



Final Clustering Activity Report

Deliverable 8.17

WP8

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TABLE OF ACRONYMS

CIW	Climate Innovation Window
COP	Conference of the Parties
CSA	Coordination and Support Action
ECAP	European Climate Adaptation Plan
ECCA	European Climate Change Adaptation Conference
ENoLL	European Network of Living Labs
EURESFO	European Urban Resilience Forum
ICT4Water	Information and Communication Technologies for Water Management
IWA	International Water Association
KPI	Key Performance Indicators
MFF	Multiannual Financial Framework
MIP4Adapt	Mission Implementation Platform
MoU	Memorandum of Understanding
NCP	National Contact Points
OLLD	Open Living Lab Days
OTS	Open Training Sessions
SDG	Sustainable Development Goal
SRL	Social Readiness Level
TRL	Technology Readiness Level
TWG	Mission Adaptation Thematic Working Group
UNSDSN	Sustainable Development Solutions Network
UN	United Nations
UWWTD	Urban Waste Water Treatment Directive
VLT	Vision Leadership Team
WEFE	Water-Energy-Food-Ecosystem
WEFE+H	Water-Energy-Food-Ecosystem-Health
WG	Working Group
WIE	Water Innovation Europe
WKE	Water Knowledge Europe
WFD	Water Framework Directive
WME	Water Market Europe
WOLL	Water-Oriented Living Lab
WPE	Water Projects Europe

EXECUTIVE SUMMARY

This deliverable reports on the clustering and stakeholder engagement activities conducted under Task T8.5 of the ARSINOE project over its four-year duration. Clustering was implemented as a strategic component of the project's impact pathway, with the aim of facilitating cooperation, co-development of outputs, and policy alignment. ARSINOE engaged in structured collaboration with sister projects funded under the Green Deal call and actively participated in broader EU-level platforms.

Clustering served as a mechanism to strengthen synergies, foster cross-project learning, and enhance the transferability and visibility of project results. The report outlines the main clustering results, including the delivery of 2 joint policy briefs, 11 joint newsletters, a shared case study map, 15+ joint events, 7 thematic webinars, and 2 Water Projects Europe sessions. These activities are further supported by performance data and outreach indicators. The deliverable also reflects on the contribution of clustering to wider stakeholder engagement and offers insights for future EU-funded projects.

1.0 INTRODUCTION

Adapting to climate change requires a wide range of strategies that help societies respond to, prepare for, and cope with evolving environmental conditions. Climate change is a deeply interconnected challenge, closely linked to **food security, water scarcity, biodiversity loss, and environmental degradation**. In this complex context, traditional or siloed approaches are no longer sufficient. ARSINOE's approach remains highly relevant in today's policy landscape, particularly as European efforts increasingly promote integrated, inclusive, and adaptive strategies for climate resilience. Clustering with other EU-funded projects has emerged as a key mechanism to support this shift—enabling the alignment of methodologies, the amplification of impacts, and the co-creation of innovative solutions. These priorities are reflected in recent EU policy developments such as the **Water Resilience Strategy**¹, which calls for systemic innovation and cross-sector collaboration to secure sustainable water systems under increasing climate stress. The project's emphasis on systemic approaches aligns with broader visions of a **Water-Smart Society**, which advocate for holistic integration across technological, societal, and governance domains.

Work Package 8 (Impact Maximization, Exploitation, Communication, Dissemination, Outreach, Replication) plays a central role in ARSINOE's overall strategy. As a cross-cutting work package, WP8 supports collaboration across scientific, policy, and communication domains—ensuring that project results are not only generated, but also translated, shared, and embedded in broader European and international contexts. A key component of WP8 has been the design and implementation of clustering activities aimed at fostering synergies with other EU-funded initiatives. These efforts have facilitated collaboration, stakeholder engagement, and knowledge exchange, creating channels for shared learning and increasing the potential for replication and impact across the research and innovation landscape.

Task 8.5 (Clustering Activities) focused on strengthening cooperation between ARSINOE and other relevant projects and initiatives, with the aim of promoting shared learning, fostering synergies, and increasing the visibility and impact of climate adaptation efforts at the European level. While particular emphasis was placed on collaboration with the sister projects— **REGILIENCE**², **IMPETUS**³, and **TransformAr**⁴, funded under the H2020-LC-GD-2020 call (Topic: LC-GD-1-3-2020)—the task also extended its outreach to a wider network of European and international initiatives.

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52025DC0280>

² **REGILIENCE** is the Coordination and Support Action (CSA) of the cluster, established to connect and support the sister Innovation Actions. The project aimed to foster the adoption of climate resilience pathways across European regions by identifying and scaling promising cross-sectoral solutions. It sought to support regional stakeholders in co-developing adaptation strategies, promote knowledge sharing through diverse engagement formats, and accelerate the uptake of innovative practices. REGILIENCE also worked to inspire policymakers, organisations, and citizens to participate in the transition toward a climate-resilient Europe. <https://regilience.eu/>

³ **IMPETUS** is one of the Innovation Actions within the cluster, contributing to the collective effort to advance regional climate resilience across Europe. The project aimed to support the EU's climate adaptation strategy and the broader goal of achieving climate neutrality by 2050. Its core objective was to transform climate commitments into concrete, urgent actions that protect both people and the environment. To do so, IMPETUS developed and tested a multi-scale, multi-level, and cross-sectoral adaptation framework designed to accelerate the transition to a climate-neutral and sustainable economy. The project also deployed "Resilience Knowledge Boosters" to engage diverse quintuple helix stakeholders, validating this approach across Europe's seven biogeographical regions. <https://impetus4cs.eu/>

⁴ **TransformAr** focused on enabling transformational adaptation to reduce the long-term impacts of climate change on people, ecosystems, and local economies. The project aimed to introduce disruptive and scalable adaptation

These targeted collaborations were designed to maximise knowledge sharing, enhance collective visibility, and reinforce the strategic coherence of climate adaptation actions across the EU and beyond. As part of this effort, Water Europe led the design and delivery of a series of **quarterly thematic seminars**, which addressed common challenges and explored synergies across participating projects. In parallel, ARSINOE engaged with platforms such as Water Projects Europe (WPE) and took part in high-level international events including among others the United Nations (UN) Water Conference and the Conference of the Parties (COP), the International Water Association (IWA) World Water Congress, contributing to policy dialogue and joint dissemination efforts.

1.1 About this report

Deliverable D8.17 (Final Clustering Activity Report) presents a comprehensive overview of the clustering activities carried out under Task 8.5. These activities were designed to create strategic synergies, align project efforts with other EU-funded initiatives, and contribute to a more coherent and impactful European framework for climate resilience.

- **Section 2** outlines the clustering activities carried out through dedicated **clustering formats**, showing how ARSINOE took part in structured exchanges with other initiatives to foster cross-project collaboration, showcase innovative solutions, and contribute to EU-level policy dialogue on water and climate resilience.
- **Section 3** focuses on the collaboration with the sister projects implemented through a dedicated **webinar series** and targeted outreach events. These initiatives provided structured opportunities for mutual learning and visibility within the climate adaptation cluster.
- **Section 4** outlines ARSINOE's collaboration with its sister projects within the broader **climate adaptation cluster**. These synergies took shape through jointly organised events, coordinated communication campaigns, shared training activities, and the development of common outputs
- **Section 5** compiles ARSINOE's participation in **clustering activities and exchanges with other EU-funded projects and international initiatives**. These include co-organised sessions, shared contributions, and collaborative involvement in various events.

solutions in vulnerable regions across Europe. By building on existing successful initiatives, TransformAr addressed water-related risks through six lighthouse demonstrator regions, where integrated approaches and cross-sectoral strategies were tested and refined to support systemic change. <https://transformar.eu/>

2.0 CLUSTERING ACTIONS

Clustering has played a central role in ARSINOE’s strategy to enhance collaboration, amplify visibility, and ensure greater uptake of project results. By fostering synergies with other Horizon 2020 initiatives, ARSINOE has expanded its outreach and strengthened connections across the water and climate innovation landscape. These activities have supported more effective dissemination, facilitated policy engagement, and opened opportunities to reach new audiences and build strategic partnerships.

To advance its clustering efforts, ARSINOE engaged with well-established formats developed by Water Europe, including Water Innovation Europe (WIE), Water Market Europe (WME), and Water Knowledge Europe (WKE). These flagship events provided structured settings for interaction with other projects and stakeholders. ARSINOE’s participation in the main sessions of each event highlighted its relevance and alignment with broader European water-related priorities. However, it was through WPE—the clustering format specifically designed to connect EU-funded projects—that ARSINOE maximised its collaborative potential. WPE events are tailored to support thematic clustering, foster structured dialogue, and promote knowledge exchange among projects addressing shared water challenges. Table 1 summarises the events in which ARSINOE participated. The next sections explore the specific content and outcomes of ARSINOE’s involvement in these events.

Table 1 Clustering events calendar and achievements

Date	Title	Format	Attendees
21 June, 2023	Water Policy: What’s Next?	WIE In-person	+180 participants
13 September, 2023	Water Knowledge Europe 2023 pre-event	Online event Livestreamed	150 participants +1060 online viewers
14 March, 2025	Adapting to Climate Change: Systemic Water Solutions for Resilience	WPE Online event Livestreamed	62 participants +290 online viewers
15 May, 2025	Sistemic Solutions and innovation for climate resilience	WPE In-person During KWE Warsaw	+100 participants

2.1 WIE 2023 – What’s Next?

The 2023 edition of Water Innovation Europe was a great success, attracting more than 180 participants from all aspects of the water sector to discuss the need for a Water-Smart Strategy. It was the right time to ask the question: “*EU Water Policy: What’s Next?*”.

As part of the event, WIE hosted the **ICT4Water Cluster**⁵ meeting, providing a strategic opportunity to cluster EU-funded projects tackling digital water and policy challenges. A key moment of the session was the intervention of ARSINOE project coordinator, Chrysi Laspidou⁶, who presented the project from a policy perspective. She described ARSINOE as a particularly complex and “challengeable” initiative within the policy dossier, given its broad scope that links directly to both the European Green Deal and the digital transition. The project’s execution across two European Commission mandates was also noted as a factor likely to influence evolving EC priorities. Figure 1 shows a slide from ARSINOE’s presentation, summarising the policy dimensions covered by ARSINOE.

The presentation highlighted ARSINOE’s relevance to several ongoing EU strategies in 2023 from the healthy soils initiative and zero pollution agenda, to the evolving legal framework on the Urban Waste Water Treatment Directive (UWWTD), the Water Framework Directive (WFD) with a source-to-sea approach. By engaging alongside other Horizon 2020 projects such as **Waterverse**⁷, **IMPETUS**, **ULTIMATE**⁸, **Waterline**⁹, **Water-Futures**¹⁰, **ToDrinQ**¹¹, and **PathoCERT**¹², ARSINOE actively contributed to the clustering dynamic of the ICT4Water community — reinforcing policy synergies, building bridges between technical and political dimensions, and shaping the digital and green transition for water governance

Figure 1 Policy development slide presented by ARSINOE



2.2 WKE 2023 pre-event

During the *Water Knowledge Europe pre-event*, held in September 2023 as the lead-up to the main WKE 2023 conference, ARSINOE was highlighted in a testimonial speech by Chrysi Laspidou, ARSINOE coordinator and Vice President for Collaboration at Water Europe. Her intervention addressed the role of EU-funded projects in accelerating climate adaptation and resilience through collaboration, referring to ARSINOE as a successful example of a consortium born out of WKE networking dynamics. The intervention emphasised ARSINOE’s systemic approach to regional transformation, which relies on stakeholder engagement and innovation clustering to co-design and implement resilience pathways.

⁵ See Section 5.7

⁶ <https://www.linkedin.com/in/chrysi-laspidou-3055b491/>

⁷ <https://waterverse.eu/>

⁸ <https://ultimate-project.eu/>

⁹ <https://www.waterline-project.eu/>

¹⁰ <https://waterfutures.eu/#>

¹¹ <https://todrinq.eu/>

¹² <https://pathocert.eu/>

The event attracted significant attention, reaching 150 participants and over 1,060 online viewers from across research, policy, and industry communities. The event served as a valuable platform to raise awareness of ARSINOE's objectives and highlight its alignment with European climate and water strategies. The registration is available at <https://www.youtube.com/watch?v=5CSkvRaZZ6c> link. Figure 2 nicely illustrates the collective view of the projects mentioned in the event.

Figure 2 Collective view of the projects mentioned in the event



2.3 WPE 2025 on Climate Adaptation Systemic Solutions

Figure 3 Banner of the WPE event on Water Solutions for Resilience



Climate adaptation is one of the most urgent and complex challenges for water management in Europe, demanding integrated, cross-sectoral responses that go beyond traditional approaches. The WPE event held in March 2025, titled *“Adapting to Climate Change: Systemic Water Solutions for Resilience”*, with the event banner illustrated in Figure 3, provided a dedicated clustering moment by bringing together the four sister projects. The session showcased how EU-funded projects are jointly developing and applying systemic water solutions to support long-term climate resilience. The event was actively supported by the **Water Europe Working Group on Water and Climate**, whose

involvement helped reinforce the clustering dimension. In addition to presenting final outcomes as ARSINOE neared completion, the event reaffirmed the importance of research-driven, actionable strategies that are scalable and aligned with EU adaptation goals. Held online, the session attracted 62 participants and was livestreamed via ARSINOE's LinkedIn account, reaching an additional 229 viewers

and generating five reposts—bringing total engagement to 291. The recording remains available at the following link: <https://www.youtube.com/watch?v=mmrph15OLWI&t=4802s>. A comprehensive post-event report of the WPE session is available in **Annex 1** (WPE on systemic solutions, post event report).

2.4 WPE 2025 on Policy Development

Held during WKE 2025 in Warsaw on 13–15 May centred on advancing water policy and cross-sectoral collaboration, the second WPE session titled “*Systemic Solutions and Innovation for Climate Resilience*” shifted the focus from implementation to policy. Organised as part of Water Europe’s **Policy for Projects (P4P) pathway**, the session served as a platform to bridge research and policy by aligning project outcomes with EU strategic priorities in climate resilience.

The event opened with a **keynote by Bertrand Vallet from the European Commission’s DG RTD** on “*The contribution of NEXOGENESIS and ARSINOE to the Water Resilience Strategy*”. Figure 4 displays the opening slide from the presentation delivered by DG RTD. His intervention set the tone for the session, emphasising how EU-funded research projects can concretely inform and support Europe’s emerging water resilience policy agenda.

The spotlight was on the ARSINOE and **NEXOGENESIS**¹³ projects, which presented key findings, case studies, and policy recommendations. Their contributions showed how EU-funded research can support the design and implementation of forward-looking, data-driven water policies, aligned with the upcoming EU Water Resilience Initiative.

The event also featured a panel discussion moderated by Water Europe, structured to guide participants in identifying key messages and insights to inform future European policy agendas. A **joint policy brief** was developed as an outcome of this discussion, building on the inputs gathered during the session. With over 100 participants, including project coordinators, EU policymakers, and stakeholders from across Europe, the session offered concrete opportunities for networking, cross-sector dialogue, and coalition building. Several new Horizon Europe projects were also present, paving the way for new synergies and partnerships. The collaborative spirit and high level of engagement are captured in Figure 5, reflecting a shared ambition to advance a Water-Smart Society through innovation and strategic cooperation.

Figure 4 DG RTD intervention in the WPE event

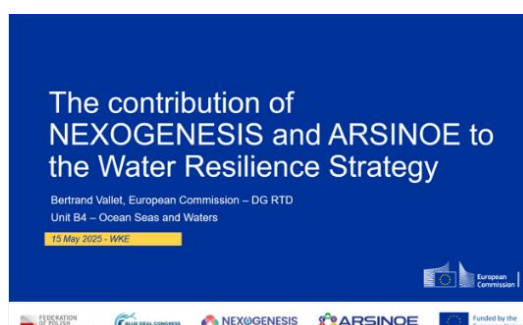


Figure 5 Participants of the WPE session during WKE 2025, Warsaw



¹³ <https://nexogenesis.eu/>

3.0 WEBINAR SERIES

Under Task T8.5, ARSINOE carried out dedicated clustering activities with its sister projects through a series of targeted webinars designed to stimulate knowledge exchange and reinforce collaborative outcomes. These seminars focused on scientific and technical themes of shared interest, helping to create a joint space for discussing challenges and opportunities in climate resilience and water innovation.

To select relevant topics, T8.5 built upon a case study mapping exercise conducted by REGILIENCE during the early phase of the collaboration and reported in **Annex 2** (Case Studies Mapping). This mapping allowed for the recognition of shared themes within the cluster, helping to pinpoint common themes that shaped the selection of topics. The selection process prioritised topics of shared interest, most of which were addressed by at least three of the four projects, providing a solid foundation for cross-project collaboration. It is important to underline that among the selected topics, two were intentionally chosen to expose thematic gaps. Although addressed by only one or two projects and not widely covered across the cluster, they were considered highly relevant to the broader climate resilience agenda. Each selected topic was then matched with a relevant Working Group (WG) or Vision Leadership Team (VLT) from Water Europe's collaboration framework, reinforcing the clustering approach and thematic coherence across projects. Leaders from these groups were invited to deliver keynote interventions, ensuring strategic alignment and grounding each session in a broader policy and innovation context.

Table 2 presents the list of selected topics, indicating which projects addressed them and whether they were selected for synergy or gap-filling purposes.

Table 2 Overview of synergies-gaps for the selected topics

Water Europe WG/VLT	Arsinoe	Impetus	Regilience	TransformAr	Synergy / Gap addressed
Green-Grey Infrastructure VLT	✓	✓		✓	Synergy
Water Security WG					Gap
Water and Public Health WG	✓	✓		✓	Synergy
Nature Based Solutions WG	✓	✓		✓	Synergy
Water-Smart Cities VLT				✓	Gap
Water and Biodiversity WG	✓	✓		✓	Synergy
Value of Water VLT	✓	✓		✓	Synergy

3.1 Calendar and achievements

This section outlines the overview on the structure, evolution, and thematic focus of the webinar series, highlighting how the initiative supported mutual learning, visibility, and strategic outreach across the cluster. While the initial focus was on internal collaboration, the strategy evolved significantly over the course of the project to reach a much wider audience.

The first two seminars were conducted as closed, one-hour online meetings reserved for ARSINOE and its three sister projects. Designed as roundtable discussions, these early sessions allowed for the exchange of experiences and insights across the projects, helping to capitalise on each other's knowledge and explore complementarities. Moderated conversations enabled participants to reflect on systemic challenges and opportunities related to topics such as green-grey infrastructure and water security, with active contributions from attendees.

During the ARSINOE General Assembly in October 2022, partners agreed to adopt a new, public-facing format for the remaining seminars. From that point onward, each event was publicly promoted, open for external registration, and livestreamed via ARSINOE and Water Europe's communication channels, including LinkedIn. This transition significantly increased visibility and engagement, transforming the seminars into high-value, openly accessible discussions on pressing climate and water topics. Table 3 provides an overview of the webinar series schedule, including dates, topics, and audience reach.

Table 3 Webinar series calendar and achievements

Seminar n.	Date	Topic	FORMAT	Attendees
#1	6 July, 2022	Impact of Green-Grey Infrastructures on climate change	Online Only sister projects	21 participants
#2	30 September, 2022	How to be Climate Resilient for Water Security	Online Only sister projects	22 participants
#3	19 April, 2023	Climate Change and its Impact on Water and Public Health	Online Livestreamed	60 participants 1,516 online viewers
#4	1 June, 2023	How can NBS support climate-change adaptation and mitigation in the water sector? An illustration with urban stormwater management	Online Livestreamed	75 participants 1,732 online viewers
#5	30 November, 2023	Water-Smart Cities Navigating Climate-Resilient Sustainable Urbanization in the Digital Age	Online Livestreamed	85 participants 1,021 online viewers

#6	29 February, 2024	Exploring the Effects of Climate Change on Biodiversity	Online Livestreamed	49 participants 925 online viewers
#7	27 June, 2024	The Future of Water: A Water Sector Approach for Building Resilience in a Changing Climate	Online Livestreamed	48 participants 663 online viewers

3.2 Seminar 1 - Green-Grey Infrastructures

Green-Grey Infrastructures play a vital role in both climate change adaptation and mitigation strategies. By combining nature-based solutions, such as wetlands, forests, green roofs, and urban green spaces, with traditional engineered systems, these hybrid approaches enhance the resilience of urban and natural environments to climate impacts. Green infrastructures provide a range of benefits: they act as natural buffers to absorb and store rainwater, reducing flood risks; they help cool urban areas and mitigate heat island effects; and they sequester carbon dioxide, contributing to climate mitigation efforts. The need for climate resilience is evident, as shown in Figure 6. The visual captures the growing urgency of building adaptive systems capable of withstanding the effects of climate change, reinforcing the case for integrated Green-Grey solutions.

Figure 6 The need for climate resilience is evident



On 6 July 2022, the first ARSINOE clustering seminar, titled *“Impact of Green-Grey Infrastructures on Climate Change”*, was held online. The event was chaired by the Water Europe Green-Grey Infrastructures Vision Leadership Team (VLT), led by Frans van de Ven (Deltares). With active participation from 21 attendees, the seminar served as a platform for a thought-provoking exchange on how hybrid infrastructures can support water management and climate resilience. Emphasising a systemic perspective, the discussion highlighted the need for integrated approaches that maximise the combined potential of green and grey systems. The

seminar laid the groundwork for continued collaboration and exploration, reinforcing the importance of Green-Grey Infrastructure in delivering sustainable, adaptive, and inclusive solutions to complex environmental challenges. See **Annex 3** (Post event report Seminar 1) for a summary of the event’s outcomes and key takeaways.

3.3 Seminar 2 - Water Security

Can resilience only be built after disaster strikes? Or can we take a different path—one that's water-smart and anticipatory rather than reactive? The second ARSINOE clustering seminar titled *"How to Be Climate Resilient for Water Security: A Link to Net-Zero Carbon"*, set out to challenge this mindset. Held online on 30 September 2022, the event (see banner in Figure 7) was chaired by Jan Hofman (University of Bath) and Blanca Antizar (Isle Utilities), co-leaders of Water Europe's Working Group on Water Security. It brought together 22 participants from the ARSINOE, TRANSFORMAR, IMPETUS, and REGILIENCE projects for a timely discussion on the intersection of water security and climate resilience.

Figure 7 Banner of the second clustering webinar



A central theme was the complexity of defining water security. It cuts across environmental, social, and economic dimensions, with different meanings depending on the regional and institutional context. Participants acknowledged the importance of developing clear, measurable indicators to make the concept operational and to assess progress in real terms. Case studies from the sister projects showcased applied solutions, underlining resilience not only as a guiding principle but also as a tangible tool for managing water-related risks such as droughts, floods, and scarcity.

Figure 8 Water Security dimensions in the European Green Deal



In alignment with the European Green Deal—Europe's blueprint for achieving a modern, resource-efficient, and climate-neutral economy by 2050—participants reflected on how water security plays a foundational role in this transformation. As shown in the visual shared during the seminar (Figure 8), the European Commission frames water security as a key enabler of climate adaptation. This view is echoed by the United Nations, which identifies water as the "lifeblood" of the Sustainable Development Goals: a fundamental requirement for advancing health, food security, energy, and environmental sustainability. The seminar concluded with a shared understanding: achieving climate-resilient water security goes far beyond infrastructure. See **Annex 4** (Post event report Seminar 2) for a summary of the event's outcomes and key takeaways.

3.4 Seminar 3 - Water and Public Health

Figure 9 Banner of the third clustering webinar



Climate change is not only disrupting ecosystems—it is also amplifying vulnerabilities across human health systems, particularly through its impact on water. As the planet warms, shifts in precipitation patterns and rising temperatures intensify droughts, floods, and extreme weather events. These changes affect the quality, availability, and safety of water, leading to risks for public health.

The third ARSINOE clustering seminar “Climate Change and its Impact on Water and Public Health,” was held online on 19 April 2023 and chaired by Cristian Carboni, leader of the Water Europe

Working Group on Water & Public Health. Figure 9 depicts the banner’s event. The event focused on how climate change is increasing the frequency and intensity of water-related health threats, including eutrophication, biodiversity loss, and the spread of waterborne diseases. With 111 registered participants and around 60 attending live, the seminar reached a global audience through livestreaming, generating over 1,500 views across Water Europe and ARSINOE social media channels. The event recording is available at the following link: https://www.youtube.com/watch?v=Y4iILjmKS-4&list=PLFth3Of5Aq_kq7wbylGnCMZH33foQkHJR&index=14&t=93s.

The session provided a space to reflect on practical responses and underscored the need for integrated strategies to strengthen the resilience of water and health systems. Alongside a keynote from the Working Group, ARSINOE Coordinator Chrysi Lapidou contributed with a presentation on “Climate Change Challenges in a Transboundary Setting,” adding depth to the discussion on shared vulnerabilities and the need for cross-border cooperation. Figure 10 shows ARSINOE participation in the event. A summary of the event’s outcomes and key takeaway can be found in **Annex 5** (Post event report Seminar 3).

Figure 10 Screenshot showing ARSINOE participation in the third webinar



3.5 Seminar 4 - Nature-based Solutions

How Can Nature-Based Solutions Support Climate-Change Adaptation and Mitigation in the Water Sector? The fourth ARSINOE clustering seminar, “How Can Nature-Based Solutions Support Climate-Change Adaptation and Mitigation in the Water Sector? An Illustration with Urban Stormwater Management”, set out to answer this pressing question. The event’s banner is illustrated in Figure 11. The event was held online and chaired by Kamal Azrague and Frédéric Cherqui, leaders of the Water Europe Working Group on Nature-Based Solutions (NBS). It attracted 75 participants and reached a broader audience through livestreaming on Water Europe’s social media channels—Twitter, LinkedIn,

Figure 11 Banner of the fourth clustering webinar



and YouTube—reaching 1,152 viewers, with an additional 580 viewers from ARSINOE’s Twitter account. As of this report, the YouTube recording had been viewed 89 times. The event recording is available at the following link: <https://www.youtube.com/watch?v=3nCe16Heq0w>

To bring a practical, research-based perspective, the event featured insights from the **MULTISOURCE**¹⁴ project, invited to deliver the keynote due to its strong focus on urban water challenges. The contribution grounded the discussion of the speakers, captured in Figure 12, in applied experience and complemented the strategic input from sister projects. The keynote highlighted the importance of treating NBS as integrated, multi-functional solutions rather than one-size-fits-all interventions. The seminar emphasized that implementing NBS is not just a technical challenge but a societal one—requiring coordinated efforts across research, policy, and civic engagement to unlock their full potential in building climate-resilient water systems. **Annex 6** (Post event report Seminar 4) provides a summary of the event’s outcomes and key takeaways.

Figure 12 Speakers of the fourth webinar



3.6 Seminar 5 – Water-smart Cities

Figure 13 Banner of the fifth clustering webinar



Held on 30 November 2023, the fifth ARSINOE clustering seminar explored how cities can act as catalysts in the transition toward a Water-Smart Society. Titled “*Water-Smart Cities: Towards Climate-Resilient Sustainable Urbanisation in the Digital Age*”, the event was chaired by Arnout Reulens, representative of the City of Mechelen and leader of the Water Europe Vision Leadership Team on Water-Smart Cities. The event’s banner is represented in Figure 13. The session brought together experts from the four sister projects, showcasing how local governments, utilities, and citizens can co-

develop urban resilience through smart technologies, nature-based solutions, and participatory approaches. The Q&A session offered a lively exchange on governance innovation, with questions focusing on how to balance centralized planning with community-driven actions, and how to scale up successful pilot initiatives. The seminar attracted wide interest, with 1,121 views across livestream and post-event channels. The recording is available at the following link: <https://www.youtube.com/watch?v=7z1VnNAoo8E>. **Annex 7** (Post event report Seminar 5) provides a summary of the event’s outcomes and key takeaways.

¹⁴ <https://multisource.eu/>

3.7 Seminar 6 – Biodiversity

As urban areas continue to expand and ecosystems face increasing stress from climate change, rethinking the integration of biodiversity into water management strategies has become a critical priority. The sixth ARSINOE clustering seminar, *“Exploring the Effects of Climate Change on Biodiversity”*, addressed this challenge. Figure 14 shows the banner of the event. Held online with the support of the Water Europe Working Group on Biodiversity, the event gathered a total audience of 974 people, with 49 participating live online. The recording is available at the following link:

<https://www.youtube.com/watch?v=PqD0wk0uCvY>

Climate resilience and biodiversity preservation are deeply interconnected and achieving both requires a cultural shift grounded in collaboration, shared values, and long-term vision. The event underscored how all actors in the water sector, from utilities and water authorities to industries, have a role to play in fostering biodiversity. The key message was clear: biodiversity must be embedded from the outset of water-related design and governance as a cornerstone of a Water-Smart Society. Additionally, contributions highlighted the need to align biodiversity with climate agendas and to use Water-Oriented Living Labs (WOLLS) as collaborative spaces to co-create and scale nature-positive solutions. In line with the WOLL concept, another key takeaway from the seminar was the essential role of citizen engagement. Tools such as citizen science, digital biodiversity mapping, and community restoration initiatives were identified as effective ways to activate public participation. **Annex 8** (Post event report Seminar 6) provides a summary of the event’s outcomes and key takeaways and Figure 15 captures the speakers involved in the sixth seminar.

