considered, and decision makers are held accountable for water management", is ultimately a means to an end [19].

Good governance is often posited as crucial to tackling water challenges. Yet, for local European governance actors the reverse is also true, that "water crises are often primarily governance crises"[20]. This argument can also be extended to climate change, biodiversity loss, pollution and extreme weather, which exacerbate water challenges, but where the human pressures that drive sustainability challenges often stem from inadequate or siloed governance approaches. In water governance, this is commonly manifested by fragmented institutional arrangements, overlapping roles and responsibilities, poor regulations, weak accountability mechanisms, and low capacity, among others[21]. Increasingly, a recognition has emerged that governance outcomes in one area are externally influenced and affected by the drivers, institutions, decisions and actors in other areas[22]. Thus, **tackling water challenges requires going beyond isolated responses that neglect the interplay between policy issues such as climate, agriculture and biodiversity and instead move towards resilience and sustainability.**

For achieving such outcomes, it is not enough to understand water characteristics through diagnostic approaches that stop at understanding hydrology or geography, as local governance

[19] Organisation for Economic Co-operation and Development (OECD). (2015). OECD Principles on Water Governance. OECD Publishing: Paris, France.
[20] Ibid
[21] Ménard, C., Jimenez, A., & Tropp, H. (2018). Addressing the policy-implementation gaps in water services: The key role of meso-institutions. Water International, 43(1), 13–33.
[22] de Loë, R. C., & Patterson, J. J. (2017). Rethinking water governance: Moving beyond water-centric perspectives in a connected and changing world. Natural Resources Journal, 57(1), 75-100.

actors also need to coordinate those efforts beyond their administrative and sectoral boundaries, as well as with actors inside and outside water services and management. Yet, working in such ways are inherently complex, particularly at local and basin scale with multi-scalar, multi-sectoral and boundary-spanning features of water resources. Added to this is a proliferation of actors influencing and partaking in water governance processes, such as civil society, the private sector and citizens themselves.

In the EU, local water governance actors need to consider a patchwork architecture of regulation and policy goals from multiple vertical levels that address cross-cutting issue domains in support of the twin digital and green transition. This entails global multilateral agreements, EU regulation and strategies, national environmental laws and policies, river basin management plans, and lastly, regional and local management. At the global level, Agenda 2030 and the indivisible SDGs are the primary governance mechanisms to address interlinked sustainability challenges, including water under SDG6. At the EU level, the Water Framework Directive (WFD), the Drinking Water Directive and the Urban Wastewater Treatment Directive are some of the legislative acts that govern the environmental and health water standards and are subsequently implemented in national legislation. For other sustainability concerns, the 2020 EU Green Deal calls for climate neutrality and a green transition that preserves biodiversity, while monitoring and preventing floods and other natural disasters, whereas the 2030 Biodiversity Strategy pays special attention to restoring freshwater ecosystems.

The wide range of strategic supranational goals and policy targets require coherent and coordination for action to occur on the ground. Yet, given the historic differences between European countries and that the organisation of water services management is subject to EU subsidiarity and a member state competence, **water governance has been implemented differently across the continent and with varied measures of efficiency and effectiveness.**

The EU provides a framework of common principles and requirements for member states to implement, such as universal access and polluter pays, but it does not go further. In simplified terms, this has given rise to either public, private or mixed management of water services and infrastructure, characterized by fragmentation both vertically and horizontally. Vertically, competencies span from supra-national to sub-national levels, with provisions set and applied across EU, national, regional, and municipal levels. Horizontally, multiple authorities are involved, including ministries and governmental bodies overseeing different aspects such as pollution, quality standards, and investments. For instance, the delivery of good quality water at fair prices and their correct monitoring, in the interest of all citizens, is not contemplated by the WFD, although it is a key target of any governance model.