Figure 14 Banner of the sixth clustering webinar

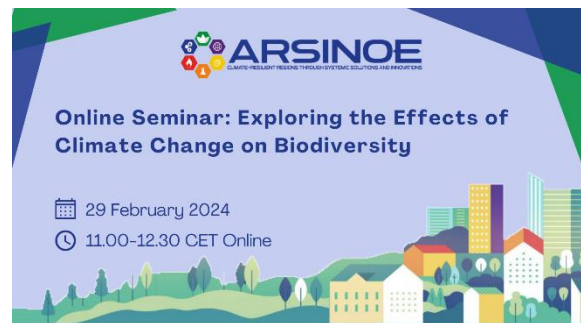


Figure 15 Screenshot of the sixth webinar’s speakers



3.8 Seminar 7 – The Future of Water

Held on 27 June 2024, the seventh ARSINOE clustering seminar, *“The Future of Water: A Water Sector Approach for Building Resilience in a Changing Climate”*, invited participants to reflect on how water systems must evolve to meet the growing pressures of a rapidly changing world. Figure 16 displays the event’s banner. With droughts, floods, and resource conflicts becoming increasingly urgent, the event provided a platform for researchers, innovators, and practitioners to articulate a shared, science-based vision for water resilience. The event attracted a total audience of 711, combining live and livestreamed participation. The recording is available at the following link: <https://www.youtube.com/watch?v=1oNYoQNKH8s>

Figure 16 Banner of the seventh clustering webinar



While the European agenda sets important strategic priorities, the seminar focused on translating these into action. Discussions explored how the water sector can serve as a pivot for climate adaptation, territorial empowerment, and systemic innovation. Keynote presentations introduced frameworks such as data-to-action pipelines, the Source-to-Sea approach, and the Water-Energy-Food-Ecosystem-Health (WEFE+H) Nexus, all aligned with international commitments like the UN Water Action Agenda and SDG 6. These systemic strategies underscored the need for integrated solutions across sectors and borders.

Citizen engagement emerged as a critical thread throughout the session—not only as a democratic imperative, but as a condition for real-world impact. Tools such as the ARSINOE’s product MINKA citizen science platform¹⁵ illustrated how local communities, when equipped with digital solutions, can play a vital role in water governance and biodiversity monitoring.

The seminar offered a snapshot of how place-based innovation can respond to global water challenges. As highlighted by the panellists, while water is a global concern, resilience is built locally, through inclusion, trust, and shared responsibility. The discussion echoed the outcomes of the 2023 UN Water Conference, reinforcing the call for integrated, transparent, and participatory governance to secure the future of water. **Annex 9** (Post event report Seminar 7) provides the full overview of the event.

¹⁵ <https://minka-sdg.org/>

4.0 SYNERGIES WITH SISTER PROJECTS

This section presents the main joint actions carried out between ARSINOE and its sister projects—IMPETUS, TransformAr, and the Coordination and Support Action REGILIENCE. The collaboration took shape in the context of the **EU Mission on Adaptation to Climate Change**, which aims to support European regions and communities in becoming climate resilient by 2030. Given their shared focus on regional adaptation pathways, all four projects directly contribute to this goal and have played an active role in advancing the Mission’s implementation.

The Green Deal Climate & Biodiversity WG was established within the Green Deal Project Support Office and has become the primary channel through which ARSINOE and its sister projects have translated results into tools and policy guidance supporting Europe’s climate resilience agenda. In addition, the four projects contributed to the Mission Adaptation Thematic Working Groups (TWGs), fostering deeper alignment with EU climate goals.

Following the kick-off of the projects in November 2021, the four sister initiatives signed a Memorandum of Understanding (MoU) and established a shared coordination board, hosted by REGILIENCE, to facilitate collaboration. This early commitment led to several joint actions, including the co-organisation of workshops, the launch of the **joint initiatives**, and the creation of a Community of Practice under the Mission Adaptation framework. Collaboration was further strengthened through monthly coordination meetings convened by REGILIENCE. GAC and Water Europe from ARSINOE took part in these exchanges, which provided a regular space for sharing updates, aligning efforts, and supporting each other in advancing regional climate resilience. These interactions resulted in a number of **joint outcomes** for the Mission, as outlined in this section, including the co-organisation and co-participation in multiple workshops, seminars, and events, and the production of joint factsheets and Policy Briefs. These efforts improved project visibility, promoted coordinated outreach, and helped shape a more consistent and impactful narrative on climate adaptation across the sister projects.

4.1 The Climate Resilience Post

Among the main communication and outreach tools developed within the cluster, the **joint newsletter**¹⁶ played a key role in giving visibility to the progress, outputs, and shared milestones of the four projects. Coordinated by REGILIENCE the newsletter was launched in 2023 and continued until the closure of the projects. It provided a dedicated space to feature news, highlight upcoming events, present tools and resources, and offer reflections on climate adaptation across different European contexts. The collaborative format gave voice to each project while reinforcing the coherence and identity of the cluster as a whole. **In total, 11 joint newsletters were issued.** A link to each Newsletter is provided in Table 4, and Figure 17 portrays the Cluster Communication Team.

Table 4 Joint newsletter links

Issue n.	Date	Link
1	4 November 2022	https://mailchi.mp/ecbb0b77a51f/the-first-issue-of-the-climate-resilience-post-is-here

¹⁶ <https://regilience.eu/newsletter-archive/>

2	17 February 2023	https://mailchi.mp/daa3ec1e1f9b/the-climate-resilience-post-issue-number-2-is-here
3	29 May 2023	https://mailchi.mp/20240bdc67ab/the-climate-resilience-post-issue-number-3-is-here
4	28 July 2023	https://mailchi.mp/6f9087810049/the-climate-resilience-post-issue-number-4-is-here-17335267
5	31 October 2023	https://mailchi.mp/afa8a27bfc1e/the-climate-resilience-post-issue-number-5-is-here-17344248
6	16 January 2024	https://mailchi.mp/a52eafdc5f93/the-climate-resilience-post-issue-number-6-is-here-17631216
7	2 May 2024	https://mailchi.mp/17f4d0c1b3a4/the-climate-resilience-post-issue-number-6-is-here-17753979
8	29 July 2024	https://mailchi.mp/9edd686ae463/the-climate-resilience-post-issue-number-8-is-here
9	20 November 2024	https://mailchi.mp/7a291bb241a0/the-climate-resilience-post-issue-number-9-is-here-18244442
10	29 January 2025	https://mailchi.mp/regilience/the-climate-resilience-post-issue-number-10-is-here-18247646
11	9 June 2025	https://mailchi.mp/regilience/the-climate-resilience-post-issue-number-10-is-here-18250604

Figure 17 Cluster Communication Team



The newsletter's structure and layout were designed to be accessible, engaging, and modular, allowing contributions to be easily integrated from all partners. Each edition featured thematic **articles, interviews, practical tools, and event announcements**, offering both depth and usability. The archive page illustrated in Figure 18 offers a full overview of the editions published throughout the duration of the cluster, while Figure 19 showcases the visual identity and editorial approach of the newsletter.

Figure 18 Snapshot of the joint newsletter archive page

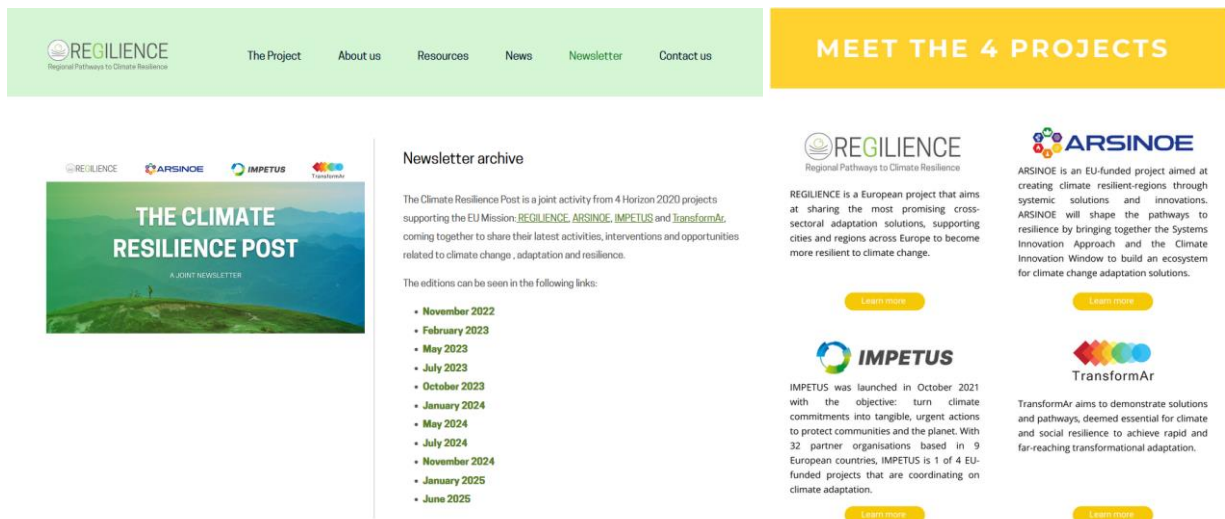
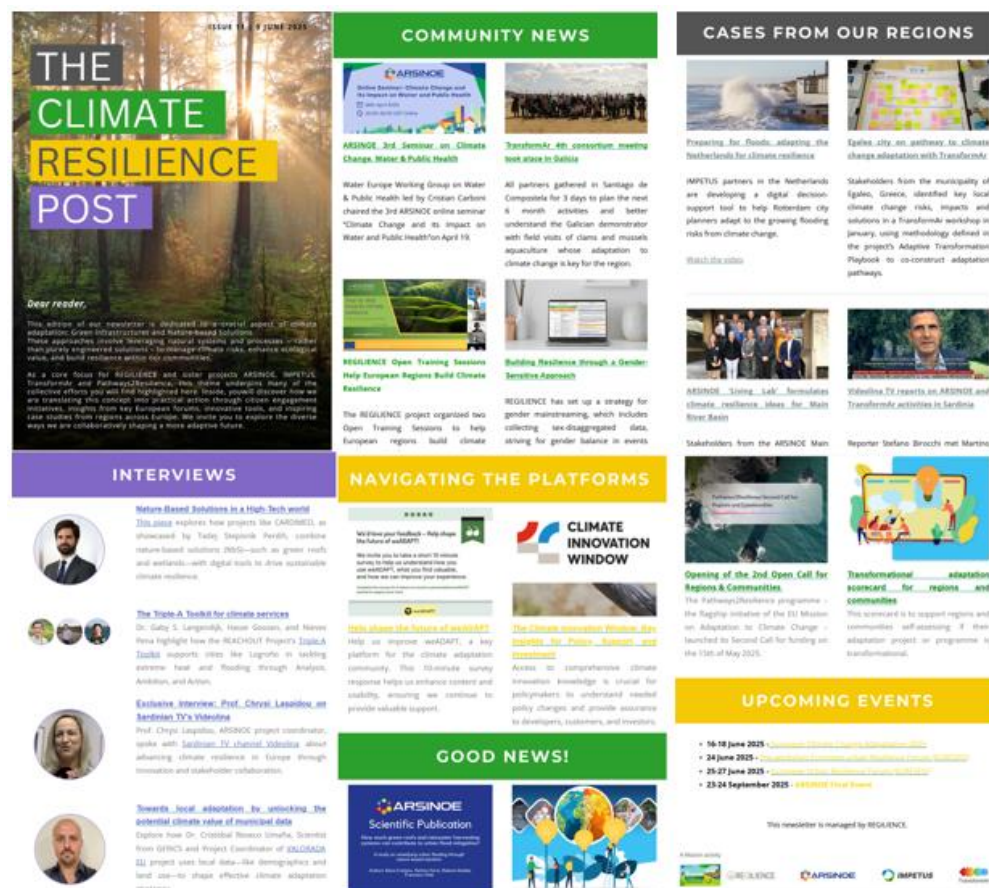


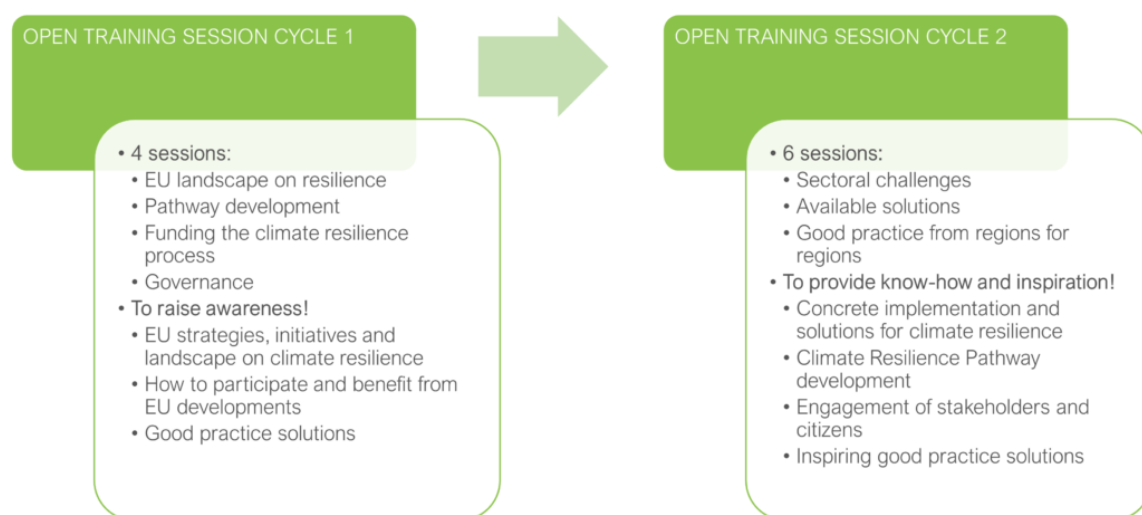
Figure 19 Joint newsletter visual identity



4.2 Open Training Sessions

As part of its capacity-building strategy, REGILIENCE launched a structured series of Open Training Sessions¹⁷ (OTS) to support European regions in designing and implementing effective climate adaptation pathways. Organised between 2023 and 2025, the OTS series offered an open, accessible format that brought together policy experts, practitioners, and local and regional actors. The sessions were designed to foster learning and exchange across regions, and to promote tested solutions and tools that support systemic resilience building. The series followed a thematic progression structured around two complementary cycles illustrated in figure 20. The **first cycle** (OTS1–OTS4) focused on strategic planning, governance, and policy integration—helping regions understand the EU landscape on resilience and make use of planning tools and co-design methodologies. The **second cycle** (OTS5–OTS10) shifted toward applied and sector-specific challenges, covering topics such as heat and health, nature-based solutions, and resilience.

Figure 20 Visual overview of the two thematic cycles from REGILIENCE website



Each session was open to all interested stakeholders and aimed to:

- Present practical support tools and technical solutions (e.g., funding databases, maladaptation checklists, indicator frameworks).
- Provide targeted guidance for developing regional adaptation pathways.
- Create space for interaction through expert presentations, peer exchange, and audience engagement.

ARSINOE contributed actively to three OTS events, sharing key lessons and tools developed within the project's Living Labs and work packages. These contributions helped situate ARSINOE's work within the broader European context and offered project-based insights into participatory approaches and regional transformation strategies.

A complete list of the Open Training Sessions is provided in Table 5.

¹⁷ <https://regilience.eu/community-building/>

Table 5 Open Training Sessions complete list

OTS Series	Date	Title of the event	ARSINOE contribution
OTS1	22 March 2023	The EU Landscape on Resilience	-
OTS2	21 April 2023	Step by Step Towards Climate Resilience	-
OTS3	12 Dec 2023	Financial Support for Regional Adaptation	-
OTS4	11 Mar 2024	Multi-level Governance for Climate Resilience	-
OTS5	10 Dec 2024	Embedding Resilience in Local & Regional Plans	-
OTS6	20 Feb 2025	Heat and Health: Building Resilience for a Hotter Future 50 Participants	The ARSINOE project: Addressing extreme heatwaves in Athens PhD. Dimitris Kofinas, University of Thessaly
OTS7	7 Apr 2025	Just Resilience: Rethinking Climate Adaptation	-
OTS8	13 May 2025	Building Resilient Futures 50 Participants	Lessons learned from synergizing CCA/DRM in Esbjerg (ARSINOE Case Study 7) Martin Drews, Technical University of Denmark
OTS9	12 June 2025	Nature at Work: Driving NbS for a cooler, water-smart and more resilient Europe 50 Participants	Cooling Athens with Nature-based Solutions: Mapping Vulnerabilities, Assessing Impacts & Optimizing NbS Selection Nefta Votsi (Institute of Environmental Research and Sustainable Development – National Observatory of Athens)
OTS10	8 July 2025	Accelerating Regional Climate Resilience 50 Participants	Segment 2: Innovation in action – scaling climate solutions by financially fueling innovators Inna Petrenko, BRIGAID Connect

4.3 Horizon Results Booster

To strengthen the visibility and uptake of their outcomes, ARSINOE and its sister projects jointly participated in the **Horizon Results Booster**¹⁸ service, an initiative of the European Commission that supports the dissemination and exploitation of Horizon 2020 project results. The collaboration focused on enhancing the cluster's strategic communication, identifying transferable results, and reaching key stakeholder groups across different governance levels.

Within this framework, the four projects co-developed a **joint factsheet**¹⁹ that presents their respective approaches and innovations in addressing climate resilience. The factsheet highlights synergies across societal, technological, and industrial dimensions. In addition, a **joint video**²⁰ was produced to showcase the cluster's shared ambition and climate resilience journey to a broader audience, supporting outreach beyond the expert community. The video reinforces the projects' collective goal: to equip Europe with systemic strategies for climate resilience by empowering societies, enabling shared solutions, and fostering transformative adaptation. It underlines how co-innovation, citizen engagement, and the development of cutting-edge tools are central to building a climate-resilient Europe—today and for the future.

As part of their joint Horizon Results Booster activities, the four sister projects released a dedicated **joint Policy Brief**²¹ on "*Stakeholder engagement in climate adaptation and resilience*", the cover of which is shown in Figure 21. Drawing on experiences from the four sister projects, the brief explores diverse methodologies for involving communities in shaping climate-resilient pathways. It underscores the central role of stakeholder participation in making adaptation efforts inclusive, trusted, and effective. At the same time, it highlights persistent challenges faced by European regions in sustaining engagement processes, particularly due to capacity constraints and limited institutional coordination.

Figure 21 Cover of the joint Policy Brief



4.4 Green Deal Climate Change & Biodiversity WG

To support the implementation of the Horizon 2020 Green Deal Call and enhance its long-term impact, the European Commission launched the **Green Deal Projects Support Office**. Its mission was to foster collaboration and coordination across funded projects by creating synergies, strengthening communication, and accelerating knowledge transfer. A central feature of this initiative was the establishment of five thematic WGs, each addressing a strategic area of the European Green Deal. Among these, the *Climate Change and Biodiversity WG* emerged as a particularly dynamic platform, uniting 17

¹⁸ <https://www.horizonresultsbooster.eu/>

¹⁹ <https://transformar.eu/sister-projects-joining-forces-on-climate-resilience-recommendations/>

²⁰ <https://www.youtube.com/watch?v=pYiwDI3UH9Q>

²¹ https://transformar.eu/storage/2024/11/Policy-brief_stakeholder-engagement-in-climate-adaptation-and-resilience_a4.pdf

EU-funded projects²² tackling interlinked challenges such as regional adaptation, biodiversity restoration, wildfire resilience, climate services, and nature-based solutions. The WG enabled these projects to share methodologies, co-develop outputs, and formulate joint policy messages to maximise their collective impact.

A key strength of this WG was its capacity to cluster projects working on similar adaptation goals. Notably, ARSINOE, IMPETUS, REGILIENCE, and TransformAr formed a tightly knit group focused on climate resilience, regularly collaborating on outputs such as monitoring frameworks, shared knowledge products, and joint outreach activities.

The WG led to several tangible outcomes:

- A comprehensive *Mapping of Commonalities and Case Studies*²³;
- Shared appearances at major EU events;
- Collaborative outputs, including the *MERLIN Podcast*²⁴, thematic webinars on nature-based solutions, and co-authored policy briefs.

Their collaborative work is documented in the publication titled ***Climate Change and Biodiversity***²⁵, released in **January 2025** by the **Publications Office of the European Union**, which showcases how project clustering can accelerate Europe's transition to climate resilience and biodiversity restoration.

4.5 EU Mission Thematic Working Groups

The EU Mission on Adaptation to Climate Change, or **Mission Adaptation**, is one of five missions under the Horizon Europe framework. It supports regions and communities in becoming climate resilient by 2030, using a place-based approach that tailors strategies to local vulnerabilities and strengths. To implement this ambition, TWGs were set up as co-creation platforms connecting projects, experts, and stakeholders. As part of the Mission's Implementation Platform (MIP4Adapt), these TWGs promote collaboration among EU-funded projects to co-develop tools, share methodologies, and align research outcomes with real-world needs. Projects such as ARSINOE, IMPETUS, REGILIENCE, TransformAr, and newcomer **NATALIE**²⁶ have been deeply involved in this work, especially in relation to monitoring and evaluation of climate adaptation activities.

This collaboration enabled the preparation of a dedicated report *Insights on Monitoring Climate Adaptation Activities: Deriving lessons learned from monitoring adaptation activities in projects under the*

²² ARSINOE, IMPETUS, REGILIENCE, and TransformAr were joined by projects specialising in climate services and localised planning, such as: **CityCLIM**, **REACHOUT**, **LOCALISED**, and **I-CISK** — which provided tools and platforms to integrate climate information into local decision-making.

Efforts on biodiversity and ecosystem restoration were represented by: **MERLIN**, **SUPERB**, **WaterLANDS**, and **REST-COAST**, whose joint work included a policy brief on ecosystem restoration and a Science publication proposing a Climate Restoration Law.

In the field of wildfire resilience and risk management, collaboration included: **FIRE-RES**, **Firelogue**, **SILVANUS**, and **TREEADS**, which focused on innovative strategies for wildfire prediction, response, and ecological recovery.

Critical insights on the behavioural and social dynamics of climate adaptation: **Rethink Action** project

²³ <https://regilience.eu/maps/>

²⁴ <https://project-merlin.eu/podcasts.html>

²⁵ <https://op.europa.eu/en/publication-detail/-/publication/2b1c9399-cd77-11ef-be2a-01aa75ed71a1/language-en>

²⁶ <https://www.natalieproject.eu/>

*EU Mission on Adaptation*²⁷ presenting insights and recommendations on adaptation monitoring, drawing from real-world project experiences²⁸. As a next step, the WG has launched the process for a final joint policy brief, with participating projects engaged in defining its scope and content.

4.6 Other Joint Activities and Initiatives

Beyond the main clustering initiatives described in the previous sections, ARSINOE also carried out a number of complementary activities that contributed to broadening its stakeholder engagement and reinforcing inter-project cooperation. These additional initiatives are briefly outlined in this section. Table 6 provides an overview of these actions, followed by a short description of each to contextualise their relevance and scope within the overall clustering strategy.

Table 6 Overview of other initiatives

Date	Event	Collaboration with
March 2023	Women in STEM	IMPETUS, REGILIENCE, TransformAr
June 2023	ECCA 2023, Dublin, Ireland. 300 participants	REGILIENCE, IMPETUS, REACHOUT, Pathways2Resilience
October 2023	ARSINOE General Assembly	IMPETUS
October 2023	EURESFO 2023, Portugal 350 participants	REGILIENCE, IMPETUS
June 2024	EURESFO 2024, Valencia 450 participants	REGILIENCE, IMPETUS
July 2024	Climate Change Adaptation in Spain: Enhancing Impact through Multi-Actor Collaboration, workshop 20 participants	IMPETUS, REGILIENCE, TransformAr
July 2024	EU Missions National Contact Points (NCPs)	IMPETUS, REGILIENCE, Pathways2Resilience, CLIMAAX

²⁷ European Commission, Directorate-General for Research and Innovation, February 2025; <https://futurium.ec.europa.eu/system/files/2025-02/Project%20Challenges%20and%20Lessons%20Learned%20%28Final%20Version%29.pdf>

²⁸ Based on Open Letter ‘Deriving lessons learned from monitoring adaptation activities in projects under the EU mission on adaptation’, as authored by Stephanie Bilgram, Carla Klusmann, Christian Kind, Elisa Andreoli, Chiara Castellani, Dimitris Kofinas, Jan Cools, Antonio Trabucco, Chrysi Laspidou.

May 2025	7 th Network of Multipliers, webinar	IMPETUS, ICHANGE, SILVANUS, TREEADS, LifeSaver, Firelogue, SCENARIOS, PAUL
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Joint communication campaigns

Water Europe and GAC participate in the monthly meetings organised by REGILIENCE, which bring together all sister projects. These meetings foster coordination, cooperation, and mutual support among the four sister projects focused on regional resilience. One key outcome has been the development of joint communication campaigns. In March 2023, a campaign titled “Women in STEM” was launched collaboratively. As part of this initiative, GAC conducted two interviews—with Teresa Pérez Ciria and Prof. Phoebe Koundouri—which were published on the ARSINOE website and further disseminated via social media channels.

ECCA 2023 – June 2023, Dublin

In June 2023, the European Climate Change Adaptation Conference (ECCA 2023) was held in Dublin, Ireland, gathering leading voices in climate resilience across Europe. On 20 June, a joint session titled “*Extreme Events – Tools for Climate Resilience*” was co-organised by REGILIENCE and featured contributions from the EU-funded projects ARSINOE, IMPETUS, **REACHOUT**²⁹, and **Pathways2Resilience**³⁰. The session brought together project partners and stakeholders to present practical tools designed to support regional and local adaptation to extreme climate events. Through tool demonstrations and an expert panel discussion, the session explored challenges to adoption, opportunities for scaling, and the importance of clustering and cross-project collaboration to enhance the usability, visibility, and policy relevance of climate resilience solutions.

ARSINOE General Assembly – October 2023, Utrecht

In October 2023, ARSINOE partners met in Utrecht for the General Assembly, which included a full-day joint event with the sister project IMPETUS and the NATALIE project. Held on October 11th, the session brought together over 70 participants from both consortia to share experiences, align approaches, and deepen collaboration within the Horizon 2020 climate adaptation cluster.

The day featured thematic breakout sessions on key topics such as heat, Water Energy Food ecosystems, flooding, groundwater, biodiversity, stakeholder engagement, and digital tools. Discussions focused on comparing methodologies, identifying synergies, and exploring the transferability of results—reinforcing the value of clustering through co-creation and mutual learning.

EURESFO 2023 – Advancing Climate Resilience through Clustering

At the 10th European Urban Resilience Forum (EURESFO 2023), held in Cascais, Portugal, ARSINOE actively contributed to advancing climate resilience by showcasing its tools and fostering synergies with like-minded initiatives. Through its participation in the Resilience Marketplace and a dedicated external

²⁹ <https://reachout-cities.eu/>

³⁰ <https://www.pathways2resilience.eu/>

exploitation workshop, ARSINOE engaged directly with cities, regional authorities, and fellow EU-funded projects to co-develop and refine systemic climate adaptation solutions.

A key focus of ARSINOE's presence was promoting clustering—bringing together initiatives such as REGILIENCE, IMPETUS, and platforms like **weADAPT**³¹ and the CIW to amplify collective impact. These exchanges enabled meaningful knowledge sharing and joint planning among projects pursuing complementary goals under the EU Mission on Climate-Neutral and Smart Cities. The clustering efforts underscored the importance of pooling resources, harmonizing methodologies, and fostering collaborative stakeholder engagement to build coherent and scalable pathways for urban and regional resilience. ARSINOE used the forum to expand its network, promote the CIW as a hub for innovation matchmaking, and reinforce cross-project alignment—demonstrating how effective clustering can accelerate knowledge uptake and optimize the impact of EU investments in climate adaptation.

EURESFO24 – Driving Synergies for Scalable Resilience

EURESFO 2024 brought together 450 participants from 35 countries in Valencia, where ARSINOE reinforced its commitment to climate resilience. Participation in the EURESFO Marketplace allowed the project to interact with a broader mix of stakeholders—including local and regional authorities, EU initiatives, and innovation platforms—reflecting a shift toward more action-oriented exchange. ARSINOE's presence in 2024 highlighted a more mature positioning within the EU Mission ecosystem. The project underlined how its systemic approach complements and interlocks with other initiatives, fostering coherent and scalable resilience pathways. The clustering narrative focused on aligning communication, identifying cross-cutting synergies, and exploring future joint actions, helping to lay the groundwork for integrated policy dialogue and coordinated scaling efforts.

Workshop “Climate Change Adaptation in Spain: Enhancing impact through Multi-Actor Collaboration”

As reported in Deliverable D8.12, ARSINOE participated in the online workshop “*Climate Change Adaptation in Spain: Enhancing Impact through Multi-Actor Collaboration*”, held on 2 July 2024 and organized by UNSDSN in collaboration with REDS-SDSN Spain, SDSN's Spanish network. The event aimed to promote knowledge exchange among SDSN Networks, ARSINOE case studies, and demonstration sites from sister projects. Representatives from ARSINOE contributed to the discussion alongside participants from initiatives such as the Mission Implementation Platform for Adaptation to Climate (**MIP4Adapt**³²), **CitiES 2030**³³, IMPETUS, REGILIENCE, and TransformAr. The event showcased cross-project, multi-level collaboration, highlighting the value of connecting regional experiences with EU-wide adaptation goals.

The workshop represented a key moment for fostering synergies between major EU-funded projects addressing climate adaptation. By bringing together representatives from multiple Horizon Europe initiatives with a Spanish case study focus, the event facilitated the exchange of methodologies, findings, and stakeholder engagement strategies. This aligns with the clustering effort's goal of building bridges between complementary projects, scaling local innovations, and reinforcing a shared European narrative on resilience.

³¹ <https://weadapt.org/>

³² <https://climate-adapt.eea.europa.eu/en/mission/the-mission/about-mip4adapt>

³³ <https://cities2030.eu/>

EU Missions National Contact Points

In July 2024, ARSINOE was featured in the “*Meet & Share: Adaptation to Climate Change Mission support actions*” event organized by **NCP4Missions**³⁴, connecting representatives from EU Mission support projects with National Contact Points (NCPs) across Europe. During the session on 10 July, Giannis Adamos (ARSINOE Project Manager) presented ARSINOE’s scope and activities, alongside contributors from IMPETUS, REGILIENCE, TransformAr, Pathways2Resilience, and MIP4Adapt. This joint presentation showcased how ARSINOE aligns with peers in supporting NCPs, offering mission-relevant knowledge, tools, and collaboration opportunities to strengthen citizen engagement and climate resilience in EU regions.

7th Network of Multipliers

On 13 May 2025, ARSINOE participated in the 7th Network of Multipliers webinar, hosted by the Green Deal Projects Support Office, as part of its final-stage dissemination and clustering activities. ARSINOE presented its key outcomes and lessons learned in advancing climate resilience and biodiversity under the European Green Deal. The webinar brought together a range of projects funded under the Horizon 2020 Green Deal Call, including IMPETUS, **ICHANGE**³⁵, **SILVANUS**³⁶, **TREEADS**³⁷, **LifeSaver**³⁸, **Firelogue**³⁹, **SCENARIOS**⁴⁰, **PAUL**⁴¹, providing a collaborative platform to share insights, showcase progress, and explore synergies across thematic areas such as climate adaptation, nature-based solutions, and environmental monitoring. The event served as a valuable touchpoint to connect, exchange practical approaches, and contribute to shaping a resilient, sustainable future.

Joint Policy Brief on Climate Resilience in EU Outermost Regions

The ARSINOE CS#5 (Canary Islands) team was approached by the REGILIENCE project to organise a series of online meetings in preparation for a joint Policy Brief on Climate Resilience in EU Outermost Regions, scheduled for publication in September 2025. The purpose of the policy brief is to highlight the unique vulnerabilities and innovation potential of the outermost regions, and to position them as “Living Labs” for climate adaptation solutions. The main objective of the meetings was to connect with ongoing discussions on the forthcoming European Climate Adaptation Plan (ECAP) and the Multiannual Financial Framework (MFF).

These exchanges also focused on priority challenges where further work is needed, including sustainable agriculture, responsible tourism, and access to housing, while recognising cross-sectoral needs in energy, water, and biodiversity management. The process reinforced the importance of integrating local knowledge, strengthening regional cooperation, and ensuring full inclusion of outermost regions in EU datasets, classifications, and funding frameworks.

³⁴ <https://horizoneuropencppportal.eu/eu-missions>

³⁵ <https://ichange-project.eu/>

³⁶ <https://silvanus-project.eu/>

³⁷ <https://treeads-project.eu/>

³⁸ <https://lifesaverproject.eu/>

³⁹ <https://firelogue.eu/>

⁴⁰ <https://scenarios-project.eu/>

⁴¹ <https://scenarios-project.eu/>

Climate Innovation Window

The Climate Innovation Window (CIW), originally developed under the BRIGAD project and hosted on Climate-ADAPT, was later adopted and enhanced by ARSINOE. Its aim is to serve as a dynamic marketplace for climate adaptation solutions, connecting innovators with regional actors. The platform allows users (such as planners, SMEs, and public authorities) to browse and find relevant tools based on criteria like Technology Readiness Level (TRL), Social Readiness Level (SRL), climate hazard, and application sector.

Within this framework, REGIANCE has played an important role in increasing the CIW's visibility across the entire cluster through strategic coordination and communication. On 27 March 2025, it organised an online seminar titled "Online Platforms for Climate Adaptation". This session introduced participants to different online tools, highlighting how each provides unique solutions and knowledge to support climate adaptation strategies. The seminar was designed to help citizens navigate these platforms effectively, encouraging them to take proactive steps in their own climate adaptation efforts. The CIW was presented to a broad audience alongside other platforms such as Climate-ADAPT and WeAdapt.

REGIANCE also promoted and supported the webinar organised by ARSINOE and BRIGAD Connect on 26 June 2025, titled "Climate Innovation Window: Showcasing your climate innovation – a gateway to European impact". This webinar was designed in response to the needs of innovators from the Impetus project, helping them use the platform effectively. Impetus has contributed a set of innovators who joined the CIW community alongside those engaged during ARSINOE. The event brought together innovators, regional stakeholders, and researchers to explore the platform's functionalities and to provide step-by-step guidance on how to upload solutions.

The CIW's presence was also organised at EURESFO 2024, where the team promoted the platform and its benefits directly to attendees, including innovators and other stakeholders who visited the stand. Additionally, REGIANCE contributed with its own deliverable results to the CIW by sharing through the platform a list of third-party platforms of interest for its users. This list was tied to the CIW content and SEO strategies, to support its dissemination. REGIANCE also arranged meetings with other platforms, such as WeAdapt, to explore potential collaborations.

By building on an existing tool, ARSINOE strengthened the accessibility and impact of climate innovations, both within its own project and across the cluster. Today, the CIW stands as a shared gateway for innovation, promoting real-world adoption and enhancing Europe's collective capacity to deliver climate-resilient solutions.

5.0 SYNERGIES WITH OTHER INITIATIVES

This section presents ARSINOE's collaborations with other **EU-funded projects and international initiatives** that have supported mutual learning and opened new avenues for cooperation. These interactions have strengthened synergies beyond the core cluster and helped situate ARSINOE's work within the broader European context. Table 7 provides an overview of ARSINOE's participation in **clustering activities and exchanges**. The following subsections detail the content and outcomes of each engagement.

Table 7 Participation in other initiatives

Date	Event/Initiative	Collaboration with
September 2022	IWA World Water Congress & Exhibition, Copenhagen	Water Europe 10.000 attendees
September 2022	Open Living Lab Days 2022, Turin	Water Europe 350 Participants
October 2022	Water4All Partnership Kick-off Meeting, Brussels	Water4All Partnership 90 Participants
March 2023	UN Water Conference	Water Europe 450 Participants and 10.000 attendees
September 2023	Open Living Lab Days 2023, Barcelona	Water Europe 400 Participants
December 2023	UN Climate Summit COP28, Dubai	Water Europe 40 participants and 70.000 attendees
January 2024	Workshop on Water Oriented Living Labs, Livorno (IT)	ULTIMATE 90 Participants
March 2024	World Water Day, Lisbon	B-WaterSmart 100 Participants
April 2025	3rd ENRICH GLOBAL Innovation Days, Nice (FR)	NexusNet COST Action 40 Participants
2023-2025	Clustering meetings and joint outputs	ICT4Water Cluster 60 projects
2023-2025	Joint collaboration	Climate Innovation Window

5.1 IWA World Water Congress

IWA World Water Congress & Exhibition – Copenhagen, 14 September 2022

During the IWA World Water Congress & Exhibition 2022 in Copenhagen held under the theme “*Water for Smart Liveable Cities*” and attended by over 8,900 participants, Water Europe actively contributed to

Figure 23 Slide projected during the IWA Conference



discussions on stakeholder engagement and technological innovation in the water sector. In a dedicated intervention titled “*Water-Oriented Living Labs as a means to engage stakeholders in the development and demonstration of water technologies*”. The ARSINOE project was referenced as a valuable example of synergy between research and practice (Figure 22 shows the slide with the project’s logo projected). The project’s integrated approach toward climate resilience and sustainable water management aligned seamlessly with the overarching themes of innovation, inclusiveness, and implementation showcased at the Congress.

5.2 OLLD 2022 and 2023

OLLD 2022 – Turin, 21 September 2022

The Open Living Lab Days 2022 (OLLD 2022) organised by the European Network of Living Labs (ENOLL⁴²), took place on 21 September 2022 in Turin. In the evocative setting of Sala Duomo at the Officine Grandi Riparazioni, Water Europe presented the concept of the Water-Smart Society and the transformative potential of WOLLs in driving the **European Green and Digital Transition**. As part of this presentation, the ARSINOE project was highlighted for its multidimensional approach to systemic innovation, particularly in fostering collaboration across sectors and regions. Its alignment with the Living Lab methodology underscored its role as a synergistic initiative supporting territorial transformation toward climate resilience. The event banner is shown in Figure 23.

Figure 25 Banner of OLLD 2022



OLLD 2023 – Barcelona, 2023 Edition, September 2023

Under the thematic focus “*Living Labs for an Era of Transitions: How Human-Centric Innovation is Changing Our Lives*,” the 2023 edition of the OLLD in Barcelona provided another opportunity to spotlight ARSINOE. In sessions dedicated to the co-creation of solutions for complex challenges, the project was

⁴² <https://enoll.org/>

mentioned as a concrete example of how integrated assessment and participatory processes can enhance the relevance and uptake of innovations. ARSINOE's contribution to fostering regional transformation and systemic resilience positioned it as a key actor within the broader Living Lab movement in Europe.

5.3 Water4All Partnership

Water4All Partnership Kick-off Meeting – Brussels, 13–14 October 2022

The ARSINOE project was also acknowledged during the **Water4All⁴³ Partnership's "Water Security for the Planet"** Kick-off Meeting. Held in Brussels, the event convened around 90 participants representing a wide range of stakeholders in the European water ecosystem. ARSINOE was cited as a strategic initiative that complements Water4All's objectives, particularly through its cross-cutting work on innovation pathways, policy alignment, and stakeholder inclusion. Its early-stage contributions were presented as part of the dialogue on synergies, reinforcing the shared ambition to accelerate water-smart transitions. Figure 24 captures a key moment from the session in which ARSINOE was presented as part of the discussion.

Figure 27 A moment from the discussion and the show of the ARSINOE logo



5.4 United Nations System

UN 2023 Water Conference – New York, March 2023

The UN 2023 Water Conference, held in March at the UN Headquarters in New York, represented an important opportunity to place water at the centre of the global agenda. At a time when inequalities in access to water and sanitation remain a pressing concern, the event brought together institutional actors, researchers, and practitioners to advance progress on the Water Action Decade and accelerate the implementation of Sustainable Development Goal 6 (SDG6). The discussions underlined the critical role of water for climate resilience, public health, and sustainable development, and stressed the need for coordinated and inclusive action.

In this framework, ARSINOE gained visibility as a key European initiative supporting climate adaptation and systemic innovation in water management. The project was presented through dedicated communication material exhibited at the UN Headquarters and—most notably—during the side event *"Climate Resilience Needs a Water-Smart Society"*, co-organised by the European Commission and Water Europe. The session focused on how EU research and innovation can support the deployment of

⁴³ <https://www.water4all-partnership.eu/>

integrated, circular, and water-smart solutions. Professor Chrysi Laspidou, Vice President of Water Europe and coordinator of ARSINOE, was invited to speak during the session. Her intervention outlined the project's approach, which combines resilience pathways with stakeholder co-creation, aiming to support regions in addressing the water-climate nexus through systemic transformation. Figure 25

Figure 29 A moment from the UN 2023 Water Conference event



captures a moment from the event.

UN Climate Summit COP28 – Dubai, December 2023

The COP28, held in Dubai in December 2023, brought the global community together to advance climate action across sectors. The Water for Climate Pavilion served as a central space to discuss water's role in climate mitigation and adaptation. In this context, on 5 December, the session *"Industry & Water Efficiency – Unlocking the Value of Water"*, was organised. The session addressed the need for enabling frameworks, including policy alignment, capacity building, and investment strategies, to accelerate the uptake of water-smart approaches in industrial contexts.

Professor Chrysi Laspidou, Vice President of Water Europe and coordinator of ARSINOE, participated in the event and shared her perspective on the role of research and innovation in supporting the transition to more resilient and efficient water use. Her intervention reinforced the importance of integrated approaches and stakeholder engagement to develop long-term solutions that contribute to both industrial sustainability and climate resilience. Figure 26 presents two moments of the event.

Figure 31 Snapshots from COP28



5.5 Horizon Europe projects, events and initiatives

Horizon Europe projects

ARSINOE continued to strengthen its role within the Horizon Europe community by engaging in various initiatives and benefiting from high-level visibility promoted through strategic partners such as Water Europe. While not always directly represented, the project was repeatedly acknowledged in multi-project settings as a relevant example of systemic innovation and multi-stakeholder engagement for climate adaptation. In this context, Water Europe highlighted ARSINOE at two major events in 2024: the ULTIMATE workshop in Rosignano and the **B-WaterSmart**⁴⁴ Lisbon event on World Water Day. In both instances, ARSINOE was referred to as a good practice example, showcasing how its integrated approach to governance and regional resilience contributes to the broader goals of water-smart innovation.

NexusNet COST Action

In late April 2025, ARSINOE was prominently featured at the 3rd ENRICH GLOBAL Innovation Days, co-located with the **NexusNet COST Action**⁴⁵ meetings in Nice, France. The NexusNet COST Action supports cross-sectoral collaboration on Water-Energy-Food-Ecosystems (WEFE) Nexus challenges, creating opportunities for projects and stakeholders to connect, exchange knowledge, and promote integrated solutions. Within this context, ARSINOE presented its innovations, focusing on how Living Lab insights and stakeholder-driven adaptation pathways are integrated with digital and environmental tools to address systemic climate resilience. The event facilitated in-depth exchanges on coordination strategies, dissemination tactics, and cross-network integration, reinforcing synergies between Horizon projects and European research communities. Sharing the stage with **ENFORCE**⁴⁶, **NATALIE**, and **ENHANCE**⁴⁷, ARSINOE contributed to showcasing the added value of collaborative approaches across the climate adaptation cluster.

5.6 ICT4Water Cluster

ARSINOE is part of one of the most extensive European digital collaboration initiatives in the water sector: the ICT4Water Cluster, coordinated by KWR. This cluster brings together more than 60 EU-funded

⁴⁴ <https://b-watersmart.eu/>

⁴⁵ <https://nexusnet-cost.com/>

⁴⁶ <https://enforce-project.eu/>

⁴⁷ <https://projects2014-2020.interregeurope.eu/enhance/>

projects focused on accelerating the digital transformation of water systems through interoperable, smart, and sustainable solutions⁴⁸. Originally launched in 2012, ICT4Water began as a hub for research on ICT applications in water management and has since evolved into a strategic platform that connects technology providers, utilities, policy actors, and researchers. The cluster actively addresses key barriers in technology adoption—such as data fragmentation, lack of standardization, and limited cross-sector integration—by fostering a shared space for exchanging experiences and aligning digital strategies.

Within this initiative, ARSINOE benefits from a dynamic clustering environment, allowing it to exchange insights, tools, and methodologies with a broad portfolio of projects tackling complementary aspects of climate resilience and water innovation. This collaboration supports ARSINOE’s integration of systemic approaches into broader digital frameworks promoted by the cluster enhancing the project ability to co-develop scalable solutions, contribute to common standards, and engage with stakeholders across local, national, and EU levels.

6.0 CONCLUSIONS

Over the course of its four-year duration, ARSINOE successfully delivered an ambitious clustering and stakeholder engagement strategy that exceeded expectations in terms of visibility, outreach, and knowledge exchange.

In Task T8.5, clustering has been embedded as a core strategic pillar of ARSINOE’s impact pathway. The project treated clustering as a deliberate method to structure cooperation, co-develop tools and messages, and created a shared space for learning and policy shaping. From the alignment with sister projects under the Green Deal call, ARSINOE has used clustering as a mechanism to actively shape narratives, build coalitions, and enable the transferability and relevance of its results.

By the end of the project, ARSINOE reached the following main results:

- Published **11 joint newsletters**
- Delivered **1 joint map** of case studies to identify and strengthen complementarities
- Organised **15+ joint events** focused on knowledge sharing among sister projects
- Organised **7 thematic webinars**
- Organised **2 Water Projects Europe** sessions
- Delivered **3 joint Policy Briefs**
- Engaged with over **60 EU-funded projects** through joint activities, events, and clustering initiatives.

These outcomes are also reflected in the project’s Key Performance Indicators (KPIs), which summarise the clustering impact in quantitative terms:

Title	KPIs	Reached	Online/ attendees reached
Number of events organised	10+	24+	-n/a-
Number of participants reached	50+	3.820+	97.200+

⁴⁸ Interview L. Vamvakieridou and J. van den Broeke – ICT4Water: Creating a unified digital water playing field – www.wateronline.com (2022)18 January

The main indicators confirm that the project has delivered beyond expectations in terms of stakeholder engagement, visibility, and inter-project synergies.

Impact of Clustering Activities

The clustering activities under ARSINOE enabled engagement with diverse stakeholders across a range of dedicated and co-organised events. Thematic and public reached over 17.000 stakeholders cumulatively. Clustering has resulted in tangible outputs including shared policy briefs, joint communication materials, post event reports, which remain available for further reuse and dissemination. These interactions contributed to knowledge transfer across sister projects and broader platforms, supported alignment with the EU Missions framework, and enabled ARSINOE's outputs to be positioned within ongoing policy and innovation discussions relevant to climate adaptation and water resilience.

Strategic Outlook

ARSINOE's clustering approach provides a reference model for future EU-funded projects aiming to maximise collective impact. It demonstrates that clustering, when integrated as a strategic process, can:

- Strengthen the coherence of the EU research landscape
- Enable knowledge sharing across thematic and territorial boundaries
- Facilitate alignment with emerging policy priorities
- Improve the visibility, usability, and transferability of research results.

LIST OF ANNEXS

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Annex 2: Case Studies mapping

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ANNEX 1: WPE ON SYSTEMIC SOLUTIONS, POST EVENT REPORT





Adapting to Climate Change: Systemic Water Solutions for Resilience

WPE Post-event Report

WP8

Author: Water Europe

Date: 14 March 2025



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



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Introduction

Climate change adaptation requires innovative and systemic solutions to enhance resilience in water management. As the **ARSINOE** project nears completion, this Water Projects Europe (WPE) event served as a strategic platform to present final project outcomes and reinforce the importance of cross-sector collaboration in advancing climate-resilient water management solutions.

The event brought together four leading EU-funded projects—ARSINOE, TRANSFORMAR, IMPETUS, and REGILIENCE—showcasing case study results and emphasizing how water-smart strategies contribute to a **Water-Smart Society**. Supported by the Water Europe Expert Group on Water and Climate, led by Vanessa Ramos, the event provided a unique opportunity to connect research, policy, and implementation, offering practical insights for future climate adaptation strategies.

Discussions throughout the event emphasized the need for integrated, scalable, and science-based adaptation strategies, aligning with EU climate resilience objectives. This post-event summary captures key insights and recommendations emerging from the discussions, offering a cohesive narrative that ties together the shared knowledge and outcomes from the seminar.

The event, attended by 62 participants, was livestreamed on ARSINOE's LinkedIn account, reaching 229 viewers and 5 reposts and achieving a total attendance of 291. The recording is available at the following link: <https://www.youtube.com/watch?v=mmrph15OLWI&t=4802s>.

The event successfully fostered knowledge exchange and collaboration, reinforcing the importance of systematic, cross-sectoral approaches to water resilience in the context of a changing climate. The insights gathered will contribute to the ongoing efforts of ARSINOE and related initiatives, ensuring that water management strategies remain at the forefront of climate adaptation policies. All presentations are available in [WPE ARSINOE](#) folder.

ARSINOE Seminar Series and Water Projects Europe edition

ARSINOE aims to foster climate-resilient regions through systemic solutions and innovative approaches. The project integrates the Systems Innovation Approach (SIA) and the Climate Innovation Window (CIW) to build a robust ecosystem for climate change adaptation solutions. Addressing challenges such as biodiversity loss, flooding, sea-level rise, droughts, water scarcity, heatwaves, and deforestation, ARSINOE has developed a three-tier methodological framework that has been demonstrated across nine diverse showcases as a proof of concept. The overarching goal is to pave the way toward a green, digital, inclusive, and resilient future.

As part of this mission, Water Europe, under the ARSINOE umbrella, has been driving knowledge transfer and exploitation through a series of clustering seminars in close collaboration with the sister projects. These seminars have facilitated dialogue on water and climate-related challenges, strengthening collaboration across initiatives and fostering a strong network for knowledge exchange that can influence policy, research, and market adoption that can be leveraged for policy development, research collaboration, and the market uptake of innovations.

With the projects nearing completion, this WPE edition took on a broader, more strategic role, aiming not only to foster collaboration but also to engage with the European Commission, contribute to policy shaping, and ensure that the knowledge gained through these projects leaves a lasting impact. By showcasing final case study outcomes, this event positioned systemic water resilience solutions within EU climate adaptation strategies, further aligning research efforts with policy objectives and future action plans.

Adapting to Climate Change: Systemic Water Solutions for Resilience

Bringing together experts from across sectors, this event explored how systemic approaches can enhance water resilience in the face of climate change. With the support of the Water Europe Expert Group on Water and Climate, led by Vanessa Ramos, the session fostered critical discussions on climate adaptation, policy integration, and innovative water management solutions.

The Expert Group on Water and Climate aims to bridge the gap between research, policy, and implementation, ensuring that climate adaptation strategies are science-driven and actionable. By fostering collaboration among stakeholders, the group supports the development and deployment of innovative solutions to improve resilience against climate risks, including floods, droughts, and water scarcity.

As part of its broader mission, Water Europe promotes knowledge-sharing, research collaboration, and policy alignment to build a Water-Smart Society—one where water is managed in a way that ensures security, sustainability, and resilience, delivering economic, social, and environmental benefits for all.

During the event, **11 case studies** showcased their results and impact, offering tangible examples of innovative water solutions implemented across Europe. Additionally, the four projects—ARSINOE, TRANSFORMAR, IMPETUS, and REGILIENCE—presented their achievements, demonstrating the power of cross-sector collaboration and systemic innovation in tackling water-related climate challenges.

1.1 AGENDA

10:00 - Opening and handover (5') – **Andrea Rubini**

10:05 - **Keynote** (10') – **Vanessa Ramos** (Aguas do Porto) WE EG Water and Climate leader

10:15 - Water-Smart Society and Climate Adaptation (10') - **Andrea Rubini** (Director of operations, Water Europe)

10.25 - PANEL 1: ARSINOE

- 10:25 - Overview of ARSINOE (5') – **Giannis Adamos** (AUTH)
- 10:30 - CS#3: Main river basin (7') – **Marion Zilker** (VKU), **Ralf Ludwig** (LMU)
- 10:37 - CS#4: Ohrid/Prespa lakes (7') – **Dijana Likar** (IECE), **Suzana Kasovska Georgievska** (IECE)
- 10:44 - CS#5: Canary Islands (7') – **Noelia Cruz Pérez** (ULL), **Joselin Sarai Rodríguez Alcántara** (ULL)
- 10:51 - CS#7: Southern Denmark (7') – **Martin Drews** (DTU)
- 10:58 - CS#8: Torbay and Devon County (7') – **Albert Chen** (UNEXE)
- 11:05 - Remarks and Q/A moderation (10') – **Giannis Adamos**

11:05 - PANEL 2: TRANSFORMAR and IMPETUS

- 11:05 - Overview of TRANSFORMAR (5') - **Chiara Trozzo** (CMCC)
- 11:10 - CS#1: West Country region (7') - **Emily Widdecombe** (WRT)
- 11:17 - CS#2: Galicia region (7') - **Amaya Soto** (CETMAR)
- 11:21 - Overview of IMPETUS (5') - **Hannah Arpke** (EURECAT)
- 11:26 - Coastal Demo Site (7') - **Queralt Plana Puig** (EURECAT)
- 11:33 - Continental Demo Site (7') - **Nasrin Haacke** (Kompetenzzentrum Wasser Berlin)
- 11:40 - Mountain Demo Site (7') - **Valentina D'Alonzo** (Eurac)
- 11:47 - Remarks and Q/A moderation (10') (**Chiara Trozzo** and **Nasrin Haacke** IMPETUS)

11:57 - REGILIENCE: Last notes and forward looking (10') – **Guido Schmidt** (Fresh-Thoughts)

12:07 - Wrap up and closure (5') – **Andrea Rubini**

1.2 Opening

Water Europe hosted an engaging online seminar as part of the ARSINOE project, funded by the European Union. The event brought together experts and stakeholders to discuss the pressing need for systematic solutions to enhance water resilience in the face of climate change.

Andrea Rubini, Director of Operations at Water Europe, opened the seminar by emphasizing the fundamental role of water in sustaining societies, ecosystems, economies, and communities. He highlighted how climate change is placing unprecedented pressure on water quality, quantity, distribution, and infrastructure, underscoring the importance of innovative and integrated approaches to water management.

Keynote

Vanessa Ramos

Águas e Energia do Porto

WE EG Water and Climate leader

During the recent ARSINOE online seminar, Vanessa Ramos from Águas do Porto, leader of the Water and Climate Working Group in Europe, provided a compelling overview of the challenges Europe faces in securing water resilience amid climate change. She provided insights into the impact of climate change on water management and the urgency of implementing resilience-building strategies.

Drawing from the 2024 European State of Water Report, she highlighted that Europe's water quality is not improving. In 2021, only 37% of surface water bodies were in good or high ecological status, while just 29% met good chemical standards. This decline is attributed to multiple pressures on water resources, exacerbated by climate change. Vanessa emphasized that climate change is intensifying water-related challenges across Europe. According to IPCC reports, climate impacts are being felt worldwide, and adaptation measures have been insufficient in addressing the scale and speed of the crisis. With every increase in global temperature, extreme regional events become more widespread and severe, creating urgent climate risks for Europe. These risks disrupt adaptation efforts and present significant challenges for water management.

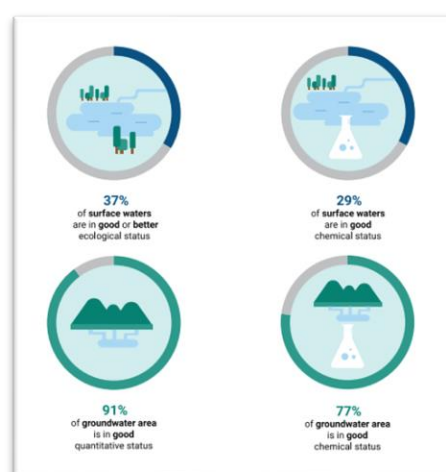


Figure 1 The overall quality of Europe's water is not improving (EEA, 2024)

A video presentation reinforced these concerns, showcasing recent climate-related water crises, including extreme floods in Australia and Spain. Additionally, the European State of Water Report revealed that 20% of European territory and 30% of its population experience water stress annually. Unfortunately, water systems remain ill-equipped to handle these rapid changes.

A recent study from the European Water Research Center examined progress on major water-related agreements, indicating that while positive strides are being made, there is still a long road ahead. Addressing this, Ramos outlined key actions needed to establish a resilient water future, including:

- ✓ Improving water management through smarter irrigation systems
- ✓ Enhancing soil health and reducing pollution
- ✓ Strengthening investments in climate action
- ✓ Scaling up nature-based solutions
- ✓ Implementing systemic strategies for climate resilience at the regional level

Ramos concluded by reaffirming that water lies at the heart of climate resilience. Building a water-smart society requires collaboration, innovation, and bold systemic solutions.

Andrea Rubini

Water-Smart Society and Climate Adaptation

Director of operations, Water Europe

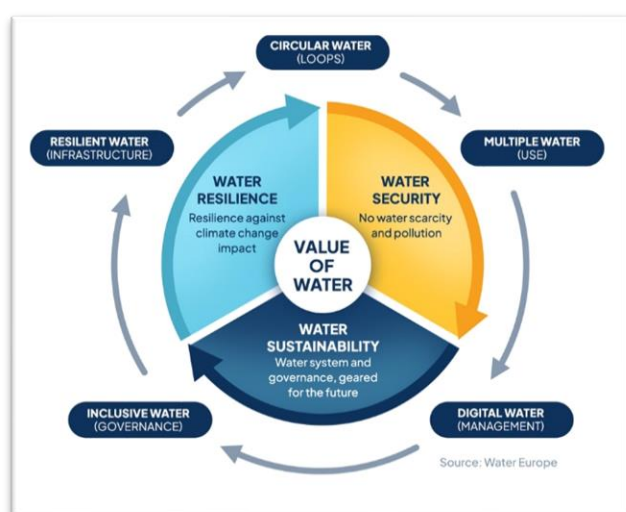


Figure 2 Water Europe vision for a Water Smart Society

Andrea Rubini introduced the concept of achieving a Water-Smart Society, a vision that emphasizes sustainable, inclusive, and resilient water management. This approach aims to ensure the efficient use of water resources while fostering innovation, collaboration, and policy development. By integrating technological advancements with governance strategies, the Water-Smart Society concept seeks to address current and future water challenges, enhancing water security and sustainability across sectors.

To drive this vision forward, Water Europe leverages several key instruments, including its Expert Groups. These groups bring together professionals, researchers, and industry leaders to collaborate on specific water-related topics,

generating knowledge, best practices, and policy recommendations. By fostering cross-sectoral cooperation and engaging stakeholders in the water ecosystem, Expert Groups play a crucial role in shaping solutions that contribute to a more sustainable and water-smart future.