The InnWater Project Pilot Sites display the interplay tension between levels, sectors and the need for coordinated efforts toward water sustainability. In Figueres and the Middle Brenta, tourism plays an important part of the local economy, but also increases demand for how much water is consumed, particularly during the dry season. The agricultural sector on the other hand is the largest consumer of freshwater across Europe [23], which is true also in most pilot sites. In Westcountry, the largest pilot site, livestock agriculture underpins the economic activity of the

[23] European Environment Agency (2021), Water resources across Europe.

region, yet the industry negatively affects the water quality and biodiversity. In the Middle Brenta pilot site, high abstraction rates are causing issues with biodiversity, water conservation and water quality.

3.3 Changing landscape, changing solutions

Box 2. Social Innovation

Social innovation refers to the design and implementation of innovative solutions which ultimately aim to improve the welfare and wellbeing of individuals and communities. Social innovation means tackling societal, water-related challenges by combining the technological and non-technological dimensions (governance, capacity building and economic) of innovation. It consists of new combinations (or hybrids of existing and new) of products, processes and services.

Water challenges both drive and are exacerbated by sustainability challenges, posing uncertain and complex questions to decision-makers. Governance is diverse, boundary-spanning and suffers from piecemeal approaches. Novel approaches, based on good governance qualities and involving a multitude of actors are necessary to achieve coordinated and coherent responses.

The InnWater Project aims to tackle multi-dimensional societal challenges while ensuring water sustainability. It does so through interdisciplinary social innovation to renew multi-level and cross-sector water governance associated with economic and financial mechanisms to support the EU Green Deal transition. It seeks to provide a local diagnostic and evidence-based assessment platform at the scale of 5 pilot sites, with an approach embedded in social innovation involving four technological and non-technological dimensions that imply new patterns of stakeholders' involvement and participation.

❖ A water governance assessment tool

The UN "good" governance principles identify key governance qualities to improve water services and water resources management: promoting legitimacy and voice through participation, consensus, and informed decisions; effectiveness, and efficiency; promoting accountability and transparency; ensuring fairness by implementing equity, rule of law, and conflict management [24] . **To achieve intended outcomes of socio-ecological resilience and sustainability, integrating good governance qualities in governance processes is critical**, i.e., in designing and implementing policies, plans, coordination, capacity development, financial and monitoring mechanisms, and regulation [25] . The InnWater Project sets out to provide an enhanced methodology for a contextual water governance assessment, based on the OECD Principles on

[24] United Nations Economic and Social Commission for Asia and The Pacific (UNESCAP). (2009). What Is Good Governance? Bangkok, Thailand.
[25] Jiménez, A. et al. (2020). Unpacking water governance: A framework for practitioners. Water, 12(3), 827.

Water Governance[26], which focus on mega Trends & Resilience; policy, Institutions & Regulation; Financing; Data, Monitoring & Evaluation; Stakeholder Engagement.

❖ A framework for citizen engagement

Contemporary views on governance emphasise the importance of engaging multiple actors and organisations in this problem-solution formulation and participatory process, helping to characterise and solve complex and wicked problems. Through Agenda 21, the Covenant of Mayors and later the SDGs, a move toward open government and participatory approaches has become part of supranational and EU strategies, for example, through the WFD. Yet, simultaneously, an increased disgruntlement and distrust towards the established forms of representative government prevail in the EU member states [27]. **Involvement and engagement of citizens is paramount, as it can increase fairness, relevance, acceptance, and sustainability of strategic policy goals.**

Voices and views from citizens raised through participatory processes such as public hearings, multi-stakeholder forums, or public audits, have the potential to influence and inform democratic processes. Effective social engagement acts as a guarantee of democratic decision-making which can only be achieved when all the interests at stake have a voice, the opportunity to be heard, a forum for deliberation, and the legitimate power to influence policies and their implementation, monitoring, and assessment.

InnWater uses the socio-political consensus helix to define its stakeholder and citizen engagement building on collaboration among research, innovation, and development between major sectors of society that include science, industry, government, citizens, and the environment[28].