1.3 Panel 1: ARSINOE

Gianni Adamos

ARSINOE Coordinator

Moderator

Giannis Adamos opened the moderation by emphasizing that “Now is the time to take action”. With the ARSINOE project reaching its final phase, the focus has shifted from development to implementation. Many of the innovations emerging from the project's case studies are now ready for commercial and scientific exploitation. This last semester is dedicated to testing and refining these solutions, ensuring they form a valuable portfolio of innovations that can be replicated in regions with similar characteristics.

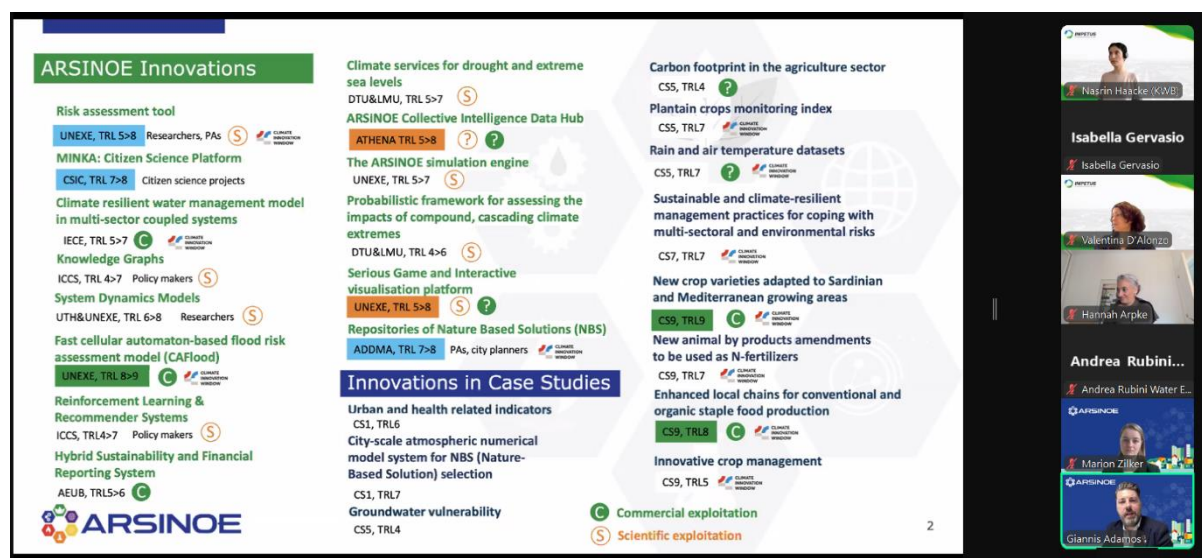


Figure 3 Portfolio of innovation for the ARSINOE project

During the event, **five case studies were presented**, each showcasing tangible results and impacts achieved within ARSINOE:

- CS#3: Main River Basin
- CS#4: Ohrid/Prespa Lakes
- CS#5: Canary Islands
- CS#7: Southern Denmark
- CS#8: Torbay and Devon County

These case studies highlight how collaborative innovation is paving the way for more resilient and sustainable water and climate management. As ARSINOE reaches its final phase, the priority remains on ensuring that these solutions transition from research to real-world applications, fostering long-term impact and scalability.

Marion Zilker, Ralf Ludvig

CS#3 Main river basin

VKU, LMU

Marion Zilker represented CS3, a case focusing on the WEFE Nexus, water management, and the provision of basic public services and utilities. She explained how stakeholders in the region worked together to understand the impacts of climate change and explore new ways to manage resources effectively. By establishing a Living Lab, they created a collaborative space where all relevant actors could engage in co-creation and define a shared vision for climate resilience.

Among the key achievements of CS3 are:

- Co-creation of innovation pathways, identifying barriers to innovation and transformation towards resilience through PESTEL-interviews.
- Selection and implementation of two key innovations: a social innovation (Tap-friendly cycle route) and a scientific innovation (IRRIBIGDATA).
- Analysis of Nexus Governance and continued stakeholder engagement to ensure long-term impact.
- Assessment of stakeholder needs for climate services, identifying barriers to the adoption of existing services.

Marion emphasized that these efforts have not only fostered stronger collaboration among stakeholders but have also paved the way for innovative solutions to enhance climate resilience and resource management in the region.

Improving climate-resilience in the case study region

Tap-friendly cycling route

- Improved access to refill stations and drinking fountains
- Education about water and climate change along the cycling route

IRRIBIGDATA

- Estimates of water needs for irrigation
- Transfer of tools for improving irrigation efficiency
- Transfer of adaptation solutions between EU-countries





Figure 4 Tap-friendly cycling route and IRRIBIGDATA

Dijana Likar, Suzana Kasovska Georgievska

CS#4 Ohrid and Prespa lakes

IECE

Djana Likar introduced CS4, a case study focused on groundwater, agriculture, and the nexus approach in the transboundary Ohrid and Prespa Lakes region, a UNESCO-protected area. She explained how the study addressed the increasing challenge of water scarcity, which has been worsened by prolonged droughts, shifting precipitation patterns, and rising temperatures. These climate pressures, combined with demographic changes and economic expansion, have intensified competition for water resources, requiring a well-coordinated management strategy that balances environmental, social, and economic needs.

To tackle these challenges, CS4 worked on enhancing climate resilience through the development of an integrated and adaptive water management framework. The objective was to optimize water allocation and use, ensuring sustainable access to sufficient, high-quality resources for all stakeholders. By conducting in-depth analysis and strategic planning, the study provided science-based solutions for effective water governance in the transboundary region.



Figure 5 SIA developed in collaboration with WP2

Key achievements of CS4 include:

- Engagement of stakeholders in co-creating innovation pathways, fostering collaboration and informed decision-making.
- Implementation of an open tender innovation call, resulting in signed innovation contracts and project deployment.
- Completion of advanced climate modeling (RCP2.6, RCP8.5), including testing, sensitivity analysis, and iterative improvements.
- Development of 17 datasets, made accessible through the Knowledge Graphs.
- Preparation of input data for the launch of a System Dynamics Model (SDM) to enhance decision-making processes.

Djana underscored how ARSINOE's innovative approach in CS4 has established a robust foundation for adaptive and resilient water management in the region. The developed model provides a balanced strategy that accounts for social, economic, and environmental needs, helping communities navigate the challenges posed by climate change.

Noelia Cruz Pérez, Joselin Sarai Rodríguez Alcántara

CS#5 Canary Islands

ULL

Noelia Cruz Pérez introduced CS5, a case study focused on groundwater, sea level rise, and agriculture in the Canary Islands, specifically La Palma and El Hierro. She explained that the primary goal of CS5 was to better understand the hydrogeological functioning of these two islands, with the intention of extending the findings to the rest of the archipelago. By developing replicable hydrological models, CS5 aimed to support water resource management, disaster preparedness, and environmental conservation across the region.

To achieve this, the study focused on gathering accurate data, building robust models, and documenting the entire process to train local experts. As a result of these efforts, CS5 successfully developed a digital geomodeler of the El Hierro aquifer, providing a valuable tool for long-term water resource management.

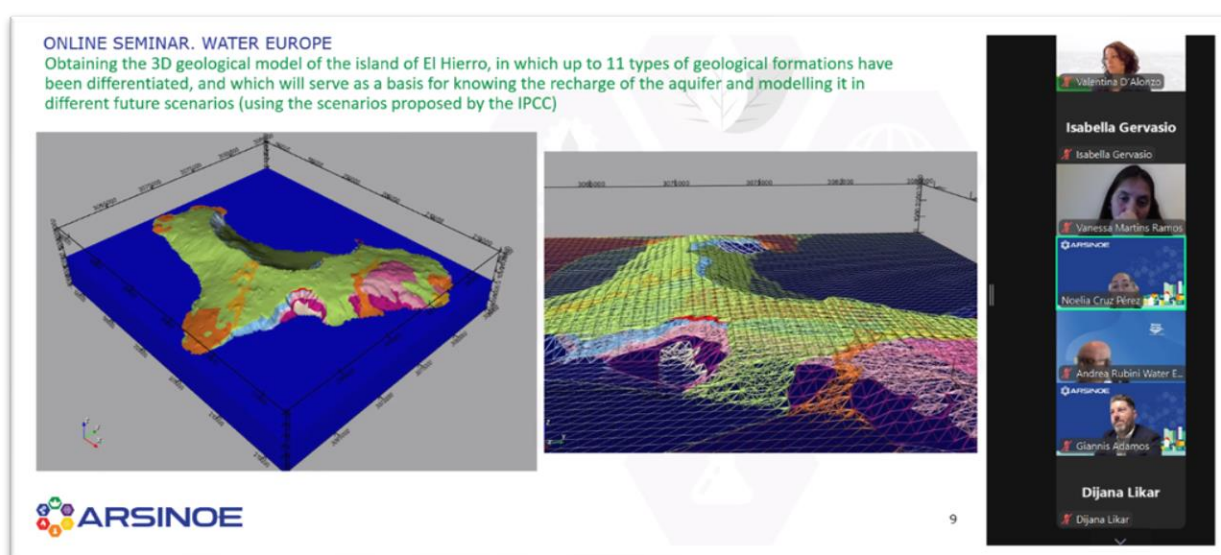


Figure 6 CS5 Geomodeller outputs for El Hierro aquifer

Key achievements of CS5 include:

- Engagement activities carried out with the Living Lab group, fostering collaboration and stakeholder involvement.
- Governance analysis conducted across three islands, providing insights into water management frameworks.
- Selection of a winner in the innovation call, supporting the implementation of innovative solutions.
- Completion of an uncertainty assessment, with CS1 serving as the frontrunner in testing and application.

Noelia highlighted that publications related to CS5 are available on Zenodo, further disseminating the knowledge generated.

Martin Drews

CS#7 Southern Denmark

DTU

Martin Drews represented CS7, led by DTU, focusing on resilience to climate extremes, particularly flooding, drought, and climate-resilient planning in Southern Denmark. He highlighted the region's growing water pressures, including storm surges, heavy rain, river backflow, and rising groundwater, alongside increasing summer droughts and challenges from land use changes. A key goal has been to raise awareness and empower civil society in adaptation efforts.

To support decision-making, CS7 developed an Integrated Damage Cost Assessment Tool, helping stakeholders assess synergies and trade-offs between adaptation strategies. One example showed a planned flood wall in Esbjerg, demonstrating how four extreme sea level rise scenarios would impact the area.

Results – Climate adaptation

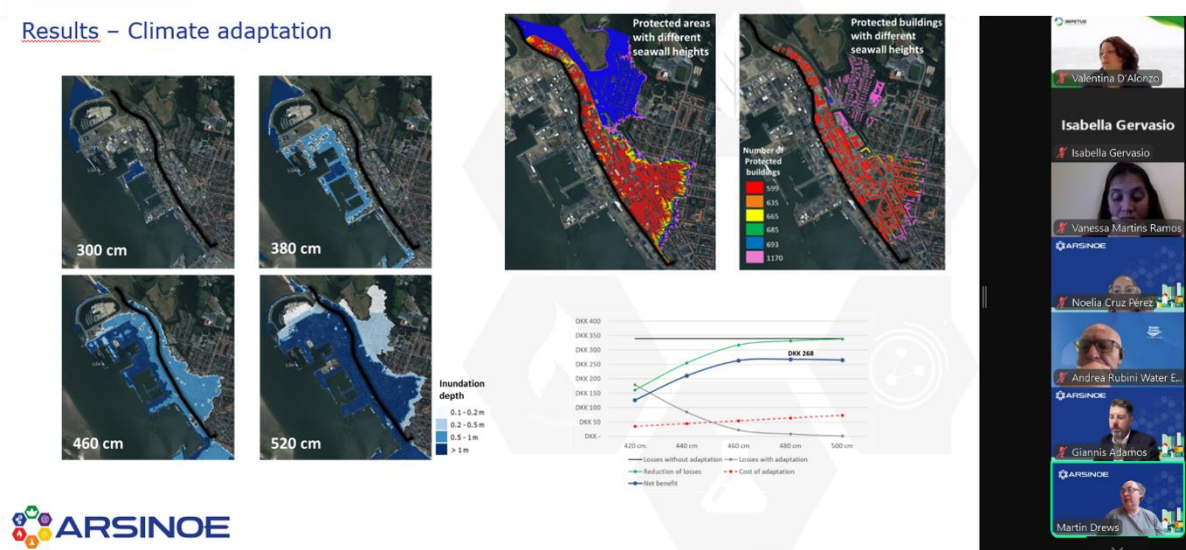


Figure 7 Impact scenarios for different sea level rise

Key achievements of CS7 include:

- Completion of the second and third workshop of the Esbjerg Living Lab, fostering stakeholder engagement.
- Scoping of a “cascading failures” model for Esbjerg and its port, developed in collaboration with CS8 (UNEXE) through desk research and multiple workshops.
- Enhancements to the DTU/OS2 Damage Cost Model, incorporating new features requested by stakeholders.
- Initiation of a new AI-based extreme sea level statistics model for Esbjerg, improving future risk assessments.
- Participation in the second innovation tender, leading to the evaluation and contracting of three innovators.
- Launch of three innovation projects, further advancing climate resilience solutions.

Albert Chen

CS#8: Torbay and Devon County

UNEXE

Albert Chen presented CS8, led by UNEXE, which focuses on flood resilience, cascading effects, and critical infrastructure impacts in Torbay and Devon County. The region has a history of frequent flooding, already damaging properties and infrastructure. CS8 aims to assess community risks by analysing intense rainfall and sea level rise projections and their potential to trigger cascading failures. Starting from a baseline scenario (0% rainfall increase, 0.00m sea level rise), projections for 2050 show a 45% increase in rainfall and a 0.42m sea level rise, worsening by 2070 to 50% rainfall increase and 0.67m sea level rise. The study evaluates the likelihood of these extreme events, maps affected areas and develops measures to enhance community resilience.

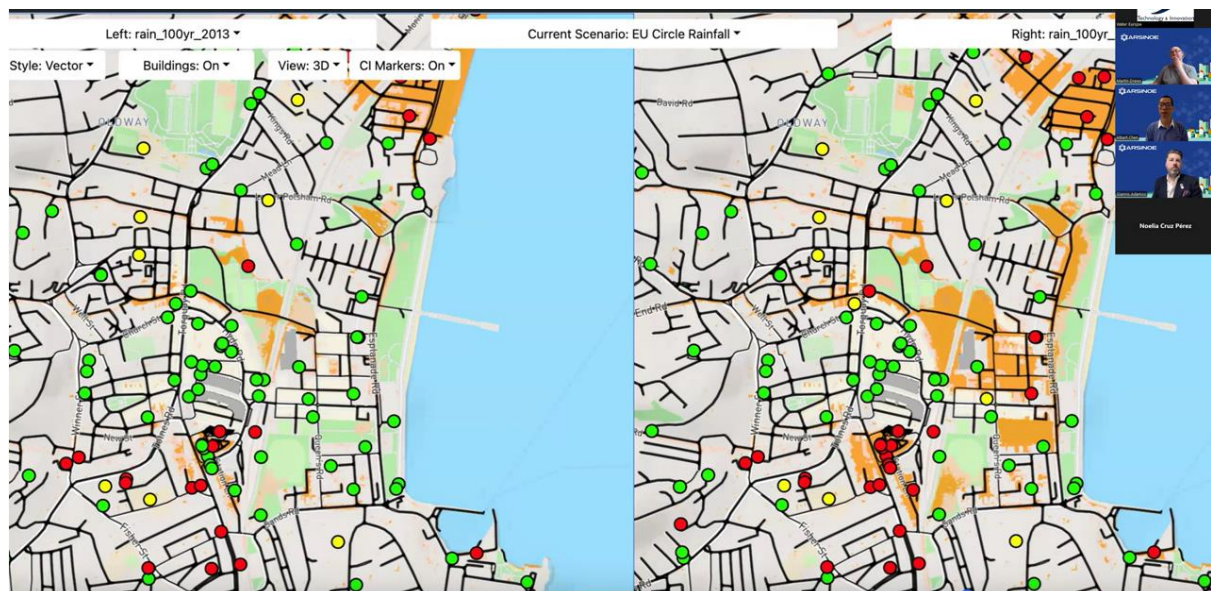


Figure 8 Cascading failure for extreme events

A Living Lab was established to engage local stakeholders and ensure community participation in decision-making.

Key achievements of CS8 include:

- Stakeholder engagement through Living Lab workshops (LL3 and LL4) to gather feedback and refine models.
- Innovator workshop held to foster collaboration between the CS8 team and selected innovators.
- Flood modeling for various scenarios and interventions, assessing risks and adaptation measures.
- Cascading failure simulations, identifying vulnerabilities in infrastructure.
- Development of a dashboard to visualize modeling results and support decision-making.
- Integration of a Digital Twin, connecting real-time data for improved flood risk monitoring.

1.4 Panel 2: TransformAr and IMPETUS

Chiara Trozzo

TransformAr coordinator representative

CMCC

Chiara Trozzo introduced the TransformAr project, which focuses on developing, testing, and demonstrating innovative solutions for climate adaptation across six demonstrator territories facing water-related risks and climate change impacts. In total, 21 solutions were implemented to accelerate adaptation efforts. Solutions included technology, Nature-based Solutions, Governance, Financing and Insurance mechanisms, and Behaviour change. The project's overarching ambition is to contribute to the EU Mission on Adaptation, supporting at least 150 European regions and communities in becoming climate-resilient by 2030.

TransformAr aims to enable faster, smarter, and more systemic climate change adaptation by:

- Developing actionable adaptive solutions.
- Creating actor-driven and impact-oriented adaptation pathways.
- Understanding the acceptability of transformative solutions.
- Conducting full-scale socio-economic impact assessments of transformational adaptation.
- Exploring alternative financing mechanisms to accelerate investments in adaptation.

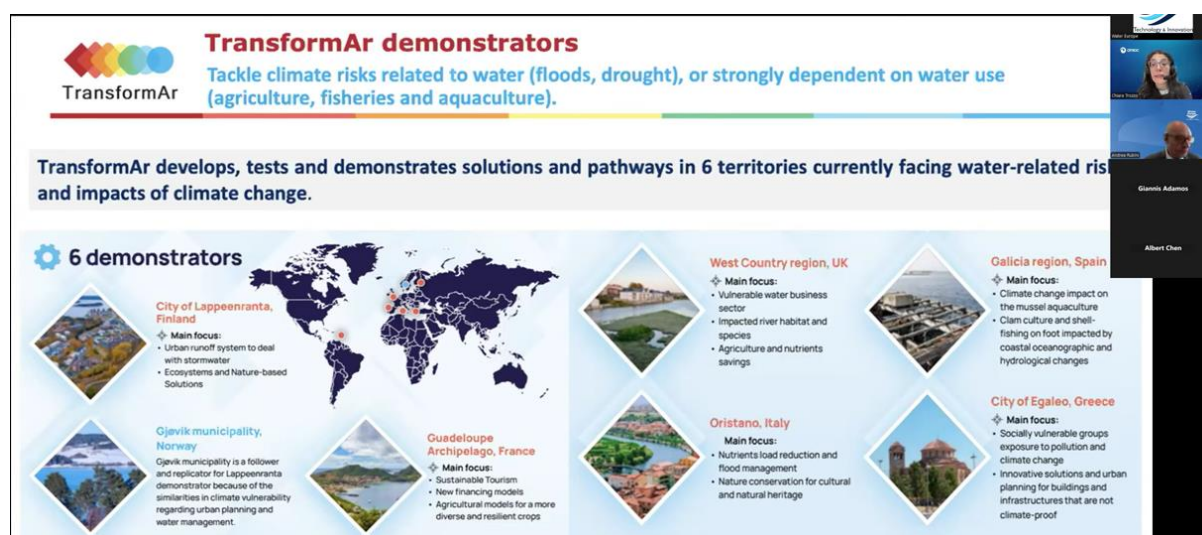


Figure 9 TransformAr Demonstrator cases

During the event, two case studies were presented, highlighting their results and impact within TransformAr:

- CS#1: West Country region
- CS#2: Galicia region

Emily Widdecombe

CS#1 Westcountry region

WRT

Emily Widdecombe presented the West Country Demonstrator, which focuses on nature-based solutions to tackle drought, flooding, nutrient pollution, and eutrophication in the Axe and Camel catchments. While both catchments have high ecological status, they fail to meet water quality targets due to agricultural mismanagement and wastewater treatment impacts. Additionally, water scarcity is becoming an increasing concern in the region.

To address these challenges, the demonstrator sites implemented nature-based solutions to enhance climate resilience, improve water quality, and reduce pollution. A network of key actors and community systems was established to maximize impact and foster long-term partnerships.



Figure 10 Example of NBS applied in the demo case

Emily also highlighted an important aspect of the project: the assessment of the bankability and investment potential of climate adaptation interventions. This evaluation aimed to understand investor interest and explore financing mechanisms to support future adaptation efforts in the region.

Amaya Soto

CS#2 Galicia region

CETMAR

Amaya Soto presented CS2, the Galicia region Demonstrator, which focuses on adapting mussel aquaculture and clam culture/shell fishing to the challenges posed by climate change. She highlighted that these sectors were chosen due to their significant role in the regional economy and their high vulnerability to environmental changes. The region is experiencing shifts in oceanographic and substrate conditions, habitat alteration due to temperature and salinity fluctuations, damage to productive and coastal infrastructure, and an increase in harmful algal blooms, all of which threaten the sustainability of these industries.

To address these risks, the demonstrator engaged 60 organizations from the quintuple helix to co-develop solutions. A total of 18 adaptation measures were identified across governance, management, policy, communication, awareness, technological and engineering solutions, nature-based approaches, and research and innovation. This process resulted in the creation of a structured action plan with six operational objectives and 34 adaptation actions, providing a roadmap for strengthening resilience in the sector.

One of the key solutions tested was the Resilience Index (RI), a mathematical model designed to assess how well operational processes adapt to climate change impacts. This strategic tool evaluates resilience scenarios and key resilience factors within production systems. After calculating the resilience index for the sector, it provides a strategy roadmap with tailored recommendations for improvement, supporting long-term adaptation efforts.

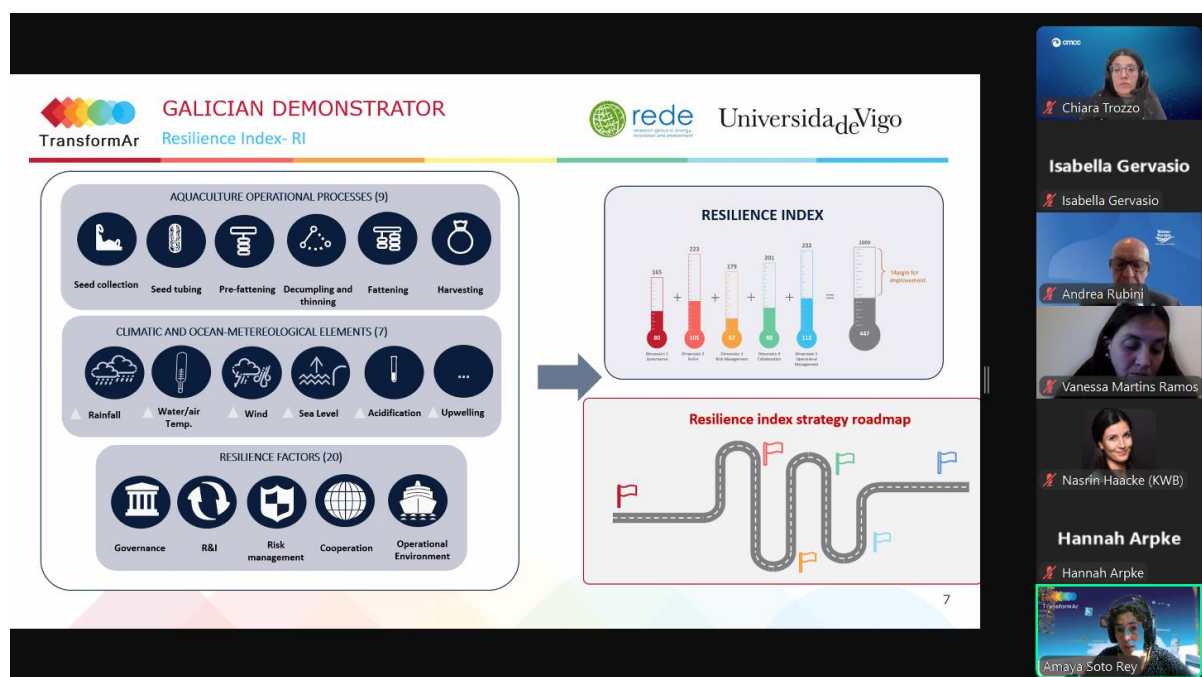


Figure 11 Resilience Index model

Hanna Arpke

IMPETUS Coordinator

EURECAT

Hannah Arpke, coordinator of the IMPETUS project, introduced the initiative, highlighting its role in climate change adaptation through integrated solution packages in water, energy, agriculture, coastal resilience, and urban planning. As an EU-funded project, IMPETUS combines digital tools and scientific research with human-centered, co-created solutions, working closely with stakeholders to develop actionable strategies. The project focuses on water resilience by strengthening infrastructure to withstand climate-related stress, improving water purification from microplastics and toxins, and ensuring equitable access to safe water, fair pricing, and financial support for businesses adapting to water challenges. From a policy perspective, IMPETUS empowers regional stakeholders with knowledge and tools for policy change, advocating through policy briefs and recommendations at the EU level.

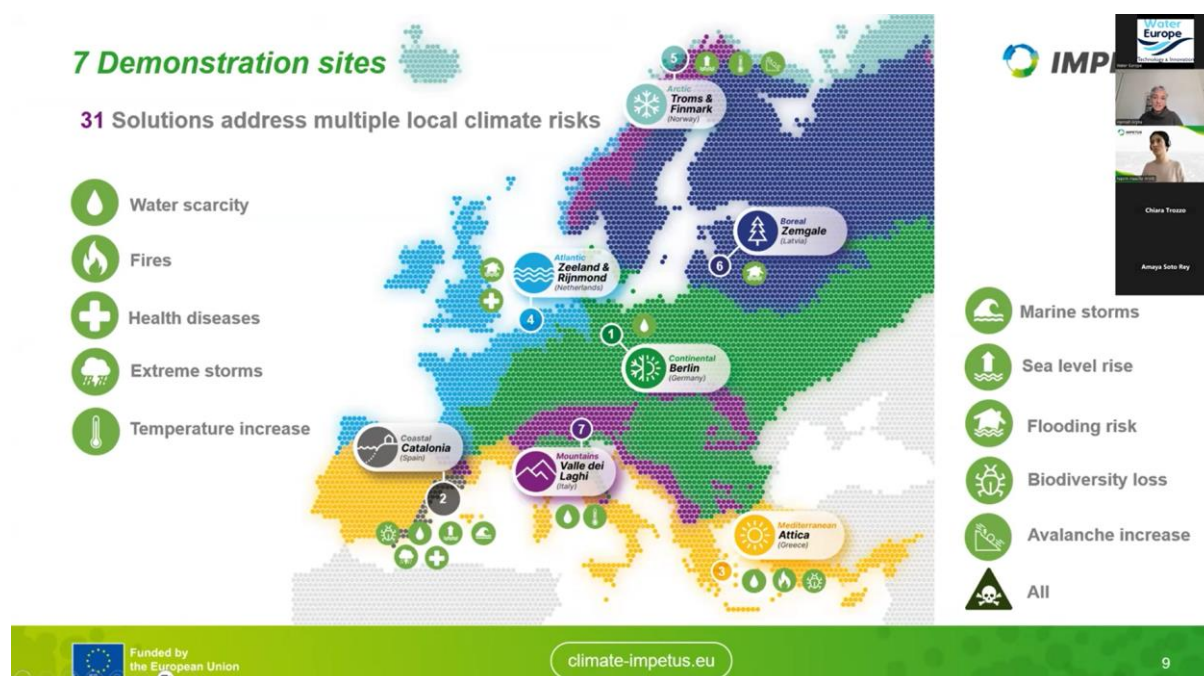


Figure 12 IMPETUS Demonstration sites

Key results include 63 emerging results (ERs), 22 key exploitable results (KERs), and 7 regional knowledge bases (RKBs), alongside the launch of the IMPETUS platform, an open-access resource for data validation, knowledge dissemination, and stakeholder engagement. Additional achievements include climate change vulnerability metrics, hotspot identification, and extensive stakeholder co-creation.

During the event, three case studies were presented, each showcasing tangible results and impacts achieved within IMPETUS:

- Coastal Demo Site
- Continental Demo Site
- Mountain Demo Site

Queralt Plana Puig

Coastal Demo Site

EURECAT

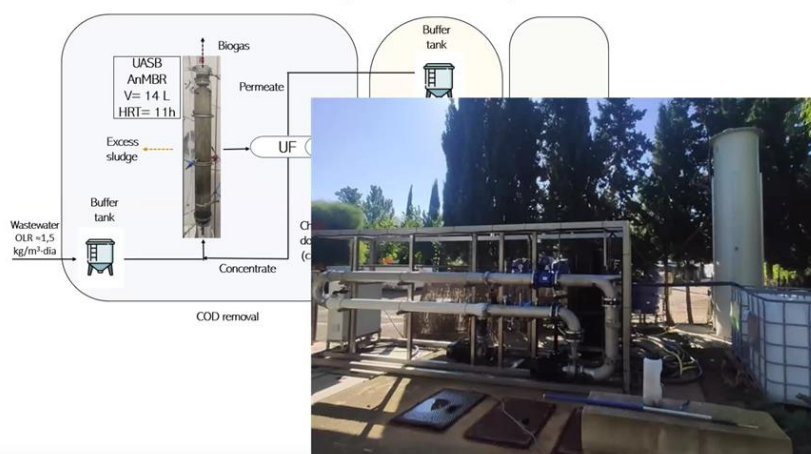
General Plana Puig presented the Coastal Demo Site in the context of the IMPETUS project, addressing the growing challenges faced by coastal regions due to climate change, especially in the Coast of Catalonia, Spain. The region is increasingly threatened by sea-level rise, the intensification of marine storms, water scarcity, and irregular precipitation, which exacerbate flooding and related damages. These climate impacts demand innovative, systemic solutions to enhance the resilience of coastal areas.

In her presentation, Queralt discussed the deployment of hybrid decentralized systems for water management to improve water availability and quality in the region. These solutions aim to optimize water use while reducing dependencies on centralized systems, a critical step for tackling the chronic water scarcity exacerbated by climate change and increased tourism.

The demo site also focuses on adapting to the impacts of sea-level rise and marine storms by enhancing river sediment transport to the coast, restoring multifunctional wetlands, and employing novel dune restoration and monitoring techniques. These measures not only protect the coastline but also help restore biodiversity and improve the natural resilience of the area.

Compact hybrid decentralized water reclamation system

- ☐ Objective: water reuse according to Directive 2020-741 and Real Decreto 1085/2024 to reduce drinking water consumption



- AnMBR:
 - ☐ 75% DQO removal
 - ☐ 80% P removal
 - ☐ 40% N removal
 - ☐ Turbidity < 1 NTU
 - ☐ TSS < 10 mg/L
 - ☐ Low occupation season experiments



Figure 13 Schema and realisation of the decentralised water reclamation system

In addition, the project assesses the resilience of drinking water plants, ensuring they can withstand the increasing presence of pathogens due to changing environmental conditions. This integrated approach, combining innovative technologies with nature-based solutions, offers a comprehensive strategy for managing water resources and ensuring long-term sustainability in the face of climate change.

Nasrin Haacke

Continental Demo Site

Kompetenzzentrum Wasser Berlin

As Nasrin Haacke explains, Berlin's water supply relies entirely on local sources—specifically, bank filtration and groundwater. However, increasing droughts, changing rainfall patterns, and a growing population are placing mounting pressure on both water quantity and quality.

Because natural groundwater recharge is often insufficient, the city supplements its reserves with surface water from the Havel and Spree rivers and nearby lakes. As this water infiltrates through soil layers, it undergoes natural purification before final treatment and distribution. After use, wastewater is collected, treated, and returned to rivers and lakes, re-entering the natural water cycle.

Climate change is now disrupting this delicate balance. To address these challenges, the IMPETUS project applies a set of interconnected models that not only assess current vulnerabilities but also test concrete adaptation strategies to support Berlin's long-term water security. These models include:

- A static and a dynamic mixing model, which both evaluate how an increased share of treated wastewater in surface waters and optimised wastewater discharge routes affect drinking water quality.
- A groundwater model that simulates how changing recharge rates and pumping patterns influence the proportion of bank filtrate in drinking water, guiding strategies to increase bank filtrate use and ensure sustainable extraction.

Together, these modelling tools provide critical insights that feed into the Masterplan Wasser, the strategic framework developed by the Berlin Senate. This plan aims to protect drinking water resources, safeguard aquatic ecosystems, and modernize wastewater management.

Key interventions, driven by the IMPETUS project, include Optimized discharge routes for wastewater treatment plants, improving water quality management and availability. Increased share of bank filtrate, leveraging groundwater resources to reduce reliance on surface water and mitigate water scarcity. And advanced groundwater modelling, assessing the impact of changing groundwater recharge and pumping rates to ensure long-term sustainability.



Figure 14 Water Management strategies put in place in Berlin

Valentina D'Alonzo

Mountain Demo Site

Eurac

Valentina D'Alonzo presented the Mountain Demo Site of the IMPETUS project, which focuses on a Decision Support System (DSS) for sustainable water resource management in mountain regions. Located in Italy's Valle dei Laghi, the site pilots the DSS in an area highly vulnerable to climate change, particularly in water management, agriculture, and tourism. The DSS combines hydrological models, satellite data, and climate forecasts, using a digital twin of the valley to simulate water resources. Its user-friendly dashboard supports decision-making at local and provincial levels, especially during water scarcity.

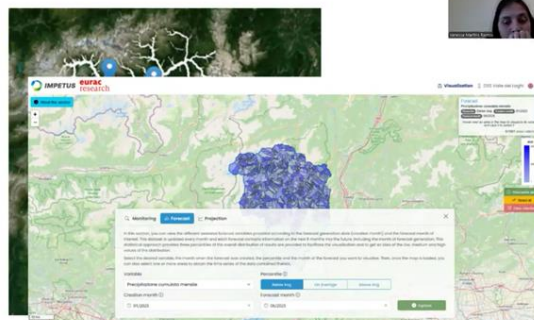
The system also includes groundwater monitoring and data from the Albola-Alto Garda Smart Agricultural Model to improve water availability predictions. Stakeholder engagement through workshops and meetings has helped tailor the DSS to local needs. Key benefits include enhanced collaboration and governance. Its modular design allows for replication in other mountain areas, with users ranging from public authorities to irrigation consortia, hydropower operators, and water utilities.



Decision Support System for sustainable and integrated water management

The **Decision Support System (DSS)** being developed integrates **multiple information layers** to enhance **sustainable management of regional water resources**. It employs hydrological models, satellite data, and climate forecasts to downscale to the complex mountain environment, supporting the design of **medium- and longer-term water management strategies**.

- The back-end of the DSS is based on a **digital twin of the Valley**.
- The tool will be available through a **user-friendly visualization dashboard**.
- Several **workshops and bilateral meetings** have been conducted with local **key stakeholders**, to inform, exchange and validate features and functionalities of DSS.



Sources: Waterjade, Eurac

Figure 15 The technology developed is a tool to support decision making

1.5 Closure

Guido Schmidt

REGILIENCE Coordinator

Fresh-Thoughts

Guido Schmidt from Fresh-Thoughts marked the closure of the event by highlighting that water challenges are not solely driven by climate change but are also compounded by other pressures that must be addressed. He emphasized that climate adaptation actions should benefit not only water users but also contribute to improving the overall health of water bodies. Guido reflected on the lessons learned from past projects, acknowledging that while there have been successes, there have also been challenges in achieving the desired outcomes. He underscored the critical importance of data access and knowledge sharing, pointing to the Canary Islands as an example where, despite being an outermost region with limited information, there has been a significant increase in knowledge. He further emphasized the need for better replication of successful solutions, making it easier for other regions to adopt them. Guido also addressed the challenge of securing funding for replication efforts, particularly beyond EU project funding, and called for exploring alternative financing sources.

Giannis Adamos

Closing remarks

In closing today's seminar, Giannis Adamos reflected on the valuable discussions and insights shared throughout the event. He emphasized that the case studies presented underscored the importance of integrating knowledge across sectors, which is essential for achieving long-term, sustainable water management solutions. Giannis noted that the event confirmed we are at a pivotal moment in addressing the urgent water challenges caused by climate change.

He stressed that this is an opportunity for collaborative efforts to make a significant impact, calling for continued testing, refining, and scaling of solutions that have proven effective in different regions. Importantly, Giannis emphasized that a water-smart society requires innovation, scientific progress, and a human-centered approach to ensure clean and safe water for everyone.

Looking ahead, Giannis highlighted the significance of continued advocacy for the adoption of these solutions, especially at the policy level. With over two billion people worldwide still lacking access to clean water, the need for continued efforts is critical. He concluded by acknowledging that while today's discussions have sparked important insights, there is still much to be done, and the collective action toward building a more resilient, water-smart future continues.

Take aways

Today's discussions highlighted the urgent need to tackle climate change through systemic, water-smart solutions that are grounded in a human-centric approach. The progress showcased by ARSINOE, IMPETUS, and TransformAr reflects the strength of collaboration and innovation in building resilient, sustainable futures. From ARSINOE's integrated resilience strategies to IMPETUS's advanced water management tools and TransformAr's climate adaptation across diverse regions, each project addresses unique challenges while offering scalable, transferable solutions.

Climate change is not a future threat—it's a present reality. With over two billion people still lacking access to clean water, the urgency of our mission is clear. These projects not only develop technical solutions but place people and communities at the heart of their work. The knowledge and tools they deliver must continue to drive action. We must keep testing, refining, and sharing solutions to support the transition to water-smart societies.

Throughout the seminar, case studies from all three projects demonstrated how local, people-focused action fuels global resilience. Together, they reaffirm the importance of innovation and cooperation in managing growing pressures on water resources. Below are some key insights that emerged:

- **Holistic Approach:** All projects, especially innovation-driven ones, must begin with a solid foundation of knowledge and research. The key to success is adopting a holistic approach to tackle complex water management challenges.
- **Addressing Specific Needs:** While the projects aim to implement broad solutions, it's crucial to recognize specific regional challenges. For instance, UNESCO-protected areas impose restrictions on interventions, highlighting the importance of aligning solutions with environmental protection.
- **Data and Collaboration:** The importance of data is emphasized, as is the need for close collaboration with various stakeholders. Engaging local communities and decision-makers from day one ensures better implementation and sharing of knowledge.
- **Scaling Solutions:** Replicating successful solutions in different regions remains a key focus. While each case study presents unique challenges, finding ways to scale and adapt solutions for different contexts is essential for broader impact.
- **Cascading Effects:** Solutions need to address cascading effects across sectors. For example, investigating flood management quickly reveals that it also touches on issues like land use, infrastructure, and broader climate challenges.
- **Local and Global Challenges:** Global challenges such as climate change affect many populations, but specific regions have unique needs. The Canary Islands, for example, face microclimates, extreme heat, and heat islands, which require tailored solutions for local conditions.
- **Human-Centred Approach:** Above all, the focus should remain on people. Ensuring clean water and a safe environment for communities is the ultimate goal of all water management efforts, making human-centred solutions the priority in all projects.
- **Resource Efficiency:** The projects need to make efficient use of the resources provided, ensuring that innovations can be adopted by other regions across Europe and beyond, maximizing the impact of funding and efforts invested.

- **Multi-Sector Approach:** The project emphasized the need for systemic climate adaptation. By integrating multiple sectors, including water management, agriculture, and energy, cross-sector collaboration can deliver comprehensive and scalable solutions.
- **Socio-Economic Impact Assessments:** Understanding the socio-economic impacts of climate adaptation is key to ensuring the success of transformative solutions.
- **Engagement of Local Stakeholders:** Engaging local communities, governments, and industry leaders ensures that the solutions developed are tailored to the specific needs and conditions of each region.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.

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This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 2: CASE STUDIES MAPPING



Annex 2

The Case Studies mapping executed by REGILIENCE is used to find possible synergies among the four sister projects.

Table X.X Title

ARSINOE	Lead partner	Key topics
CS 1 Greening the Athens metropolitan area. Athens, Greece	UTH	Environment, Health, Infrastructure, Enhance green infrastructure, Support urban biodiversity, Design Climate Adaptation policies and NBS
CS 2 Mediterranean Ports. Limassol, Cyprus. Piraeus, Greece. Valencia, Spain.	AUEB	Coastal infrastructures, Tourism, health and well-being, Maritime transport, Resilience assessment, Climate data collection
CS 3 Main river. Germany	LMU	Water-energy-food security, Ecosystem integrity, Resilience and adaptation, Environment-aware decision making, Water resources management, Land use, forest, agriculture, Policy, government and financial analysis
CS 4 Ohrid/Prespa lakes. Macedonia Albania	IECE	Water use, Health, Allocation of water quantity and quality, Improve human health, Food production, Natural environment systems conservation, Clean energy production, Sustainable economic growth
CS 5 Canary Islands	ULL	Aquifers in volcanic area, Agriculture, Water and carbon footprint, Production sectors, Food sovereignty
CS 6 Black Sea	AUTH	Integrated watershed management approach, Climate resilience good practices
CS 7 Southern Denmark Denmark	DTU	Floods, Ecosystems and biodiversity, Energy, Water management, NBS, Governance models, Financing instruments, Cultural heritage
CS 8 Torbay and Devon county UK	UNEXE	Health, Flood, Environment, Infrastructure
CS 9 Mediterranean Island – Sardinia Italy	AGRIS	Water-Food-Energy Nexus, Adaptation of agriculture production system, Food security,

		Increase the resilience of energy and water management distribution system for irrigation
IMPETUS	Lead partner	Key topics
CS 1 Berlin-Brandenburg DE	KWB	Water Resource Management, Irrigation water management, economic impacts of physical climate risks
CS 2 Region of Attica EL	NTUA	Environmental agriculture solutions, Digital tools climate adaptation, Water-Energy master plan, Forest fires & restoration
CS 3 Catalonia coast ES	EUT	Multifunctional wetlands, circular economy & reuse, Sand dunes restoration, Sediment transportation through irrigation networks, Biodiversity loss, Water quality & pathogens detection, Economic impacts extreme storms, Alliance resilient coast, Behavioural change in tourism
CS 4 Area Valle dei Laghi IT	EURAC	Water management, Bio-district to address altitudinal shift of crops, Insurance products for agriculture, forestry & hydropower, Cultural heritage
CS 5 Zemgale Region LV	BEF	Digital Twins for climate adaptation, Governance plans
CS 6 Zeeland NL	N&S	Digital Twins (climate adaptation), Heat awareness system, Monitoring dashboard
CS 7 Troms & Findmark NO	UiT	Digital Twins (climate adaptation, marine spatial planning)
TRANSFORMAR	Lead partner	Key topics
CS 1 City of Egaleo EL		Urban microclimate; Monitoring, IoT, Citizen app, Awareness
CS 2 Galicia ES		Mussel and clam aquaculture; Monitoring and digitalisation, IoT
CS 3 City of Lappeenranta FI		Urban stormwater management (NBS), Modular treatment, IoT, Citizen app

CS 4 Guadeloupe archipelago FR		Local adaptation acceleration fund for the agriculture and tourism sectors
CS 5 Oristano IT		Smart lagoon management (and related ecological monitoring system) & coastal contract approach
CS 6 Gjøvik municipality		Follower (Urban stormwater management)
CS 7 West Country region UK		Financial mechanisms for nature-based rural nutrient management; Integrated coastal wetland; Nutrients; Sensors and monitoring

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ANNEX 3: POST EVENT REPORT SEMINAR 1

3



Impact Of Green-Grey Infrastructures on Climate Change

Seminar 1 – Post-event Report

WP8

Author: Water Europe

Date: 6 July 2022



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

CONTEXT AND PURPOSE

Green-Grey Infrastructures combine nature-based solutions (e.g. wetlands, forests, green roofs) with traditional engineering systems (e.g. drainage networks, flood barriers) to increase adaptability and mitigate climate-related risks. This hybrid approach enhances flood protection, reduces urban heat, supports biodiversity, and improves water quality—contributing to both climate adaptation and mitigation.

The first clustering seminar in the ARSINOE Seminar Series focused on the role of Green-Grey Infrastructures (GGI) in strengthening climate resilience and supporting sustainable water management. Organised by Water Europe and chaired by Frans van de Ven (Deltares), leader of the Water Europe GGI Vision Leadership Team, the event brought together participants from the sister projects **ARSINOE, TRANSFORMAR, IMPETUS, and REGILIENCE**.

These seminars are designed as “quick-fire” events—short, focused discussions that build a critical mass of knowledge and foster cooperation across Horizon 2020 projects tackling climate and water challenges.

1.1 Agenda

Time	Session	Speaker
14:00–14:05	Welcome & introduction	Andrea Rubini,
14:05–14:15	Tour de table	All participants
14:15–14:35	Keynote presentation	Frans van de Ven, Deltares
14:35–14:55	Panel discussion	Moderated by Andrea Rubini
14:55–15:00	Wrap-up and next steps	

KEYNOTE

Impact of Green-Grey Infrastructures on Climate Change

Speaker: Frans van de Ven (Deltares)

1.2 Keynote Insights.

Frans opened with a recap of ARSINOE's objectives and its ambition to contribute to climate resilience through systems innovation. His main points included:

- Many European water infrastructures are **aging and vulnerable**, requiring systemic renewal.
- **Resilience must be multi-dimensional**, including threshold, coping, recovery, and adaptive capacities.

- A **three-point planning approach** is essential: damages can't always be avoided, but they can be **minimised**, and benefits should be **maximised** (social, spatial, economic).
- Solutions should move from traditional grey infrastructure to **hybrid green-grey systems**, where **nature-based solutions complement engineered systems**.
- **Cooperation and adaptability** are key to long-term resilience, especially under uncertainty.

PANEL discussion

- **Can system failure still be tolerated?**

Frans argued that socially and politically, failure is no longer acceptable. "Society is too dependent on vital infrastructure, and governments now demand immediate action when disruptions occur". He posed a challenge to the group: "Should we replace aging systems with the same solutions—or redefine what 'grey' infrastructure should be?"

- **Collaboration potential across projects**

Hannah asked whether opportunities already exist among the sister projects to share best practices for hybrid solutions. Frans replied that while it's early for specifics, there is a shared understanding that minimising damage and maximising benefits must drive future solutions. Mere replacement of infrastructure is no longer sufficient.

- **Bridging investment gaps across Europe**

Hannah highlighted disparities between countries with greater or lesser financial capacity. In some cases, patching existing systems is the only viable option. Frans acknowledged this challenge and emphasised a shift from cost-minimisation to benefit-maximisation. He shared experiences from workshops where stakeholders became so enthusiastic about added value that they exceeded budgets—demonstrating a growing willingness to invest.

- **Subsidiarity and localised governance**

Oscar introduced the concept of subsidiarity, proposing that governance frameworks should reflect local conditions and capabilities. Frans agreed: "Adaptability is more important than uniformity. If neighbouring regions apply different approaches but both are resilient, that's a good outcome". Oscar added that using subsidiarity to avoid perceptions of injustice during the transition will help maintain public and political trust.

- **Multi-functionality and inclusiveness**

Andrea Rubini asked about mechanisms for encouraging more inclusive, multifunctional systems. Frans noted that multi-functionality raises stakeholder expectations and engagement. A water body serving 15 purposes naturally attracts more attention than one with a single function. He advocated for multi-source systems in urban water management: using

decentralised water sources could ease environmental pressure and support circular water-smart cities.

Sara raised a final point: What monitoring and evaluation tools are available to assess multifunctionality in nature-based solutions? This question remained open and was proposed as a topic for the next seminar.

OUTCOMES AND NEXT STEPS

- The seminar sparked a rich exchange on **policy, governance, and practical implementation** of green-grey infrastructures.
- Participants confirmed a shared ambition to move beyond siloed approaches toward integrated, inclusive, and adaptive water solutions.
- The next seminar in the series is planned for **September 2022** and will continue exploring governance and investment challenges.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 4: POST EVENT REPORT SEMINAR 2





How to be Climate Resilient for Water Security

Seminar 2 – Post-event Report

WP8

Author: Water Europe

Date: 30 September 2022



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



The second seminar in the ARSINOE clustering series, titled *"How to Be Climate Resilient for Water Security"*, was held online on Friday, 30 September 2022. The event was chaired by Professor Jan Hofman from the University of Bath and Dr. Blanca Antizar from Isle Utilities, who lead and co-lead the Water Europe Working Group on Water Security, respectively.

This seminar brought together participants from four Horizon 2020 sister projects—ARSINOE, TRANSFORMAR, IMPETUS, and REGILIENCE—to explore how water security is defined and how it intersects with the challenges posed by climate change. With 22 participants, the discussion was dynamic and thought-provoking, highlighting the urgent need to align strategies across sectors and projects to strengthen resilience.

A key focus of the discussion was the complexity of defining "water security." The term is inherently multifaceted, touching on availability, accessibility, quality, and efficient use of water resources. Because water security applies across environmental, social, and economic dimensions, finding a commonly accepted definition remains a major challenge. The diversity of local contexts and stakeholder perspectives adds further complexity, making it essential to adopt flexible, inclusive approaches when shaping water security strategies.

To move from abstract discussions to practical action, the seminar emphasized the importance of identifying clear and measurable indicators. These indicators can help operationalize the concept of water security by enabling stakeholders to monitor progress, assess vulnerabilities, and evaluate the impact of their efforts. During the seminar, several real-world case studies were presented, providing concrete examples of how water security challenges are being addressed in different regions. These case studies helped translate theory into practice, offering useful insights and lessons that could be adapted by others.

One of the central conclusions of the seminar was that resilience must become a guiding principle in how we understand and achieve water security. In a world increasingly shaped by climate change, resilience refers to the ability of systems, communities, and ecosystems to absorb shocks, adapt, and recover. Whether facing droughts, floods, or water scarcity, a resilient approach is vital to reduce risks and prevent economic losses.

Achieving resilience in water security is not only about building physical infrastructure. It also requires access to innovative technologies, the sharing of expert knowledge, supportive financial mechanisms, and governance systems capable of coordinating across sectors and scales. Investing in infrastructure alone is not sufficient; the institutional and social frameworks around water must also evolve to ensure long-term effectiveness.

A short survey was conducted during the seminar to capture participants' views and identify shared priorities. The results underscored a strong consensus around the importance of resilience and the need for further collaboration to refine the tools and approaches that can support climate-resilient water security.

This second seminar continued to build momentum for joint action among sister projects and provided a valuable space for aligning strategies, sharing experiences, and exploring future cooperation. The insights gathered will feed into the next phases of the ARSINOE initiative and contribute to developing a coherent European approach to water resilience in the face of climate change.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 5: POST EVENT REPORT SEMINAR 3

5



Climate Change and its Impact on Water and Public Health

Seminar 3 – Post-event Report

WP8

Author: Water Europe

Date: 19 April 2023



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



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Introduction

Water is vital for human health. A minimum amount of water is required for consumption daily for the survival of humans and all other forms of life, and access to safe water, sanitation and hygiene is the most basic human need for health and well-being. In addition, water plays a central role in many spheres of human life which have direct and indirect repercussions on health. Agriculture, fish farming, industrial production and energy generation require large amounts of water. Last but not least, water is a fundamental component of ecosystems, on which our health and well-being depend.

Water, however, is a finite resource increasingly stretched by rising demand due to rapid population growth, urbanization, increasing water needs from agriculture, industry, and energy sectors, misuse, poor management, over-extraction of groundwater and contamination of freshwater supplies. According to the UN, a 40 per cent shortfall in freshwater resources by 2030 coupled with a rising world population has the world careening towards a global water crisis.

Climate change exacerbates this already alarming picture, jeopardizing the quantity and quality of our water. As the earth's temperature rises, warmer weather causes more water to evaporate, allowing the air to hold more water. This sets the stage for heavier rainfall and flooding, which decreases the quality of our water and increases health risks by contaminating the water we drink along with crops and other food we eat. In addition, the rising temperature of lakes and oceans creates a more hospitable environment for some harmful algae and other microbes to grow, with further negative impacts on water and food safety.

Access to clean water and sanitation is a fundamental human right. Ensuring public health requires addressing the multiple challenges climate change poses through a holistic, integrated approach and a systemic point of view. Having this in mind, Water Europe commits to facilitating knowledge transfer and exploitation by promoting discussion to build a stronger and clearer vision of future actions on available technologies and reinforced decision-making processes, including the social, environmental, and economic dimensions.

ARSINOE is an EU funded project which is meant to leverage innovation from climate adaptation across a series of key systems like biodiversity, flooding, sea level rise, drought, water scarcity, heat waves and deforestation.

Having this in mind, Water Europe - under ARSINOE's umbrella - facilitates knowledge transfer and exploitation by organising a series of seminars on common topics to discuss gaps and synergies with the purpose of leading the discussion towards building a stronger and clearer vision of future actions on available technologies and reinforced decision-making processes, including the social, environmental, and economic dimensions. The scope of these events is to create a critical mass of exchanged knowledge, intelligence, and experience and capitalise, disseminate, and exploit this critical mass for different or combined purposes for policy development, further R&I collaboration, and market uptake of innovations.

This third seminar is about “**Climate Change and its Impact on Water and Public Health**” and is chaired by the Water Europe Working Group on Water & Public Health led by Cristian Carboni with the support of a panel of experts from the sister projects [ARSINOE](#), [TRANSFORMAR](#), [IMPETUS](#) and [REGILIENCE](#).

Working Groups are the operational level for members' collaboration and coordination in WE. They are fully member-driven, the backbone of our WE community that provides technical and scientific inputs on a series of themes that voice the water-related challenges, needs and opportunities of each respective field at a European level. The scope of the Working Group on Water & Public Health is to make health an important element in EU water-related policies and boost the R&I methodology to contribute to the **achievement of a Water Smart Society in which the value of water is recognized and protected as a precious resource for human health and well-being**. The WG focuses on the core values of healthy water,

healthy environment and healthy ecosystems which brings to healthy economy, healthy society, healthy people, peace and stability.

The working group analysed and provided clear advice to the water value chain on selected areas of interest in need of further coordination and support at the policy and R&I level, with the aim of translating the concept of water quality and safety and the importance of water for public health into the European context and to contribute to achieving a water-smart society that ensures access to water, sanitation and hygiene for all.

AGENDA

SUBJECT	PRESENTER
Introduction to the Arsinoe Seminars Series and clustering activities	Andrea Rubini
Climate Change and its Impact on Water and Public Health	Irina Calancea, Cristian Carboni, Claudia Topalli (WG Water and Public Health)
Reducing risks of maladaptation: Examples from public health	Teresa Geidel (Regilience)
Climate Change Challenges in a Transboundary Setting	Chrysi Laspidou (Arsinoe)
TransformAr: Accelerating and upscaling transformational adaptation in Europe: demonstration of water-related innovation packages	Antonio Trabucco, Fred Hattermann (TransformAr)
Panel discussion and Q/A	Andrea Rubini (Moderator)
Wrap up and take aways	Andrea Rubini

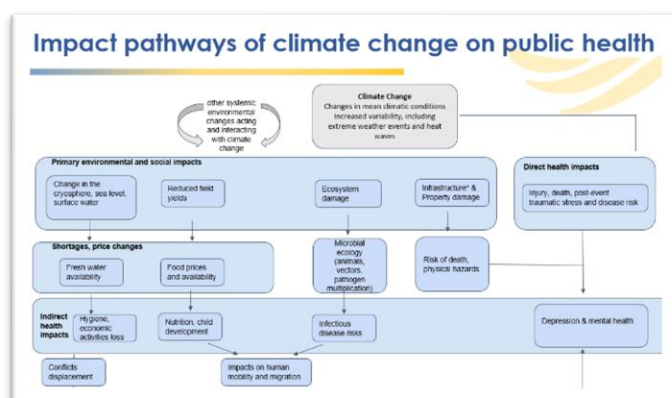
Climate Change and its Impact on Water and Public Health

Irina Calancea (VEOLIA)

Working Group on Water & Public Health

Climate change is the biggest global health threat of this century. Human activities are driving the global warming trend observed since the mid-20th century and induce global environmental changes. Greenhouse emissions from fossil fuel-based power generation and transport and from the agriculture and mining sectors increase the heat-retaining capacity of the lower atmosphere, resulting in global warming.

Land degradation, ocean acidification, food insecurity and extreme weather, coupled with disruptions and depletions of the stratospheric ozone concentration, soil fertility, fresh-water resources, biodiversity stocks and ecosystem functioning, and global nitrogen and phosphorus cycles are only a few examples of the consequences of global warming.



The seminar began with an overview of the direct and indirect effects of climate change on human health. The impact pathways of climate change on the environment, the social sphere and public health were described.

The speech emphasized that reducing emissions of greenhouse gases can result in improved health, with a consequent reduction of related costs and how at the local level, exposure to the consequences of

climate change can be mitigated by good health system capacity.

Governance, leadership, access to medical products and stability of the health workforce are the elements that can lead to a resilient health system. At global level instead, only 0.5% of multilateral climate finance has been allocated to health projects, and developing countries are paying the highest price in terms of health care costs, water-borne diseases, malnutrition and heat waves.

Cristian Carboni (Industrie De Nora S.p.a.)

Working Group on Water & Public Health

The intervention addressed the major factors that impact on water quality and quantity. Climate change is causing new problems but is also exaggerating existing ones. It is not only about shortages of water availability: intermittent discharges and runoff events caused by more excessive rainfall, leads to supply disruptions or inundations that can facilitate the growth and spread of pathogens such as Cryptosporidiosis infection among children (as happened for example after several days of heavy rain in

June 2013 in eastern Germany), but also Salmonella, Norovirus, Campylobacter and other pathogens. Climate change could lead to the development and spread of previously scarce species of microorganisms.

The second part of the speech focused on the impact of climate change on biodiversity and ecosystems. Biodiversity supports human and societal needs, including food and nutrition, development of drugs, it also supports economic opportunities and leisure activities that contribute to overall well-being. Approximately two-thirds of known human infectious diseases are shared with animals, and most recently emerging diseases are associated with wildlife this means that human health and well-being are influenced by the health of local plant and animal communities; for this reason, an ecosystem approach is essential.

The main factors described during the talk that have an impact on water quality and quantity are as follows:

- Temperature increasing
- Decrease of flow rate and consequent concentration of pollutants in water and sediments
- Climato-hydrological events (flood dry, marine immersions, sea level rise)
- Greater extraction of groundwater with risk of intrusion of saline or polluted waters
- Climato-hydrological events (intensive rain, soil dryness, degradation of forest)
- A water quality deteriorated under effect of climate change.