The InnWater Socio-Political Consensus approach starts at the local community, but pre-existing institutional structures determine how stakeholders' interests or goals are brought into the stakeholder engagement process[29]. The preliminary meetings and findings of InnWater indicate that some of the Pilot Sites struggle with actively involving a wide number of stakeholders, and especially those from civil society. It is important to also consider how social engagement should contribute to building and strengthening institutional structure. Consolidating institutional structure entails not only stakeholders' engagement, but also different procedures to identify and involve citizens by working systematically with large and small civil society groups, prioritising the contribution of residents and communities, ensuring funding and resources to sustain structures, as well as monitoring and assessing.

---

[26] OECD, 2015. OECD Principles on Water Governance. OECD

[27] Elelman, R, (2023): Citizen Engagement in the 21st Century, Deliverable D3.1, Public, EU Horizon InnWater Project, Grant agreement No. 101086512

[28] Carayannis, E. G., & Rakhmatullin, R. (2014). The quadruple/quintuple innovation helixes and smart specialisation strategies for sustainable and inclusive growth in Europe and beyond. Journal of the Knowledge Economy, 5, 212-239.

[29] Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross‐sector collaborations: Needed and challenging. Public administration review, 75(5), 647-663.

❖ Economic modelling tools

Drinking water and wastewater services within the EU are complex due to various aspects influencing their costs and governance. Citizens typically only recognize the value of aqueduct services directly impacting water quality in the tap, whereas the crucial roles of sewage and wastewater treatment in environmental preservation often go unnoticed yet carry equally high costs.

The governance frameworks outlined by national legislations contribute to the complexity of water services regulation and pricing. EU legislation provides general principles on water pricing but does not introduce a legal basis for measuring service providers' performance and standardized performance indicators. This leaves member states to determine oversight responsibilities with pricing oversight occurring at national, regional, or local levels, districts or agglomerations.

The characteristics of a region, such as water availability and pollution levels, directly affect service costs and subsequently, citizens' bills. Areas with scarce or polluted freshwater resources necessitate higher investments in distribution and treatment infrastructure, leading to disparities in water service prices within the same country and highlighting local vulnerabilities to climate change and biodiversity loss. Water is also used by different sectors, for a range of economic and social uses, highlighting the importance of its integrated management.

Through economic information and modelling tools, InnWater will support a better understanding of the interactions between water management and economic and social activities (uses). This will produce relevant information for both decision makers and citizens, especially regarding water resources and energy production.

Box 3. Water System Services Prices in La Réunion

For the French InnWater Pilot Site of Reunion Island, the consumer bill for water is already higher than the national average in a socio-economic setting poorer than most other regions of the country. Already experiencing difficulties with water pricing, due to insufficient infrastructure and regulatory shifts, climate change impact may increase prices substantially. The populous south-western part of the island is estimated to experience up to 50% reduced water resources during the drought season but will also need to adapt to changing precipitation patterns from shifting cyclone tracks, which may cause coastal aquifer depletion with current high consumption rates and groundwater salinization as a flow-on effect. The InnWater social innovation approach, including its governance assessment and pricing platform tools, will support the assessment of these complex situations, engaging stakeholders and citizens to play a key role in finding equitable and effective solutions.

CONCLUSION

Europe stands at a fork in the river. The challenges facing water systems in Europe are multifaceted, complex and urgent, driven by human activities and exacerbated by climate change and biodiversity loss. The challenges vary across regions, from water stress, groundwater loss, flash floods to prolonged droughts, but with severe consequences to European societies, economies, and the environment. Fragmented governance approaches have hindered effective management, emphasizing the need for good governance principles such as accountability and transparency.

The importance of local governance in understanding and addressing water challenges cannot be overstated, as solutions must be context-specific to citizens, hydrology, geography and other socio-economic conditions, meanwhile involve coordination across administrative and sectoral boundaries. Addressing these challenges requires social innovation and multi-stakeholder engagement to develop enduring and sustainable solutions.

Moving forward, there is a critical need for coordinated action at all levels, from local to global, to ensure the sustainability of Europe's water systems. By prioritizing good governance principles, embracing social innovation, and fostering multi-stakeholder engagement, Europe can navigate its water challenges and work towards a more resilient and sustainable future.

InnWater seeks to be part of ensuring water systems sustainability, aiming to promote social innovation to renew multi-level and cross-sector water governance associated with economic and financial mechanisms that support the EU Green Deal transition.

ANNEX

1. TABLE OF WATER SYSTEM CHALLENGES AND CONTEXT FOR PILOT SITES

Pilot Site	Water System context	Water System Challenges	Governance Context	Water Governance challenges	Systemic Impact
Reunion Island	Volcanic island; Large topographical differences; extreme weather events - cyclones	Significant bt uneven precipitation; Dry Season with larger surface catchment to inflow; Uneven geographical distribution of rainfall; Ecological Risk from anthropogenic risks; Saline intrusion in coastal aquifers; pollution – ~40 % surface water stations in poor chemical health and ~30 groundwater pollution; climate change leads to more severe droughts – up to 50%;	High population density; socio-economic challenges; population concentration on south-western coast with high local water footprint; High domestic water consumption; low willingness to pay for water and sanitation	Consumer price – annual bill for water weighted higher than national average for half population; Water pricing due to a) stakeholders not knowledgeable b) infrastructure insufficient for efficiency improvements and mitigating climate risks, c) Problematic water tariff equalization due to shifting WASH responsibilities to inter-municipalities	Climate change contributing to more severe droughts; Climate change bringing about shifting cyclone tracks and thereby changing precipitation patterns;
Middle Brenta	Natura 2000 area, Brenta River play key role in drinking water supply	Water quality and conservation as well as biodiversity at risk from: high aquifer abstraction rates, Climate change causing severe droughts; anthropisation, pollution.	High abstraction rates; Lack of governance; High use of Natura 2000; Active local partnership aimed at establishing payment for ecosystem services; High population density	Need for strengthened Internalization of Environmental and Resource Costs of drinking water consumption tariffs; Traditional norms and views on management practices among key actors;	Climate change scenarios forecast reduction in water contributions by 13% to 2039 (?) horizon, albeit may rise to 20%.
Figueres	Topographical differences; coastal area with wetlands; Muga river basin and connected reservoir; several	Water scarcity; Seasonal abstraction rates; Water contributions extremely irregular due to dependence on precipitation; Reservoir plays key	Low population; Large agricultural share of water consumption concentrated to summer; tourist related water	Water Scarcity and Water demand; If demand increases climate change impacts will increase deficit; ecological flows of river	If water demand increases climate change impacts will increase deficit; increased risk

	protected natural areas; two groundwater aquifers	role for water supply; Swamp dries up during drought threatening biodiversity; historic marine intrusion, pollution and overexploitation of groundwater; area increasingly prone for flooding	consumption seasonal;	courses must be guaranteed	of flooding in last 20 years
Westcountry		Predictions for Water deficit by 2050; Water quality	Largest and most populous pilot site; agriculture and livestock important for local economy; water quantity handled at regional scale whereas quality, flooding and biodiversity handled on smaller scales	Treatments costs from poor water quality; scale of pilot site and volume of activity poses challenges for local engagement; catchment groups exist but siloed across government so challenge for integration	
Middle Tisza	Flat region, comprised of mainly agricultural land, just 5% natural forest and vegetation; Lake Tizsa (artificial) and River Tisza, Lake Tisza operates as reservoir;	Substantial variations in water flow in River Tisza seasonally and across different years; region characterized by water extremities – increased floods and intensifying and recurring droughts;	Lake Tisza for hydropower but now tourist spot; Lake Tisza has different seasonal management strategies; flood adaptation measures in place;	Water allocation must balance competing demands is a growing concern; Short history of stakeholder consultation means it is still evolving and comparatively low civil participation; complexity in drought related governance is a challenge and opportunity; lack of economic data/information on costs of conflicting activities and implications of policy instruments; Water pricing is low due to conflict avoidance, but water scarcity requires shift;	Water scarcity; Recurring and intensifying droughts; increased floods; scarcity leading to potential conflicts between water users

Table 1: Table analysing the context and challenges for water systems and governance, as well as their systemic interaction, for the 5 InnWater Pilot Sites, based on the 5.1 Pilot Site Assessment.