All impact factors are all connected to each other, climate change impacts on water availability, which in turn affects migration and economic factors. All of these affect the treatment and distribution of drinking water and its cost, making more and further treatment necessary. Cristian concluded that we need action on policy and on finance sectors to find and implement technical solutions to mitigate these impacts.

Claudia Topalli (Idexx laboratories)

Working Group on Water & Public Health

From a policy-making perspective, there is the need to have a coordinated policy framework comprising urban, industrial and rural domains, upstream and downstream to have a global view. Legal requirements at local, European and global level on water governance should be followed not only by penalties but also by investments to promote sustainable financing and should also include sustainable financing and financial planning to achieve its goals. Legislation should simplify, harmonise, speed up and promote the diffusion of technological solutions that can quickly reach the market.

All water-related policies need to interrelate so that information is easily accessible to all water stakeholders, both professional and non-professional. The local stakeholders include the public sector, private sector, research sector, citizens, NGOs and representatives of socio-cultural entities who would

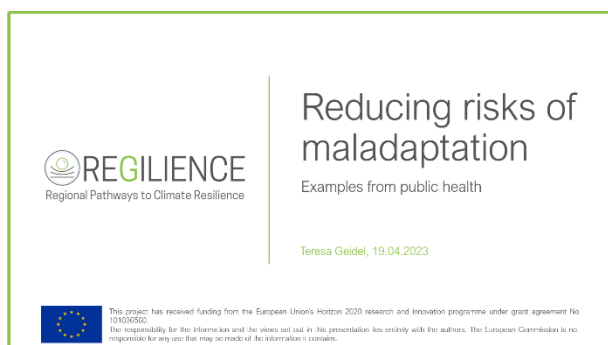
be involved at all stages of policy creation and the implementation process of resulting actions. Together these socio-political sectors are known as the Quintuple Helix.

Policies must have clear microbiological and chemical parameters and consider emerging pollutants. Policies must provide for microbial monitoring during the whole water cycle and must relate to the regulations involving the clinical and veterinary aspects as their impact on antibiotic resistance.

REGILIENCE

Teresa Geidel

Reducing risks of maladaptation: Examples from public health



What impact does maladaptation have on public health? While climate change poses a serious threat to ecosystems and livelihoods, the ways in which we adapt to climate change impacts can also go wrong, usually unintentionally. This is referred to as maladaptation, which can exacerbate negative effects of climate change and may be harmful in the same sector where the adaptation project is applied, or effect other sectors, sooner or later.

In order to minimize the risk of maladaptation, before it is too late, it is important that planners or adaptation planners consider the potential maladaptation risks already in the planning phase. The [self-assessment tool for maladaptation](#) by REGILIENCE can be useful in identifying potential risks and raising awareness of maladaptation early on amongst people who plan adaptation actions in all sectors, to minimize potential negative impacts in the field of water and public health.

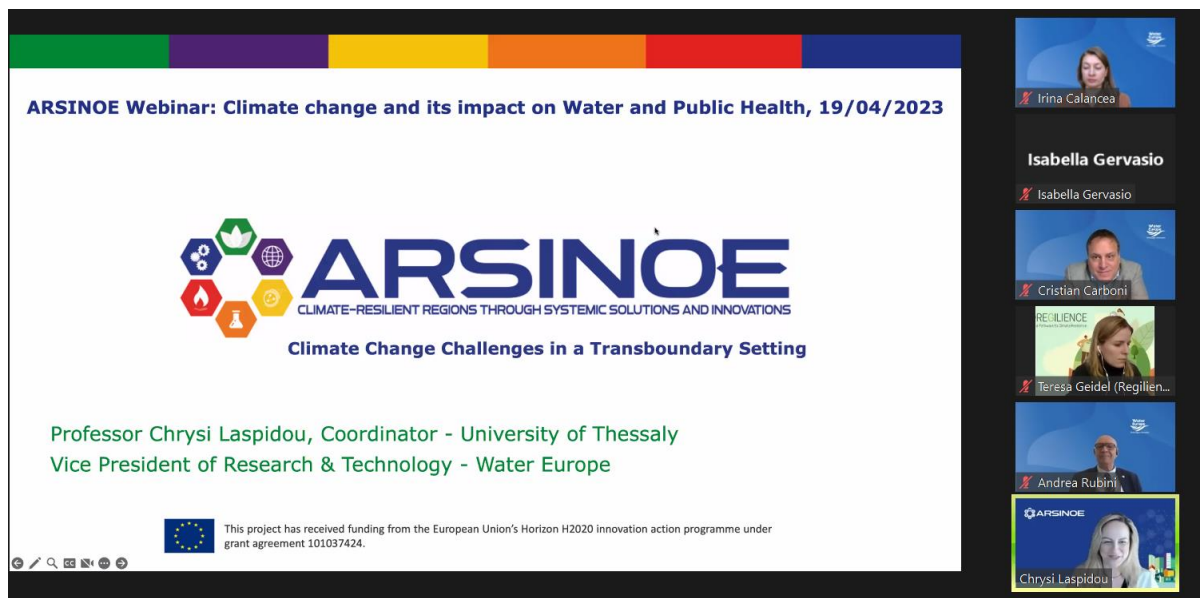
ARSINOE

Chrysi Laspidou

Climate Change Challenges in a Transboundary Setting

ARSINOE is a 15-million-euro H2020 Innovation Action of 41 partners from 15 European countries aiming at building climate-resilient regions through systemic solutions and innovations. ARSINOE focuses on various climate change challenges across different contexts in 9 case studies and addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies and proposes climate change adaptation solutions. Water related challenges are at the core of many ARSINOE case studies and the challenges become increasingly complex in transboundary settings. The

One Health approach provides a comprehensive understanding of health risks and benefits, but it is yet insufficiently connected with the resource nexus interlinkages. Health is related to climate change hazards and there is a clear need to advance our understanding of nexus interlinkages with the One Health approach, across disciplines and sectors through a balanced and systemic approach.



The ARSINOE project assesses vulnerability of climate change by identifying the factors and socio-political conditions that make population and marginalised communities more vulnerable to climate change, with special focus on the socio-economic aspects. In the 9 case studies of the project, climate hazards and number of people exposed to the hazards are taken into account. The link with public health emerges with extreme heat which affects population with high morbidity and mortality rates, and also impacting on critical infrastructure and health facilities, with cascading effects on other sectors, including economic. Still, there is the need to focus on the health benefits from nature and nature-based solutions in cities that go beyond physical health to include mental and social health, while addressing biodiversity loss and water is at the centre of this process.

In ARSINOE, interlinkages become even more complex when the setting is transboundary, especially when the countries involved are not all members of the EU. In the case study of the Ochrid-Prespa Lake system, we explore the numerous water management challenges related to the multiple water users in three countries—Albania, North Macedonia, and Greece, such as water supply, agriculture, industry, tourism and energy, at the same time respecting the high environmental value of the ecosystem. In a different context, the Black Sea case study conducts a Source-to-Sea study following a virtual watershed approach to explore a complex land-sea system with multiple implications on the different ecosystem services. Water quality of rivers, eutrophication in freshwater and coastal areas, salted soils, impacts of precipitation and run-off extremes on biodiversity are some of the water-related challenges of the case study.

TransformAr

Antonio Trabucco, Fred Hattermann

TransformAr: Accelerating and upscaling transformational adaptation in Europe: demonstration of water-related innovation packages.

TransformAr is an EU-funded project aimed to develop and demonstrate solutions and pathways to achieve rapid and far-reaching transformational adaptation (TA) across the EU. The goal is to support regions and communities in their societal transformation towards climate change resilience.

The presentation introduced the project and outlined the current state of play, with a focus on climate change and its impacts on water and related sectors. The demand for water by different sectors will be influenced by climate change and other non-climatic factors. More specifically, socio-economic development will influence the expansion or reduction of economic sectors and the consequent impact on water demand. From this perspective, modelling will lead to better water management by taking into account projections, hazards and changes in water demand and water needs.



The Sustainable Development Goals are an emblematic example of the standard assessment needed in the water sector to compare the results of adaptation solutions with each other and also to compare results in different regions. They correlate different options of water uses and needs by matching water supplies and uses, with the aim of achieving sustainable water uses through efficient and feasible adaptive solutions, integrating public health concerns with ecosystem health and, broadly speaking, of environment needs in general.

Q/A session

The Q/A session revolved around the topic:

What are in your opinion the main barriers that are slowing the adoption of solutions to address the impacts of climate change on water and public health?

ANDREA RUBINI

Climate change is an important driver which has an impact on water quality, quantity and availability, on the resilience of water systems to be able to provide water on the right quantity, in right quality and in the right time to the users. This has an impact on the economy, on the stability of the society and ultimately has an impact on health. Europe is investing a lot of resource in research and innovation to find technological and governance solution able to convey adaptation and mitigation measures the impact of climate change on water. A circular economy approach for water requires time, investments and political leverage.

FRED HATTERMAN

First of all, we must mention the acceptance of climate change by past decision-makers as a major barrier, as uncertainty led to inaction. There was no perception that failure to act was making the situation worse. In the last decade we are seeing floods and droughts, and now that we are more aware of the current situation the main barrier is the complexity of the problem and the need for large investments. Communication is a further aspect to consider when we talk about adaptation and mitigation as tackling climate change includes also investing in wellbeing in cities to be more family-friendly and with better air quality. The communication should address not only the difficulties and should include the benefits of investing in the future and in the circular economy.

IRINA CALANCEA

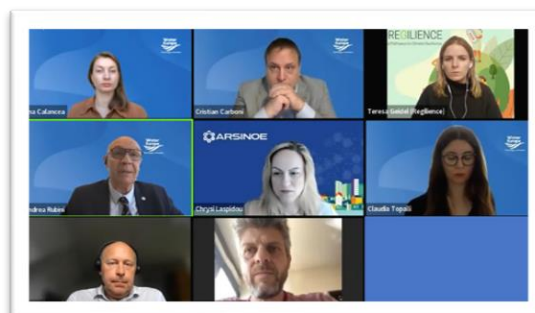
The lack of political will is another constrain. Governments don't always prioritise climate change mitigation actions and adaptation measures. The technology does exist, especially in developed countries, but sometimes implementation is complicated due to the regulation because sometimes legislation does not keep pace with technological innovation. Climate change is an urgent issue that does not leave so much time.

CHRYSI LASPIDOU

Another aspect is the collaboration, the complexity of the actors involved to address the issue and achieve the goals. It is not one-sided solution; actors need to consult and reach consensus in an inter-dependent way. We need to find structures to collaborate that are not on-the-spot design, and these could be the **Water-oriented Living Labs** where stakeholders are constantly involved and consult with each other with established collaborations to reach a consensus and advancing.

ANDREA RUBINI

ARSINOE Seminar 3



Water is a global challenge and climate change has global impacts, but solution must be found at local level, and Water-oriented Living Labs support systemic solutions at local level.

TERESA GEIDEL

There is a lot of pressure on citizens to inform themselves to make good decisions about the environment and puts a lot of responsibility on individuals, and decision-makers should dare to regulate or ban some options to minimize negative effects of human activities on the environment. The lack of political commitment may also be connected to the legislation period of governments which often is a four-year span to fulfil promises to voters, preventing systematic change and how things are done so far is not questioned enough.

ANDREA RUBINI

The points discussed at today's meeting to address the global challenge of climate change include important messages: people's participation, political leverage, and investment are needed to bring about long-term change. The solution to climate impact requires time, commitment and participation and includes careful communication with users and citizens to bring them into the process. Water-oriented Living Labs are a real-life environment where academia, business, people and public authorities sit around the same table to find a common understanding and agreement on sustainable development, which in turn affects society's ability to be more resilient and adaptable to climate change.

Take aways

- Climate change has direct and indirect effects on human health.
- Excessive rainfall and floods can facilitate the growth and spread of pathogens.
- Action on policy and on finance is needed to find and implement technical solutions to mitigate climate change impacts.
- From a policy-making perspective, there is the need to have a coordinated policy framework to have a global view.
- Policies must have clear microbiological and chemical parameters and consider emerging pollutants.
- There is the need to minimize the risk of maladaptation as it can exacerbate negative effects of climate change.
- Modelling can contribute to better water management.
- Communication should address also the benefits of investing in the future and in the circular economy.
- Sometimes implementation of technology is complicated because legislation does not keep pace with technological innovation.
- Water-oriented Living Labs are suitable collaborative tools for addressing complex issues in a participatory way.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 6: POST EVENT REPORT SEMINAR 4

6



How can NBS support climate-change adaptation and mitigation in the water sector?

Seminar 4 – Post-event Report

WP8

Author: Water Europe

Date: 1st June 2023



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



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Online Seminar: How can NBS support climate-change adaptation and mitigation in the water sector?

 01 June 2023

 11.00–12.00 CEST Online

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Introduction

This fourth seminar hosted by WE is about **“How can NBS support climate-change adaptation and mitigation in the water sector? An illustration with urban stormwater management”** and is chaired by Water Europe Working Group on Natural-Based Solutions led by Kamal Azrague and Frédéric Cherqui, carried out with the support of a panel of experts from the sister projects [ARSINOE](#), [TRANSFORMAR](#), [IMPETUS](#) and [MULTISOURCE](#).

Working Groups are the operational level for members’ collaboration and coordination in WE. They are fully member-driven, the backbone of our WE community that provides technical and scientific inputs on a series of themes that voice the water-related challenges, needs and opportunities of each respective field at a European level. The scope of the Working Group on Natural-based Solutions is to foster the research, development, and implementation of NBS in the public and industrial water sectors to contribute to the **achievement of a Water Smart Society in which the value of water is recognized and protected as a precious resource for human health and well-being**. The WG focuses on exchanging information among different groups, implementing nature-based solutions; discussing the different classes and variations of nature-based solutions and their effects; providing input in national and European research and innovation programmes; and facilitating joint research and innovation activities and contribute to achieving a water-smart society that ensures access to water, sanitation, and hygiene for all.

The panellists analysed and provided clear advice on how nature-based solutions can support climate change mitigation and adaptation. The topic has been illustrated from the perspective of urban stormwater management. In particular, the panellists have discussed on how systems have evolved from drainage pipes to source management solutions, such as NBS. The agenda included the showcase of some solutions available today at the city scale. To conclude, the panellists have explored lessons learned and current limitations to the development of NBS.



SUBJECT	PRESENTER
Introduction to the Arsinoe Seminars Series and clustering activities	Andrea Rubini
Keynote speech	Anacleto Rizzo Fabio Masi (Multisource)
How can NBS support climate-change adaption and mitigation in the water sector? An illustration with urban stormwater management	Kamal Azrague Frédéric Cherqui
A business model for greener cities: a rapid assessment tool to assess the multi-benefits of storm water management	Jan Cools (TransformAr)
Nature-based solutions in urban stormwater management – Not just an option, but a starting point	Sanna Varis (TransformAr)
Large scale installation of green roofs as NBS for a sustainable urban water management	Elena Cristiano (Arsinoe)
Implementation of NBS to protect the Catalan coastal line against severe events	Queralt Plana Puig (Impetus)
Panel discussion and Q/A	Andrea Rubini (Moderator)
Wrap up and take aways	Andrea Rubini



Keynote speech

Anacleto Rizzo

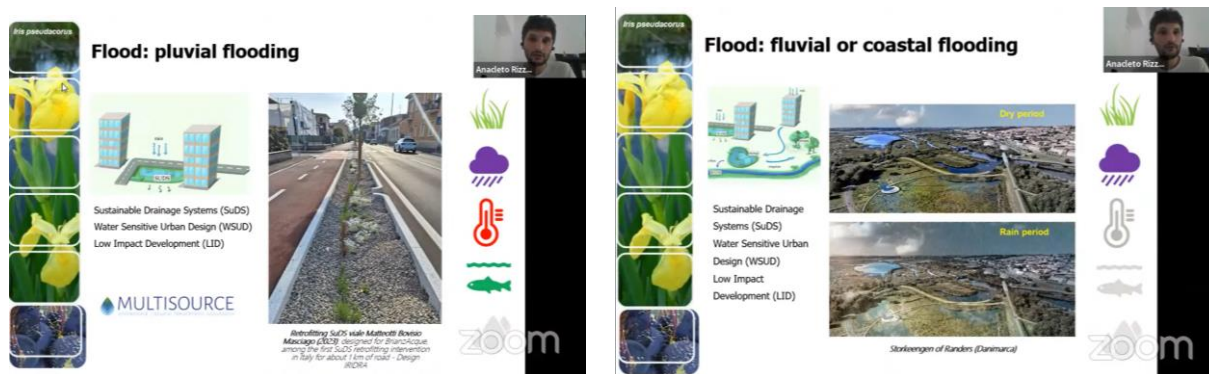
IRIDRA Srl

The keynote speech centred on the systemic approach of Nature-based Solutions (NBS) for climate change adaptation, with a specific focus on the water sector in sub-urban regions. The speech highlighted the detrimental effects of rising temperatures, floods, and droughts on water security, which subsequently impact water quality and biodiversity.

During the presentation, an overview of NBS was provided, accompanied by compelling case studies that showcased its practical application. The primary message conveyed was the significance of adopting NBS as a comprehensive solution when addressing climate-related risks. For instance, a notable example was presented, demonstrating the retrofitting of a "rain garden" in Italy within the sustainable drainage systems (SuDS) framework. This approach not only addressed issues of flood management but also yielded improvements in water quality and the promotion of biodiversity.

Another study highlighted the successful utilization of detention basins to effectively address fluvial challenges. Additionally, the presentation emphasized the efficacy of rainwater harvesting in mitigating droughts, exemplified by the use of bioclimatic tanks. Furthermore, the discussion encompassed the recovery of greywater through green roofs and vertical walls, as well as the implementation of mixed wastewater treatment in an agroforest system, thereby showcasing the versatility of NBS.

In summary, the keynote speech emphasized the importance of perceiving NBS as a multifaceted solution that can effectively tackle various challenges associated with climate change. The key takeaway from the seminar underscored the need to avoid a narrow focus on a singular issue, instead recognizing the broad scope of NBS and its potential to address multiple aspects of climate change adaptation.



How NBS can support climate-change adaption and mitigation in the water sector? *An illustration with urban stormwater management*

Kamal Azrague

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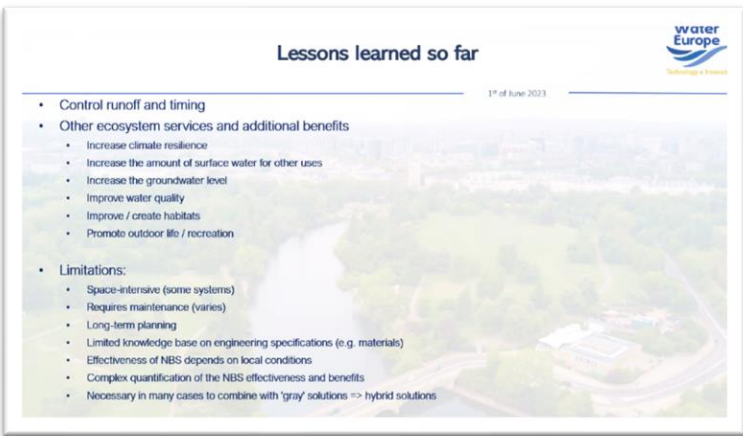
Frédéric Cherqui

INSA Lyon

This a dual-voice presentation that focused on exploring the evolving nature of urban stormwater management, specifically examining how it has transformed over the course of the past century through the lens of Nature-based Solutions (NBS). Initially, stormwater management systems were primarily developed as network solutions aimed at diverting drainage water away from urban areas to protect the health of citizens. This involved directing water towards natural areas outside the city. However, a shift in perspective has gradually emerged, leading to a slow paradigm shift wherein urban stormwater is seen as a valuable resource that can support the cities for instance, with the growth of vegetation.

Nevertheless, managing water within urban environments presents numerous challenges. The presentation highlighted these challenges and demonstrated how they can be effectively addressed through the application of NBS approaches. Specifically, five NBS approaches were discussed to manage stormwater runoff: open spaces and waterbodies, wetland construction, bioretention area, green roofs, and permeable pavement. By employing NBS, cities can mitigate flooding risks, enhance water quality, and promote sustainable water management practices.

In conclusion, the presentation summarized the key takeaways and lessons learned thus far within the scientific community. It also acknowledged the current limitations and ongoing research in the field of urban stormwater management, emphasizing the need for further exploration and innovation in order to create resilient and environmentally conscious cities.



Lessons learned so far

1st of June 2023

- Control runoff and timing
- Other ecosystem services and additional benefits
 - Increase climate resilience
 - Increase the amount of surface water for other uses
 - Increase the groundwater level
 - Improve water quality
 - Improve / create habitats
 - Promote outdoor life / recreation
- Limitations:
 - Space-intensive (some systems)
 - Requires maintenance (varies)
 - Long-term planning
 - Limited knowledge base on engineering specifications (e.g. materials)
 - Effectiveness of NBS depends on local conditions
 - Complex quantification of the NBS effectiveness and benefits
 - Necessary in many cases to combine with 'gray' solutions => hybrid solutions

water Europe
Sustaining a Planet

ARSINOE

Large scale installation of green roofs as NBS for a sustainable urban water management

Elena Cristiano

University of Cagliari

The continuous urbanization growth, combined with climate changes, that are leading to more frequent intense rainfall events, is increasing the pluvial flood risk in urban areas. With the aim to mitigate urban floods, several blue-green solutions have been proposed in the literature. Among these Nature-based Solutions (NBSs), multilayer blue-green roofs have shown large potential ensuring a high retention and storage capacity while providing many additional benefits to support a sustainable development of smart and resilient cities. However, the performance of these NBSs has been mainly investigated only on a building scale. In this work, we aim to evaluate the potential impacts of a large-scale installation of multilayer blue-green roofs over a large neighbourhood or an entire city.



We investigate the potential impacts of a large installation of traditional and multilayer blue-green roofs in nine cities worldwide, characterized by different climatological characteristics and urban structures. Results show the high potential benefit of multilayer green roofs, although the performance at large scale is strongly dependent on the availability of flat suitable roofs. Compared to traditional extensive and intensive green roofs, multilayer blue-green roofs ensure the complete retention of most of the intense and extreme rainfall events.

TransformAr

A business model for greener, more resilient cities

Jan Cools

University of Antwerp

The economic case of Nature-based Solutions (NBS) has been demonstrated, also in cities. NBS provide multiple benefits, including stormwater management and climate change adaptation. In practice, however, investments in NBS are slow and mostly at small-scale. Two approaches have been presented that aim to upscale urban NBS. In the recently finished project Nature Smart Cities, a business model is developed to support local authorities in assessing the multi-benefits of nature-based solutions, which include stormwater management. In TransformAr, we developed the Playbook for Transformational Adaptation, a step-by-step guide to co-design adaptation pathways. In both, we are working towards the challenge of accelerating investment in nature-based solutions. A main challenge is to identify what triggers actual investment in NBS



Nature-based solutions in urban stormwater management –Not just an option, but a starting point

Sanna Varis

Lappeenranta kaupunki



The use of nature-based solutions in urban stormwater management increases both the diversity and comfort of the urban environment, as well as resilience and adaptation to the challenges of climate change. Without Nature-based Solutions, stormwater floods would become more common and cause extensive damage to structures, and the often undersized sewer network built decades ago would have to be enlarged and expanded.

NBS can be more expensive to build, maintain and design than traditional methods. However, Nature-based Solutions have unquestionable benefits, which can be used to justify their increasing use for the city organization, stakeholders as well as the citizens. The most important lesson learnt in adding NBS in the city of Lappeenranta is that it requires collaboration.

Stakeholders should be engaged at an early stage: cooperation, increasing understanding and sharing information is of primary importance from the beginning of the planning process. Attitudes have to be changed to make NBS mainstream: not just an option to be chosen in a special case, but a minimum level from where to start.


CHALLENGES OF NBS (and lessons learnt)

- Slow process: NBS implemented only in connection with the renewal of the urban structure
- Costs: often more expensive (construction, materials, area requirement) -> has to be justified by other benefits
- Maintenance: requires more resources, maintenance must be involved early in planning
- Requires collaboration: engaging stakeholders, city organization, citizens
- Attitudes
 - Providing information, stakeholder engagement is crucial
- Challenges are common for all types of NBS
 - In TransformAr workshops the stakeholders highlighted: *Pilot sites are a good idea, but in practice the transition from pilot to normal operation is difficult*
- A lot of work needs to be done to make NBS mainstream: not just an option to be chosen in a special case, but a minimum level from where to start

Impetus

Implementation of NBS to protect the Catalan coastal line against severe events

Queralt Plana Puig

Eurecat

The Catalan coast in north-eastern Spain has a wide array of geographical and biodiversity systems that provide ecosystem services. This area is a hotspot of tourism, natural and societal factors, economic activities and interests, urbanisation, agriculture, and critical infrastructure and industries. These compete for resources and make the region highly vulnerable to climate change impacts. Sea-level rise, water scarcity and severe storm events are some of the main contributors to the degradation of the coastal line, specially at deltas and estuaries. The adaptation to sea-level rise and marine storms by enhancing NBS, like

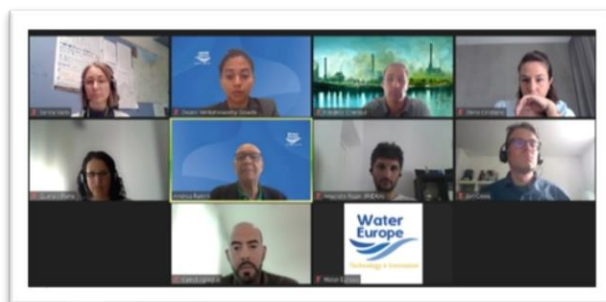
Conclusions and lessons learnt


- In Catalonia, climate change is a fact
 - 2023: longest drought period for the last 50 years
 - 2020: storm Gloria, high winds and heavy rainfall
- Strategies for climate change adaptation are urgently needed
- Collaboration and cooperation with relevant stakeholders are crucial
- Preliminary results show the potential of the implemented solutions
 - Wetland implementation: Removal of organic compounds from agricultural wastewater
 - Sand dune restoration: Coastline protection increasing sand height
 - Biodiversity assessment: Evaluation of the effectiveness and sustainability of NBS

multifunctional wetlands and novel dune restoration and monitoring methods, is crucial in Catalonia to protect the coast, infrastructures, and the biodiversity.

Q/A session

During the Q&A session, there was a significant focus on the advantages of Nature-based Solutions, the implementation of choice experiments involving citizens who own private lands, the direct challenges faced by solutions such as green roofs due to the energy sector and the need for a wholesome approach to implement NBS in cities. The following key points were highlighted:



- NBS can most often take the form of retrofitting: which can be effectively demonstrated by the WOLLS.
- The benefits of NBS in multiple transitional boundaries are widely recognized within the scientific community. However, the main hurdle lies in effectively communicating these benefits to the general public.
- The common perception that NBS solutions are inherently more costly is often untrue. However, the complexity of assessment parameters complicates the evaluation of costs. Therefore, the ongoing work of the TransformAR project in developing an economic assessment framework is crucial for clearly defining the monetary advantages.
- The question of whether NBS solutions should be more centralized or decentralized depends on cost considerations and the desires of citizens regarding their private lands. For instance, private landowners have the opportunity to implement various measures that promote biodiversity. This approach is currently being tested and gradually adopted in countries like Finland, Norway, and Belgium, signifying a social experiment.
- Overcoming legislative barriers is essential not only to challenge existing practices but also to establish accountability in urban areas for the maintenance of NBS solutions. The lack of standardization leads to confusion, and achieving a more homogeneous approach would facilitate optimized engineering in the future.

In conclusion, addressing the broader picture requires collaborative efforts not only from researchers and engineers but also from political entities, citizens, and a shift in how we approach climate change.

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 7: POST EVENT REPORT SEMINAR 5





Water-Smart Cities: Navigating Climate-Resilient Sustainable Urbanization in the Digital Age

Seminar 5 – Post-event Report

WP8

Author: Water Europe

Date: 30 November 2023



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



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Introduction

Water, as a global challenge, underscores the intricate interplay between the shared concerns posed by climate change and the imperative for addressing solutions at local level. The recent seminar organized by the ARSINOE EU project provided insights into the challenges of global water issues. The focus was on exploring the potential of Water Smart Cities, looking beyond just water scarcity and management to address broader climate challenges.

The aim of this seminar was to explore the potential of Water Smart Cities in the context of the challenge of water management in changing climate conditions. Organized by ARSINOE EU project, the seminar facilitated discussions and presentations, serving as a platform for the exchange of knowledge on the principles defining Water Smart Cities. Throughout the event, a recurring theme emerged — the importance of merging global awareness with localized strategies. It became evident that effective and sustainable solutions to water challenges must be developed at the local level, recognizing the unique characteristics of each community for resilient and sustainable urban development.

This post-event summary outlines key outcomes, insights, and recommendations, providing a glimpse into innovative approaches to address the development of climate-resilient regions and the integration of systemic solutions for sustainable, smart, and climate-adaptive urban environments for a Water-Smart Society.

The event, attended by 85 participants, was livestreamed on LinkedIn (387 viewers), Twitter (608 viewers), and YouTube (26 viewers), achieving a total attendance of 1,106. The recording is available at the following link: <https://www.youtube.com/watch?v=7z1VnNAoo8E>

ARSINOE Seminar Series

ARSINOE seeks to foster climate-resilient regions through systemic solutions and innovative approaches. The project's core strategy involves integrating the Systems Innovation Approach (SIA) and the Climate Innovation Window (CIW) to establish a robust ecosystem for climate change adaptation solutions. Within the framework of the EU-funded ARSINOE project, the goal is to harness innovation to address climate adaptation across multiple critical systems. These encompass biodiversity, flooding, sea-level rise, droughts, water scarcity, heatwaves, and deforestation. ARSINOE aims to create an ecosystem for climate change adaptation solutions. It develops a methodological framework that combines the Systems Innovation Approach with the Climate Innovation Window, a reference portal, resulting in a new three-tier approach. This approach will be demonstrated in nine diverse showcases, serving as a proof of concept. The overarching objective of the project is to pave the way towards a green, digital, inclusive, resilient, and sustainable future.

With this vision in mind, Water Europe, operating under the umbrella of ARSINOE, will proactively foster knowledge transfer and exploitation by organizing a series of clustering seminars on common selected water and climate-related topics in close collaboration with the sister projects [ARSINOE](#), [TRANSFORMAR](#), [IMPETUS](#) and [REGILIENCE](#). These seminars aim to discuss gaps and synergies, leading the conversation towards a stronger and clearer vision for future actions. The scope of these events is to create a critical mass of exchanged knowledge and experience, which will be capitalized upon, disseminated, and exploited for various purposes, including policy development, further research and innovation collaboration, and the market uptake of innovations.

Water Smart City seminar

This fifth seminar, titled “**Water-Smart Cities: Navigating Climate-Resilient Sustainable Urbanization in the Digital Age**”, was chaired by the Water Europe VLT Water-Smart Cities, led by Arnout Reulens (City of Mechelen). It has featured a panel of experts from the sister projects [ARSINOE](#), [TRANSFORMAR](#), [IMPETUS](#) and [REGIANCE](#), who provided valuable insights drawn from their experience and the ambitious goals of these projects.

The Water Europe VLT Water-Smart Cities played a pivotal role in shaping the event's focus on urban end-user needs, circular economy principles, and the realization of a Water-Smart Society. This VLT in Water Europe sets visionary benchmarks and fosters collaboration among stakeholders, creating a foundation for innovation, experimentation, and the transformation of urban environments into smart, sustainable, and resilient Water-Oriented Living Labs. The VLT is comprised of local water stakeholders from all corners of Europe, that combine the drive for innovation with local field experience. Thus, guaranteeing the feasibility of the way forward.

1.1 AGENDA

TOPIC	PRESENTER
Introduction to the Arsinoe Seminars Series and clustering activities	Andrea Rubini
Watersmart cities: learnings from 3 local pilots	Arnout Ruelens (VLT Water-Smart Cities)
Let's scale up synergies of public services' infrastructures!	Gunnar Braun (ARSINOE)
Rapid cost benefit assessment for urban nature-based solutions	Jan Cools (TransformAr)
Using data for efficient governance of coastal cities	Victor Estella (IMPETUS)
Panel discussion and Q/A	Andrea Rubini (Moderator)
Wrap up and take aways	Andrea Rubini

1.2 Keynote

Arnout Ruelens (City of Mechelen)

Watersmart cities: learnings from 3 local pilots

Water poses a global challenge, yet effective solutions must be crafted at the local level. There's a crucial need to share information about our approaches because cities worldwide encounter similar challenges, and valuable solutions are available. Learning from each other is essential. Water Europe's Vision Leadership Team on Water Smart Cities gathers examples directly from the field to understand what works in cities for practical learning. Climate change is a pressing concern affecting us all, with manifestations like droughts, floods, forest fires, heatwaves, and rising temperatures. Its impact is particularly felt in urban areas, affecting both buildings and people, influencing society significantly. A promising solution lies in the concept of a Water Smart City.

While acknowledging the established benefits, SMART solutions should not solely revolve around technical aspects like data collection and monitoring. They need to be linked to the Water Smart Society (WSS) concept, emphasizing circularity, acknowledging the true value of water, considering resilience to climate change, and adopting an inclusive governance model that involves everyone, aligning with Water Europe's vision.

To this extent, the city uniquely possesses the scale necessary to actualize the Water Smart Society (WSS) concept. It is sufficiently small to implement initiatives at the local level but also possesses the size to foster ambition and nurture a vision. Cities play a pivotal role in addressing specific urban challenges related to climate change, experimenting with innovative governance models, establishing meaningful connections with citizens, inspiring for activities within private spaces. Cities hold a privileged position in aligning European and National climate plans with the needs and perspectives of the people.

INFORMATION

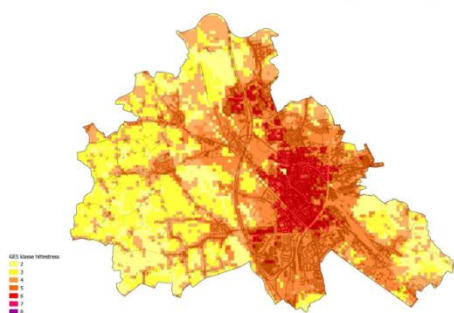


Figure 1 - Heat wave data become information for emergency planning

Figure 3, Figure 4).

What does climate smartness mean from the city perspective? It starts with the Internet of Things (IoT) collecting data — a collaborative, real-time effort involving citizens and schools. Following this, the process involves modeling the collected data, transitioning from raw data to actionable information (Figure 1). The collected data and resulting information play a crucial role in policy planning, guiding the implementation of various actions to address issues identified through data collection. At the city level, these data are invaluable for governance planning, influencing urban planning, and informing emergency planning specifically tailored to climate adaptation needs. Ultimately, it is the cumulative impact of numerous small actions that truly makes a difference in effective urban planning, all the while ensuring citizen involvement (Figure 2,



Figure 2 – Many small actions make the difference in urban planning #1



Figure 3 – Citizen involved in realising the city green and blue infrastructures



Figure 4 – Many small actions make the difference in urban planning #2

In conclusion, Water Smart Cities embody a mindset centered on valuing urban spaces in a circular manner, anchored in evidence-based policies and decision-making, even at the local level. While our current emphasis is on adaptation, challenges persist. SMART technologies need to be seen as a means rather than an end, not an end in itself: we need to remember that technology support evidence-based policy. SMART thinking embraces circular thought processes and demands an evidence-based approach.

1.3 ARSINOE

Gunnar Braun

Let's scale up synergies of public services' infrastructures!

Valuing water, water security, sustainability and resilience are the basis of water smart societies. Local public utilities are key partners for achieving these goals in the face of climate change and other crises due to their unique design. Covering multiple sectors including water and energy they are uniquely situated to boost the creation of water smart societies by finding synergies between sectors. Yet, challenges remain. Especially, when green and blue infrastructure competes with other pre-existing systems. Increasing energy efficiency wherever possible is one of the levers for increasing sustainability and resilience in the water sector. Increasing efficiency decreases land-use for energy production, storage and transport. The energy transition needs to be water-smart.



How can green and blue infrastructure find space in densely populated cities without constraining the use of other infrastructures? Broadening our perspective, it's essential to recognize that energy efficiency measures have already addressed aspects of the water discussion. For instance, energy efficiency constraints limit the space required for power sites, heat supply, and water demand. Consequently, this mitigates competition for space. However, the placement of blue and green infrastructures underground in cities can introduce conflicts with other uses, including the planting of new trees.

Figure 5 – If we could uncover the ground we could find the net of underground infrastructures for heat, electricity, gas, water, suwage, and telecommunication

1.4 TransformAr

Jan Cools

Rapid cost benefit assessment for urban nature-based solutions

In the TransformAr project, nature-based solutions (NBS) are being demonstrated in an urban (cities of Lappeenranta, Finland & Gjøvik, Norway), rural (West country, England) and coastal context (Sardinia, Italy). The implementation of a NBS in the city of Lappeenranta, Finland is illustrated. In Lappeenranta, a bio-filtration area is constructed in the city centre, to capture polluted stormwater runoff, that would otherwise discharge in the Lake. The NBS is expected to reduce the overload to the sewer system. Upstream NBS in Lappeenranta has shown to be successful but on the other hand, also shows that they are not sufficient to reduce the flood risk. For the city of Lappeenranta, it is the first NBS that at the same time considers flood risk and water purification at the same

time (Figure 6). To assess the impact, and thus steer forthcoming investments in stormwater management, water quantity and quality before and after the NBS is monitored. In addition, NBS investment is to be encourage on private land in addition to public land. A choice experiment with citizens in Norway and Finland is therefore conducted to understand the willingness of citizens to invest in NBS.

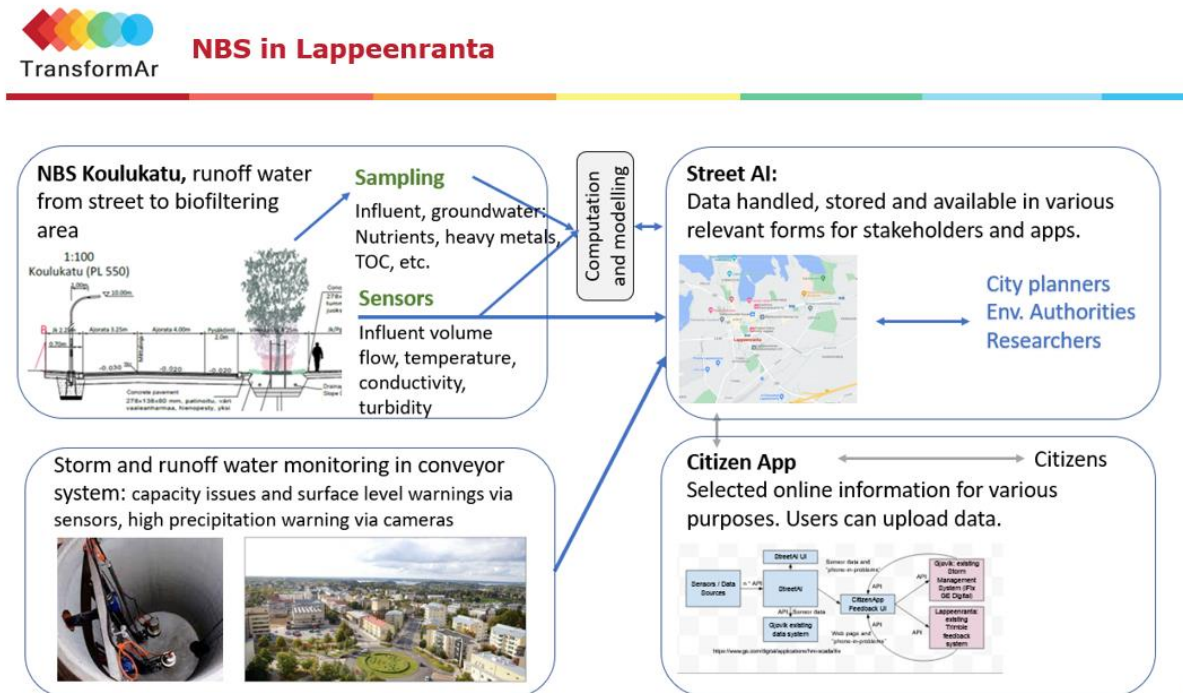


Figure 6 – The NBS bio-filter in the city of Lappeenranta treats the storm water collected from the streets

1.5 IMPETUS

Victor Estella

Using data for efficient governance of coastal cities

About 40% of the global population lives within 100 kilometres of the coast, including urban areas. However, this closeness often leads to a number of environmental challenges like marine pollution, overfishing, coastal erosion and climate-driven issues. There is a big push towards turning our cities into Smart Cities with the aim of using technology to improve urban resilience and quality of life. Including ocean data is still a big challenge. During the event Victor presented how the ocean data can contribute to the concept of water smart cities by presenting two approaches to improve the governance of coastal cities: one based on the monitorisation of coastal erosion (a visual representation can be found in Figure

7), and the other on climate risk assessment of coastal infrastructures, such as harbours, to assess the risk of climate change impacts.

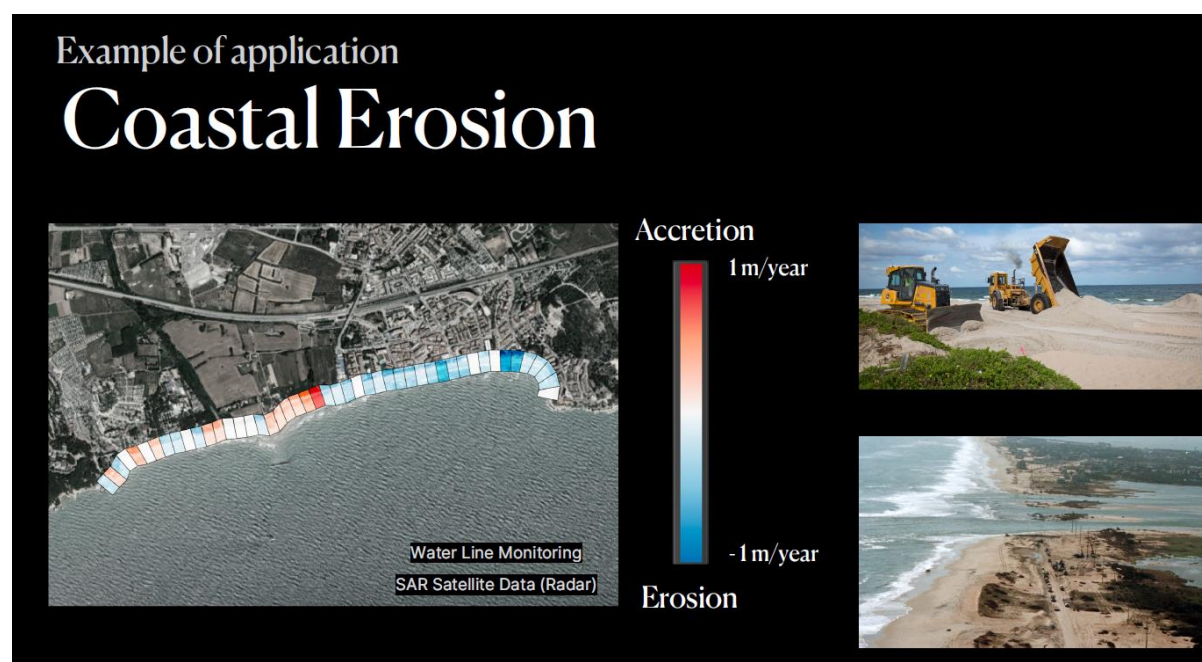


Figure 7 – Example of ocean data used for the long-term urban planning for coastal cities to tackle with sea level rise based on satellite data

To conclude, the core message of the intervention is that by extending the concept of smart cities to Smart Coastal Cities, incorporating both ocean and city data, policymakers can be in a better position to understand risks and plan effective adaptation measures.

1.6 Q/A session

The panel discussion revolved around the questions coming from the audience:

- *What can smaller cities and towns with fewer resources learn from Mechelen?*
- *How do water smart cities strike a balance between maximizing water resource utilization and minimizing environmental impact?*
- *What is the role of data as opposed to personal experience e.g. when advocating for the creation of blue and green infrastructures? Is there a point where lived experience becomes more impactful than data about the benefits?*

ARNUT RUELENS

Since Mechelen is not a big city (80,000 inhabitants), we can say that it is not about scale and financial resources, but it is more on building coalition and finding partners. City planners have not to do everything on their own but rather be the director and have the willingness to move forward and to bring activities forward.

ANDREA RUBINI

- *What new technologies do you think are relevant to tackling the impact of climate change on coastal cities?*

VICTOR ESTELLA

In my view, efforts should be directed towards two key areas. First, the development of technologies that enable us to understand the impact of past events, such as floodings and droughts, on the city. Second, the focus should be on developing monitoring technologies and solutions to provide real-time information on current conditions and how they evolve over time. By combining these two approaches, we can enhance our ability to forecast or at least be prepared for future events based on historical patterns.

ANDREA RUBINI

- *Land competition is a prevalent feature in many areas of Europe, and Natural-Based Solutions (NBS) often require land for their purposes. A growing concern now is the competition among territories for water resources. How can NBS effectively mitigate or address the emerging challenges of competition for both land and water?*

JAN COOLS

Competition for land is the number one reason raised for not proceeding further with NBS by city governments as they want to use public land for other purposes. But in Lappeenranta we are conducting an experiment with citizens to understand under what condition they agree to invest on NBS on their private lands. We found that it is easier to convince landowners if we provide them with a long-term vision.

ANDREA RUBINI

- *What could be the role of utilities and water companies in supporting and achieving a water smart society while tackling the challenges of climate change?*

GUNNAR BRAUN

Building on Jan's comment regarding coastal contracts, which can serve as a collaborative platform for defining roles, responsibilities, and financial commitments, we observe similar collaborations in our region. Many water supply companies are partnering with farmers, involving municipalities and other stakeholders to safeguard water resources.

What we can do with data is speed up the learning curve from the changes we have implemented in the landscape over the last two decades in the water cycle. Currently, our learning is primarily derived from challenging experiences. Data can assist in creating models and running simulations in virtual environments, enabling us to react more swiftly. It helps bridge knowledge gaps faster, facilitating better and quicker decision-making.

Take aways

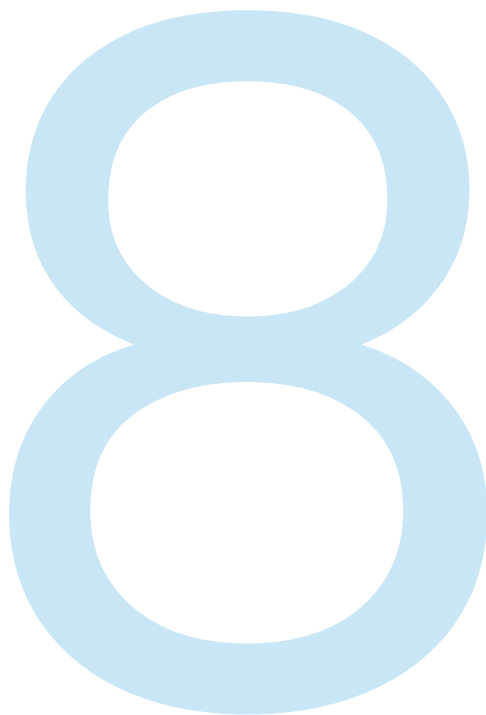
- *SMART solutions should not solely revolve around technical aspects like data collection and monitoring. They need to be linked to the Water Smart Society (WSS) concept*
- *SMART thinking, viewed as a means rather than an end, embraces circular thought processes and demands an evidence-based approach.*
- *Municipalities have great support in climate issues through their municipal companies for public services*
- *Responsible for different infrastructures and services, municipal companies are a true asset to implement climate resilience*
- *Cross sectoral benefits, like moving land-use from intensive to extensive by renewables supports water security in climate change*
- *Reducing energy demands in cities and thus rural energy installations extends space for water protection*
- *Modern telecommunication infrastructure, such as LoRaWAN, support real time resilience strategies and data basis'*
- *Accurate data allows decision makers to plan better adaptation measures while contributing to climate adaptation*

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 8: POST EVENT REPORT SEMINAR 6





Exploring the Effects of Climate Change on Biodiversity

Seminar 6 – Post-event Report

WP8

Author: Water Europe

Date: 29 February 2024



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

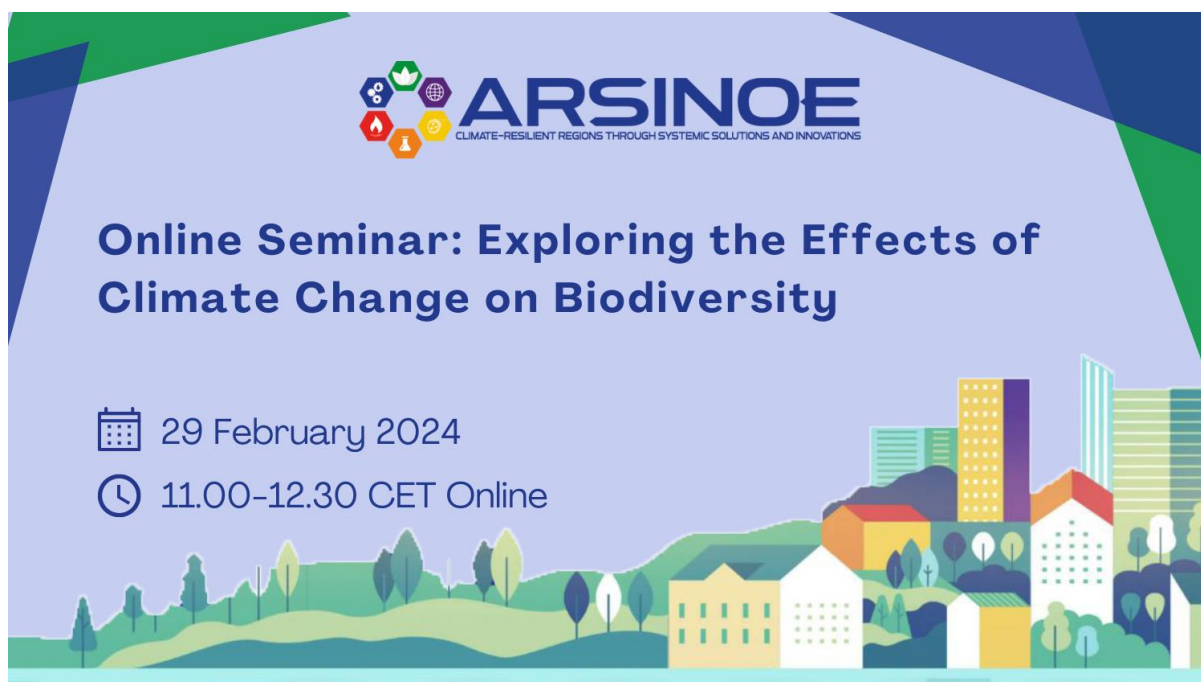


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Introduction

Biological diversity is vital for the proper functioning of ecosystems, contributing significantly to the delivery of essential services that sustain life on Earth. Life itself relies on access to clean water, pure air, fertile land, a robust ecosystem, and a climate suitable for living. Unfortunately, human activities, such as ecosystem degradation and climate change, are currently causing a decline in biodiversity across the globe, with variations in impact observed in different regions and among various species.

The ongoing rates of species extinction and the subsequent losses in global biodiversity are expected to worsen if current practices persist. Tackling this challenge requires comprehensive measures across all sectors. Notably, the water sector holds a pivotal position in efforts to reverse biodiversity loss, recognizing its crucial role in supporting life on Earth. In this context, the aim of this seminar was to unravel the complex effects of climate change on biodiversity. The seminar wanted to explore practical actions that stakeholders in the European water sector can take to effectively address biodiversity loss.

By focusing on critical systems such as biodiversity, and the way this is influenced by flooding, sea-level rise, droughts, water scarcity, heatwaves, and deforestation, the seminar, organised by ARSINOE EU project aimed at showcasing a transformative three-tier approach through nine diverse showcases by facilitating discussions and presentations and serving as a platform for the exchange of knowledge.

The panel of experts, drawn from ARSINOE and its sister projects, shared invaluable insights into their ambitious goals and experiences, offering a panoramic view of the ongoing efforts to mitigate the impact of climate change on biodiversity. In this regard, the seminar was not just a discussion; it has served as a collective endeavour to foster collaboration, exchange knowledge, and ignite the spark of innovation needed to ensure the resilience and sustainability of our planet's rich tapestry of life.

This post-event summary outlines key outcomes, insights, and recommendations, providing a glimpse into innovative approaches to mainstream biodiversity into the water sector for a Water-Smart Society. The event, attended by 49 participants, was livestreamed on LinkedIn (485 viewers), Twitter (395 viewers), and YouTube (45 viewers), achieving a total attendance of 974. The recording is available at the following link: <https://www.youtube.com/watch?v=PqD0wk0uCvY>

ARSINOE Seminar Series

ARSINOE seeks to foster climate-resilient regions through systemic solutions and innovative approaches. The project's core strategy involves integrating the Systems Innovation Approach (SIA) and the Climate Innovation Window (CIW) to establish a robust ecosystem for climate change adaptation solutions. Within the framework of the EU-funded ARSINOE project, the goal is to harness innovation to address climate adaptation across multiple critical systems. These encompass biodiversity, flooding, sea-level rise, droughts, water scarcity, heatwaves, and deforestation. ARSINOE aims to create an ecosystem for climate change adaptation solutions. It develops a methodological framework that combines the Systems Innovation Approach with the Climate Innovation Window, a reference portal, resulting in a new three-tier approach. This approach will be demonstrated in nine diverse showcases, serving as a proof of concept. The overarching objective of the project is to pave the way towards a green, digital, inclusive, resilient, and sustainable future.

With this vision in mind, Water Europe, operating under the umbrella of ARSINOE, will proactively foster knowledge transfer and exploitation by organizing a series of clustering seminars on common selected water and climate-related topics in close collaboration with the sister projects [ARSINOE](#), [TRANSFORMAR](#), [IMPETUS](#) and [REGILIENCE](#). These seminars aim to discuss gaps and synergies, leading the conversation towards a stronger and clearer vision for future actions. The scope of these events is to create a critical

mass of exchanged knowledge and experience, which will be capitalized upon, disseminated, and exploited for various purposes, including policy development, further research and innovation collaboration, and the market uptake of innovations.

Exploring the Effects of Climate Change on Biodiversity

This sixth seminar, titled “*Exploring the Effects of Climate Change on Biodiversity*”, has been supported by the Water Europe WG on Biodiversity, led by Sara Eeman (Aveco de Bondt) and Piia Leskinen (Turku University of Applied Science). The Water Europe WG on Biodiversity brings together a multidisciplinary group of experts sharing the aim of mainstreaming deliberate and systematic consideration of biodiversity across all water sector activities. The WG wants to promote the dialogue between scientists, policymakers, businesses, and local level actors to find new synergies and innovations in water management and biodiversity protection. The group aims to support national and European R&I ambitions and policies, as well as the achievement of the WE Vision for a Water-Smart Society.

1.1 AGENDA

TOPIC	PRESENTER
Introduction to the Arsinoe Seminars Series and clustering activities	Andrea Rubini
How to act biodiversity inclusive within the water sector	Sara Eeman, Piia Leskinen (WG Water and Biovidersity)
Using remote-sensing and citizen-science data to assess urban biodiversity for sustainable cityscapes: the case study of Athens, Greece	Chrysi Laspidou (ARSINOE CS1)
TransformAR Westcountry Demonstrator Sites, NBS for Nutrient Mitigation, Climate Change Adaptation & Biodiversity Co-Benefits	Emily Widdecombe (TransformAr)
IMPETUS Supporting Reforestation and Biodiversity - A service to provide deforestation monitoring and restoration strategies	Stelios Manoudakis (IMPETUS)
Evaluating the resilience of biofiltration bacteria	Maria Paraschiv (ARSINOE CS1)
Panel discussion and Q/A	Andrea Rubini (Moderator)
Wrap up and take aways	Andrea Rubini

1.2 Keynote

Sara Eeman (Aveco de Bondt), Piia Leskinen (Turku University of Applied Science)

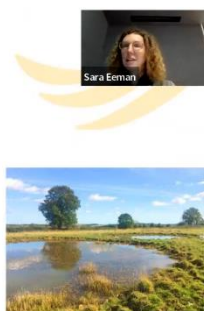
How to act biodiversity inclusive within the water sector

Sara and Piia opened their keynote speech building upon the notion that ***all individuals working in the water sector can contribute to improving water and biodiversity***. They stressed the close interconnectedness of water and biodiversity, identifying climate change and pollution as the main stressors for biodiversity. The goal of their intervention is to showcase viable alternatives and possibilities for the water sector in dealing with biodiversity.

Goal

Getting focus on the role of **the entire water sector** in combatting ecosystem degradation and biodiversity decline to achieve biodiversity and ecosystem restoration targets in the European Green Deal and related EU legislation.

Water sector actors - water utilities and companies, water intensive industries and water authorities - deal with spatial planning and water quality and quantity issues and are thus **in a unique position to drive positive change** for the protection and restoration of biodiversity and ecosystems



With the aim of illustrating these possibilities, Sara and Piia highlighted the unique position of the entire water sector, which includes utilities companies, water-intensive industries, and water authorities. These actors play a crucial role in land use planning and restoration projects, necessitating access to good and clean water. Consequently, they possess a distinctive capability to drive positive changes in both water management and biodiversity conservation (Figure 1).

Figure 1. The water sector can drive the positive change to biodiversity inclusion in planning phase

The examples provided, such as the RESIST project (Figure 2) and the design of corridors for dragonflies (Figure 3), serve as tangible instances showcasing the practical implementation of this positive change in fostering new nature and creating habitats for specific species.



Figure 2. In the planning phase for water protection biodiversity needs are taken into account

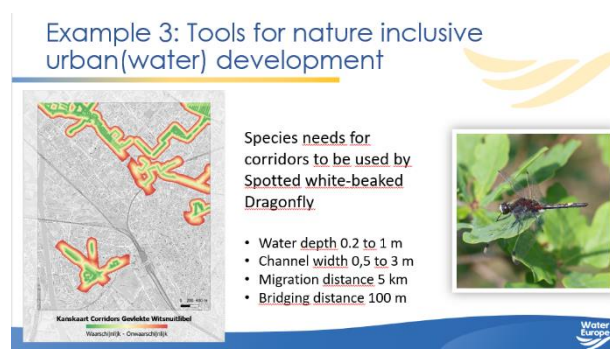


Figure 3. Dragonfly corridors are included in the city planning

1.3 ARSINOE CS1

Chrysi Laspidou

Using remote-sensing and citizen-science data to assess urban biodiversity for sustainable cityscapes: the case study of Athens, Greece

Urban biodiversity is an important and growing research area as cities continue to expand and more and more people are living in urban centers. In order to effectively protect and conserve urban biodiversity and inform future urban planning, a thorough understanding of the patterns and underlying factors affecting biodiversity is essential. However, developing a replicable methodology for assessing urban biodiversity across different cities is challenging, mainly due to data limitations on habitats and species in urban areas. In response to these challenges, Chrysi presented a biodiversity analysis framework tailored for the municipality of Athens, Greece. The city faces unique challenges in preserving biodiversity while accommodating urban growth, with the analysis conducted at the zipcode level. The use of a k-means clustering scheme led to the classification of urban habitats incorporated using earth observation data, while citizen science-generated species occurrence data from the Global Biodiversity Information Facility (GBIF) platform was used for biodiversity analysis and validation.