REFERENCES

Barnett, C. (2022, December 7). Europe's water crisis is much worse than we thought. National Geographic. Retrieved from https://www.nationalgeographic.co.uk/environment-and-conservation/2022/12/europes-water-crisis-is-much-worse-than-we-thought

Bennich, T., et al. (2023). Recurring patterns of SDG interlinkages and how they can advance the 2030 Agenda. One Earth.

Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross-sector collaborations: Needed and challenging. Public administration review, 75(5), 647-663.

Carayannis, E. G., & Rakhmatullin, R. (2014). The quadruple/quintuple innovation helixes and smart specialisation strategies for sustainable and inclusive growth in Europe and beyond. Journal of the Knowledge Economy, 5, 212-239.

Couldrick, L, (2023): Preliminary Pilot Site Implementation Guide, Deliverable D5.1, Sensitive, EU Horizon InnWater Project, Grant agreement No. 101086512

Elelman, R, (2023): Citizen Engagement in the 21st Century, Deliverable D3.1, Public, EU Horizon InnWater Project, Grant agreement No. 101086512

Elsner, G. (2023). Will Europe's next crisis be a water crisis?. European View, 22(2), 255-262.

European Environment Agency. (2021). Water resources across Europe — confronting water stress: an updated assessment (ISBN 978-92-9480-391-7). ISSN 1977-8449. doi:10.2800/320975

European Environment Agency. (2018). European waters assessment of status and pressures 2018 (EEA Report No. 7/2018). ISBN 978-92-9213-947-6. ISSN 1977-8449. https://doi.org/10.2800/303664

Graz University of Technology. (2023, January 25). Satellite data shows sustained severe drought in Europe. ScienceDaily. Retrieved from www.sciencedaily.com/releases/2023/01/230125104007.htm.

Independent Group of Scientists appointed by the Secretary-General. (2023). Global Sustainable Development Report 2023: Times of crisis, times of change: Science for accelerating transformations to sustainable development. United Nations, New York.
Jiménez, A. et al. (2020). Unpacking water governance: A framework for practitioners. Water, 12(3), 827.

de Loë, R. C., & Patterson, J. J. (2017). Rethinking water governance: Moving beyond water-centric perspectives in a connected and changing world. Natural Resources Journal, 57(1), 75-100.

Ménard, C., Jimenez, A., & Tropp, H. (2018). Addressing the policy-implementation gaps in water services: The key role of meso-institutions. Water International, 43(1), 13–33.

Organisation for Economic Co-operation and Development (OECD). (2015). OECD Principles on Water Governance. OECD Publishing: Paris, France.

Porkka, M. et al. (2023). Global water cycle shifts far beyond pre-industrial conditions–planetary boundary for freshwater change transgressed. EarthArXiv eprints, X5BP8F.

Richardson, K. et al. (2023). Earth beyond six of nine planetary boundaries. Science Advances, 9(37), eadh2458.

United Nations Economic and Social Commission for Asia and The Pacific (UNESCAP). (2009). What Is Good Governance? Bangkok, Thailand.

WWF. (2020). Living Planet Report 2020 - Bending the curve of biodiversity loss (R.E.A. Almond, M. Grooten, & T. Petersen, Eds.). WWF, Gland, Switzerland.

INN WATER

Promoting social innovation to renew
multi-level and cross sector water governance

@InnWater

@ InnWater_EU

https:/www.innwater.eu/

contact.innwater@oieau.fr