This integrative approach enabled the consideration of fine-scale environmental variation, which played a crucial role in species' abundances and distributions in urban settings. The analysis revealed that nearly 80% of Athens' land cover is impervious and lacks vegetation, significantly impacting biodiversity, which is predominantly concentrated in Urban Green areas. The city's dense urban fabric, extensive cementification, lack of open streams and noisy large arterial roads take a toll on urban species occurrences, which are up to 100 times less than the green and blue areas.

The work presented by Chrysi highlighted the importance of zipcode-level analyses in understanding the complex interplay between urbanization and biodiversity. Furthermore, it demonstrated that it is possible to assess urban biodiversity using free and open satellite data, without previously acquiring a high-resolution species occurrence dataset through field surveys, thus providing a comprehensive understanding of urban biodiversity patterns in cities like Athens (Figure 4). Figure 5 illustrates the results of the observation of Athen's biodiversity.

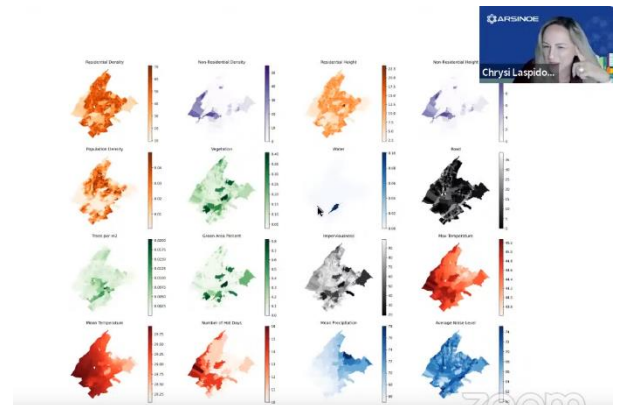


Figure 4. Athens data combined in layers can unveil patterns, create clusters, and craft thematic maps for the city planning

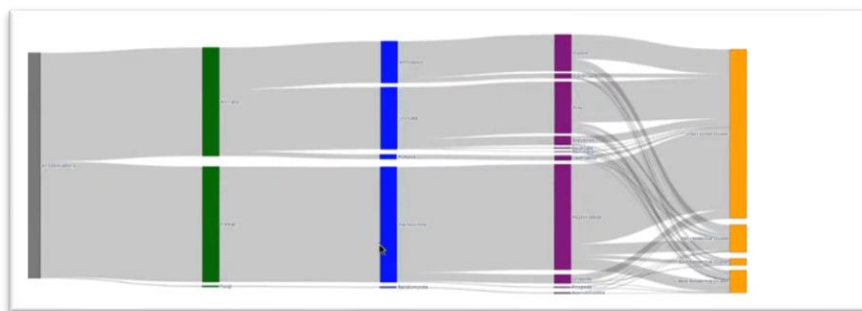


Figure 5. Sankey Diagram for Kingdoms, Phyla, Classes of biodiversity observations in Urban Habitat Clusters in Athens

1.4 TransformAr

Emily Widdecombe

TransformAR Westcountry Demonstrator Sites, NBS for Nutrient Mitigation, Climate Change Adaptation & Biodiversity Co-Benefits

Emily discussed the TransformAr case study in the West Country region of the UK, which has a population of approximately 5.6 million people. This agricultural region faces climate pressures, including hotter and drier summers, intense downpours, milder winters, and rising sea levels. Current challenges include poor soil quality, soil compaction, and inadequate water retention, making communities vulnerable to climate change. To address these issues, a key site in Camel is focusing on nature-based solutions, such as creating a wetland buffer strip. This involves the management of riparian woodlands, establishing hedgerows, and digging scrapes to capture sediment. These interventions aim to mitigate nutrient pollution and offer multiple co-benefits, such as improving water quality, stabilizing riverbanks, enhancing biodiversity, and reducing the risk of floods. The use of scrapes also provides habitat for amphibians and invertebrates, supporting biodiversity. In this regard, Figure 6 displays how Natural-Based Solutions delivers multiple co-benefits to biodiversity, while Figure 7 reports benefits of wader scrapes.

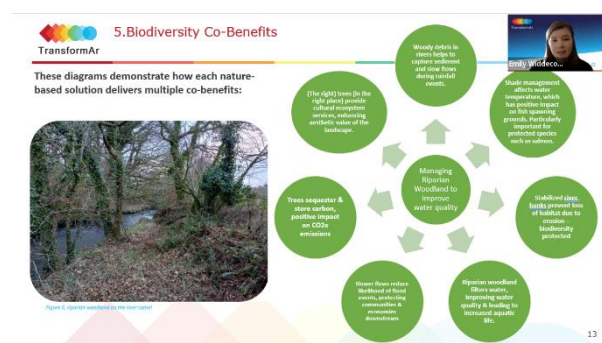


Figure 6. NBS co-benefits to biodiversity

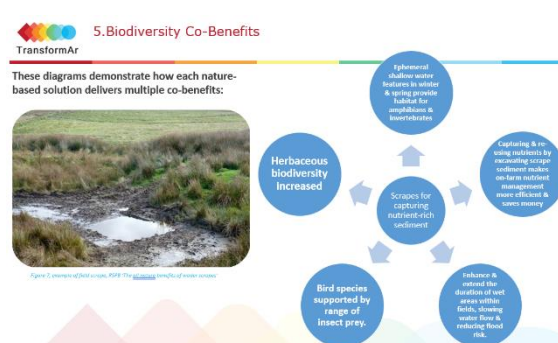


Figure 7. Benefits of wader scrapes to biodiversity

Nature-based solutions have additional advantages, including carbon sequestration, cultural ecosystem services, and economic benefits by capturing and reusing nutrients on farms. Overall, these interventions contribute to the region's resilience to climate change and promote a healthier environment.

1.5 IMPETUS

Stelios Manoudakis

Supporting Reforestation and Biodiversity - A service to provide deforestation monitoring and restoration strategies

The escalating climate crisis and alarming rise in forest loss areas have underscored the urgent need for effective restoration practices and continuous monitoring of deforestation. Stelios showcased how the IMPETUS project is supporting reforestation and biodiversity using Machine Learning algorithms trained using satellite images to monitor plant biodiversity with the

aim of providing guidelines for successful restoration practices where biodiversity degradation is being spotted. The proposed service addresses these needs by integrating remote sensing datasets and ground truth data to identify tree species in degraded forest areas and monitor deforestation hotspots. Utilizing products such as Sentinel, CORINE Land Use/Land Cover (LU/LC), and ESA WorldCover, the service focuses on the Attica region, Greece. Machine learning (ML) and artificial intelligence (AI) techniques are employed to analyse these datasets, facilitating the identification of tree species in degraded areas and continuous monitoring of deforestation. Ground truth data from the LUCAS dataset, CORINE LU/LC, and ESA WorldCover ensure the robustness and reliability of the results. The methodology developed demonstrates its effectiveness in identifying tree species and monitoring deforestation, providing valuable insights into the composition of degraded forest areas and deforestation hotspots. By leveraging remote sensing products and ML/AI techniques, the service offers a practical approach to support restoration efforts and combat deforestation in the face of the climate crisis. The information generated as shown in Figures 8, 9 and 10, serves as an advisory tool for stakeholders and forestry experts, empowering them to implement targeted and effective restoration practices and make informed decisions to mitigate the adverse impacts of forest degradation. This integrated approach presents a promising monitoring tool for addressing deforestation and restoring degraded forest areas, contributing to broader efforts to combat the direct and indirect effects of climate crisis.

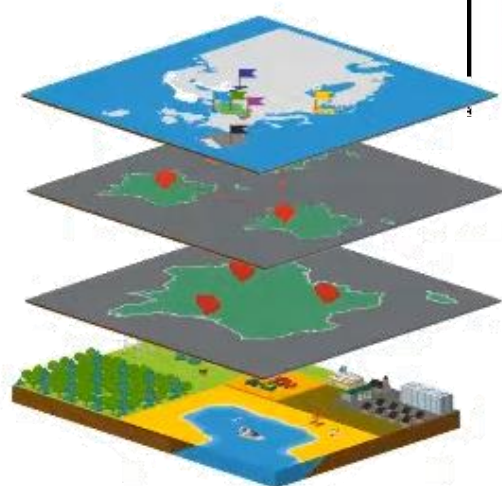


Figure 8. ESA Sentinel 2 data layers

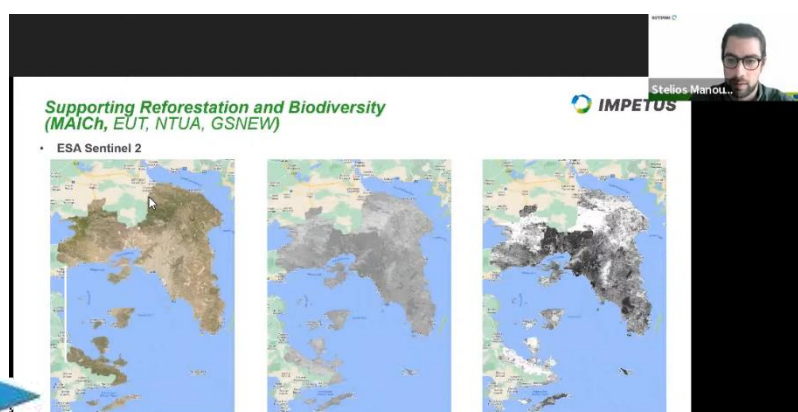


Figure 9. Coordination of Information of the Environment

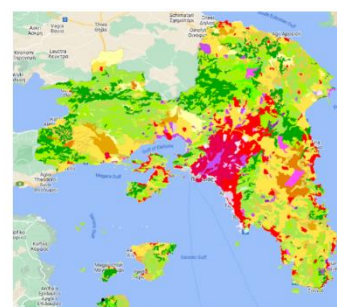


Figure 10. Data gathering leads to maps

1.6 ARSINOE CS6

Maria Paraschiv

Evaluating the resilience of biofiltration bacteria

Through the ARSINOE Project, in the Case Study #6 – Black Sea, Sub-case Danube Delta, an innovative approach is under development to assess the adaptation pathways that microorganisms involved in natural biofiltration processes express. Thus, analytical techniques are combined with data from the assessment of local ecosystem state under climate and socioeconomic scenarios. The aim is to evaluate the efficiency of applying innovative nature-based solutions for increasing the resilience of ecosystems under pressure such as Danube Delta. Maria highlighted the importance of biodiversity in addressing climate challenges, presented monitoring techniques and ongoing genetic analysis, and shared insights into alternative farming strategies to enhance soil capacity in the Danube Delta region, a protected area with high sensitivity to climate change.

Two innovative technologies are proposed for the Danube Delta: (1) investigation of the bacteria present, to identify those that have a selective biofiltration role for evaluating the resilience of biofiltration bacteria; (2) farming on salted soils based on the evaluation of the complexity of various abiotic factors that contribute to the plant behaviour during their lifetime. This includes integrating the assessment of local ecosystem state and future pathways, under climate and socioeconomic scenarios, with specific regard to ARSINOE focus on systems innovation and resilience as shown in Figure 11.

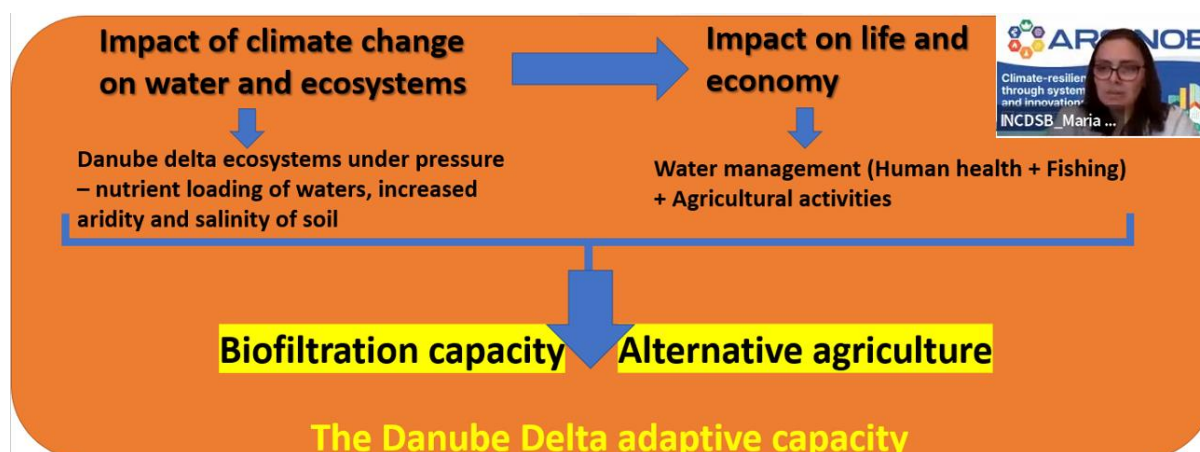


Figure 11. The Danube Delta adaptive capacity

The research presented involved innovative technologies, including investigating bacteria in the Delta for natural biofiltration and developing alternative farming methods for affected soils. Collaborating with the Black Sea University Network, Maria's team engaged stakeholders to address challenges in maintaining water quality and supply for isolated localities. The work included monitoring microorganism density utilizing DNA sequencing to identify species involved in biofiltration (An interesting view of the lab work is provided in Figure 12). The ongoing research aims to identify adaptive metabolic pathways and assess the impact on soil biodiversity for alternative agriculture.

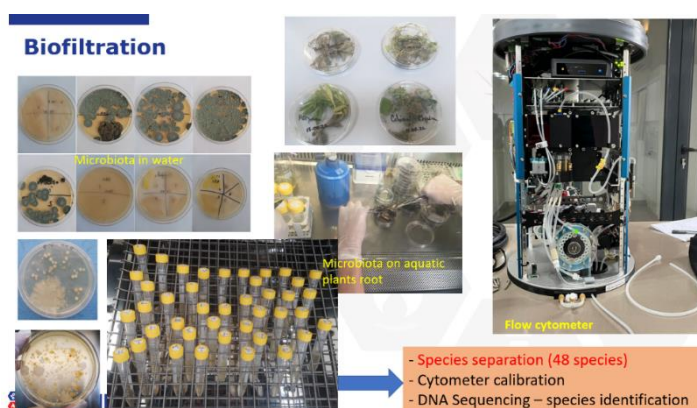


Figure 12. Biofiltration sequences in the lab

1.7 Q/A session

The panel discussion revolved around the following topics:



- What do you perceive as the primary obstacle and driving force hindering our society's capability to sufficiently address biodiversity within our broad societal framework?
- What factors do you identify as impediments to, and facilitators of, our ability not just to preserve but also to restore biodiversity in our society?

CHRYSI LASPIDOU

From my recent interactions with various ministers and high-ranking officials, I've observed that **biodiversity tends to rank low on the agenda**. Many individuals struggle to grasp its significance as it lacks tangibility and immediate visibility. In the broader context, such as climate change discussions focusing on energy and emissions, biodiversity receives minimal attention. Our project, Bionex, underscores the challenges faced in elevating biodiversity awareness. To effect change, I advocate for capacity-building, fostering understanding, and incorporating a shift in our philosophical approach to nature. The Nature Futures framework, exploring our relationship with nature, emphasizes the need to view nature as integral to society rather than an external entity. Ultimately, a key mission should involve raising biodiversity in the agenda, aligning IPB and IPCC activities, and emphasizing the often-overlooked benefits of nature.

ANDREA RUBINI

- *There's a crucial aspect of activity to address concerning stakeholder engagement. This aligns with Water Europe's advocacy for territorial water ecosystem sustainability, emphasizing our focus on Water-oriented Living Labs. This strategic approach necessitates collective participation, where all stakeholders convene to develop a shared understanding of challenges. However, it's noteworthy that biodiversity, though pivotal, often remains concealed, posing a unique challenge in our efforts.*
- *I was genuinely impressed by the initiative that actively engages in establishing connections with users. I am curious about your perspective on how citizens, or more broadly, common people and civil society organizations, can play a crucial role in advocating for and contributing to the increase, protection, and restoration of biodiversity.*

CHRYSI LASPIDOU

Citizens play a pivotal role, and their engagement is crucial. However, it's noteworthy that engaging citizens can be challenging. Our experiences reveal that citizens often prove difficult to involve. It's not a straightforward process; although we assert that citizens should be interested, reality indicates otherwise. Consequently, a well-thought-out strategy is essential to uncover benefits that resonate with them and maintain their active involvement.

Our approach currently involves schools and children, a method we find effective. Utilizing digital tools, we navigate challenges such as privacy issues and data quality. For instance, automatic species recognition is an intriguing activity for young minds. However, it's vital not to underestimate the difficulty in engaging and sustaining public participation. We must develop a robust strategy that offers a win-win situation, acknowledging that people won't automatically contribute data without a compelling incentive.

In addressing the impending water demand crisis and biodiversity challenges, we must create an irresistible offer. This entails an all-encompassing strategy, penetrating cities, communities, and instilling the necessary knowledge and awareness for fostering biodiversity in a sustainable society.

Take aways

- *All individuals in the water sector can contribute to improving water and biodiversity.*
- *Climate change and pollution are major stressors for biodiversity.*
- *The unique position of water sector actors allows them to play a crucial role in land use planning and restoration.*
- *Understanding biodiversity patterns and underlying factors is essential for effective conservation and informing urban planning.*
- *Developing a replicable methodology for assessing urban biodiversity across different cities is challenging due to data limitations on habitats and species.*
- *Nature-based solutions aim to mitigate pollution and offer multiple co-benefits, including improving water quality, stabilizing riverbanks, reducing flood risk and enhance biodiversity by providing habitat for amphibians and invertebrates.*
- *Climate challenges include hotter and drier summers, intense downpours, milder winters, and rising sea levels, impacting soil quality, compaction, and water retention, making communities vulnerable to climate change.*
- *Nature-based solutions provide additional advantages like carbon sequestration, cultural ecosystem services, and economic benefits by capturing and reusing nutrients on farms.*

- *The escalating climate crisis and alarming rise in forest loss highlight the urgent need for effective restoration practices and continuous monitoring of deforestation.*
- *Innovative approaches to assess adaptation pathways for microorganisms are essential for enhancing our understanding of ecosystem dynamics, improving ecosystem management practices, and promoting ecosystem resilience in the face of environmental challenges.*
- *By applying innovative approaches to assess adaptation pathways for microorganisms, researchers can better understand how these organisms respond to environmental changes and can provide valuable insights into ecosystem health and functionality.*

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.

ANNEX 9: POST EVENT REPORT SEMINAR 7

9



The Future of Water: A Water Sector Approach for Building Resilience in a Changing Climate

Seminar 7 – Post-event Report

WP8

Author: Water Europe

Date: 27 June 2024



This project has received funding from the European Union's Horizon H2020 innovation action programme under grant agreement 101037424.



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Introduction

Water is an invaluable resource essential for life, economic activities, and environmental health. As climate change intensifies, the future of water becomes increasingly uncertain, demanding innovative and sustainable solutions. Addressing the complex challenges of water management in the face of climate change and growing global demand requires innovative, integrated, and collaborative solutions. Emphasis is placed on the importance of holistic approaches like the Water-Energy-Food-Ecosystem-Health Nexus and citizen engagement. Transforming collected data into practical solutions and fostering inclusive participation are essential for ensuring sustainable water practices and a resilient future for water resources.

One major theme of the seminar was the "Source to Sea" approach, advocating for a complete water quality monitoring system that covers the entire water cycle. This holistic method addresses the connections between water sources and their interactions with various sectors, aligning with key UNEP/UN areas to promote integrated solutions. Another focus was the "Water-Energy-Food-Ecosystem-Health Nexus" (W.E.F.E+H), highlighting the links between these sectors. Understanding these connections helps create strategies that optimize resource use and reduce negative impacts, contributing to overall sustainability.

The seminar also explored citizen engagement as a crucial element for water sustainability. Involving the public in water management efforts and using their insights can enhance policies and practices. This inclusive approach ensures that water management benefits from diverse community perspectives, fostering a Water-Smart Society.

A significant theme is transforming collected data into practical solutions to enhance water quality. This approach bridges the gap between data gathering and real-world applications, ensuring that information leads to tangible improvements in water management. By addressing these key areas, we can lay the foundation for ongoing efforts to develop innovative, integrated, and collaborative solutions to the complex challenges of water management in the face of climate change and global demand.

The seminar's post-event summary provides insights and recommendations for a sustainable water future. By addressing these key areas, the ARSINOE seminar has laid the foundation for ongoing efforts to develop innovative, integrated, and collaborative solutions to the complex challenges of water management in the face of climate change and global demand.

The event, attended by 48 participants, was livestreamed on Water Europe social media accounts LinkedIn (478 viewers), Twitter (111 viewers), and YouTube (25 viewers), and ARSINOE's Twitter account (49 viewers) achieving a total attendance of 711. The recording is available at the following link: <https://www.youtube.com/watch?v=1oNYoQnKH8s>

ARSINOE Seminar Series

ARSINOE seeks to foster climate-resilient regions through systemic solutions and innovative approaches. The project's core strategy involves integrating the Systems Innovation Approach (SIA) and the Climate Innovation Window (CIW) to establish a robust ecosystem for climate change adaptation solutions. Within the framework of the EU-funded ARSINOE project, the goal is to harness innovation to address climate adaptation across multiple critical systems. These encompass biodiversity, flooding, sea-level rise, droughts, water scarcity, heatwaves, and deforestation. ARSINOE aims to create an ecosystem for climate change adaptation solutions. It develops a methodological framework that combines the Systems Innovation Approach with the Climate Innovation Window, a reference portal, resulting in a new three-tier approach. This approach will be demonstrated in nine diverse showcases, serving as a proof of concept. The overarching objective of the project is to pave the way towards a green, digital, inclusive, resilient, and sustainable future.

With this vision in mind, Water Europe, operating under the umbrella of ARSINOE, will proactively foster knowledge transfer and exploitation by organizing a series of clustering seminars on common selected water and climate-related topics in close collaboration with the sister projects [ARSINOE](#), [TRANSFORMAR](#), [IMPETUS](#) and [REGILIENCE](#). These seminars aim to discuss gaps and synergies, leading the conversation towards a stronger and clearer vision for future actions. The scope of these events is to create a critical mass of exchanged knowledge and experience, which will be capitalized upon, disseminated, and exploited for various purposes, including policy development, further research and innovation collaboration, and the market uptake of innovations.

The Future of Water: A Water Sector Approach for Building Resilience in a Changing Climate

The 7th ARSINOE Seminar, titled ***"The Future of Water: A Water Sector Approach for Building Resilience in a Changing Climate"***, brought together experts to discuss strategies and technologies for sustainable water management. The event has been supported by the Water Europe VLT on the Value of Water, led by Dominique Darmendrail (BRGM) and Richard Eleman (EURECAT).

The VLT on "Value of Water" aims to develop efficient socio-economic and governance models that validate research and innovation results, driving towards a water-smart society. This involves understanding and highlighting the role water plays in social and economic development. The VLT aims to make the implicit values of water explicit. This effort is intended to improve corporate, social, and policy decisions by highlighting the comprehensive value of water, which includes its economic, social, and environmental aspects.

This approach helps stakeholders understand the broader impacts of water use and management, ensuring that water governance is more inclusive and sustainable. By making the value of water explicit, Water Europe aims to foster better decision-making processes that can lead to a Water-Smart Society.

1.1 AGENDA

TOPIC	PRESENTER
Introduction to the Arsinoe Seminars Series and clustering activities	Andrea Rubini
Adjust to survive - The role of the water sector in climate adaptation	Richard Elelman (VLT Value of Water)
Engagement strategies to maximize long term participation in volunteer monitoring programs	Jaume Piera (ARSINOE)
Improving climate resilience of the Water-Energy-Food Nexus: Demonstration of water-related innovation packages	Fred Hattermann (TransformAr)
The Digital Twin of the catchment area: a new concept for water monitoring and prediction	Matteo Dall'Amico (IMPETUS)
Panel discussion and Q/A	Andrea Rubini (Moderator)
Wrap up and take aways	Andrea Rubini

1.2 Keynote

Richard Elelman

Adjust to survive - The role of the water sector in climate adaptation

Head of Politics at EURECAT – Centre Tecnologic de Catalunya

Specialised in the politics of Climate Change, Energy and Water. with emphasis on citizen engagement. and the effects of Climate Change on migration, gender equality, conflict and health

In order to ensure a realistic and achievable process that results in enhanced water-based resilience capable of facing the challenges posed by climate change it is necessary to take into account four basic factors: Data to Action, Source to Sea, the Water-Energy-Food-Ecosystem-Health Nexus (W.E.F.E+H) and the role of citizen engagement and citizen science.

The concept of **Data to Action** addresses the need to translate monitoring data into relevant solutions that protect, restore, conserve, and enhance water quality and management. It must be ensured that monitoring extends beyond the midstream and upstream monitoring of water to also include within the equation, factors such as social, financial and policy investment enablers. In this way, upstream risk causes and midstream state of water quality are matched directly to proven solutions, and the engagement of all social sectors at local community levels can facilitate that the data is translated to action.

The **Source to Sea** approach fosters the concept of water management encompassing the entire water cycle and its interaction with diverse sectors, such as major water-dependent activities including food systems and agriculture, the one-health approach and the state of biodiversity.

Information regarding ambient water quality is critical. Water administrators must be capable of advising food systems about locations with an adequate level of acceptable water quality for food production. At the same time, solutions to address agricultural risks to water quality, such as the use of organic fertiliser to substitute agrochemicals that leach into water bodies and contaminate them to cause eutrophication, are urgent and need to be monitored to ensure sustainable water use by the agriculture sector.

The water-related health impact is one of the most critical aspects of climate change. Changes in precipitation patterns and the melting of glaciers can lead to water quality-related crises in many regions, affecting access to safe drinking water and sanitation. This can notably enhance the risk of waterborne diseases such as cholera, giardia and typhoid as can the additional aspect that increased rainfall and flooding often result in the contamination of water supplies. and data on the state of water resources is critical to determine locations where water of acceptable quality for human use can be found.

Deforestation destroys biodiversity and water catchments and drives siltation to degrade ambient water quality. Monitoring deforestation as an upstream risk to ambient water quality also helps to monitor biodiversity loss hotspots – especially the loss of forests. Awareness regarding the upstream causes such as timber harvesting for biomass energy and logging operations, needs to be followed by the creation of cross-sectoral solutions including clean cooking biogas and sustainable logging practices whilst determining the investment potential of such solutions.

The **Water-Energy-Food-Ecosystem-Health Nexus** (W.E.F.E+H), is a means of highlighting the urgency of creating holistic approaches to monitoring and action that covers upstream risk causes, midstream state of water quality, and downstream end-of-pipe solutions in a manner that understands the interactions of water quality with the nexus areas of energy, food, ecosystems, and health. The European Commission

and the United Nations place special emphasis on the need to understand the Nexus, to develop capacities to implement interactive solutions it at all levels, from local to regional, while ensuring the economic viability of the suggested measures. Acknowledging the WEFE+H Nexus is essential for a transition towards more sustainable and resilient societies. While research on the subject is still evolving, policy-makers, water administrators and all other stakeholders require access to innovative tools that local communities and municipalities can use to adopt policies that permit economic development whilst guaranteeing the co-existence and reinforcement of water management with healthy food, energy, ecosystem and public health initiatives.

Citizen engagement and citizen science especially at the local community level have been enhanced over the last five years in schemes such as the World Water Quality Alliance of UNEP and the RENAISSANCE approach to Science Diplomacy promoted by the European Commission. It is recognised that it is necessary to proactively involve all sectors at the local community level (known collectively as the Helix of Social Consensus) in the co-identification of the most important climate change-related challenges (including water) which the inhabitants face and the co-design, co-implementation and post-implementation analysis of actions developed to produce tangible solutions. There exists an imperative need for all stakeholders, both professional and non-professional, to engage with each other without sectoral prejudice so that the potentially dramatic, long-term socio-political effects of climate change can be converted into the foundation of a lasting form of intermunicipal diplomacy, a form of diplomacy based on science and knowledge exchange, disseminated by art and executed through proactive, genuine citizen engagement and citizen science which translates into policy continuity. The creation over the last three years of Local Water Forums has demonstrated an ability to guarantee a broad social consensus at a local level and just as importantly, a combined sense of responsibility on the part of all concerned which translates into policy continuity. Local Water Forums have since 2021 demonstrated their effectivity and capacity to be replicated at the local level anywhere in the world. Three elements are present within established forums: A) The support of science and technology in a mutually beneficial relationship, B) The involvement of people capable through their artistic talent to provoke an emotional response on the part of the community in question and finally, C) the true engagement and empowerment of citizens capable of entering into a permanent dialogue with supranational entities and water utilities alike.

1.3 ARSINOE

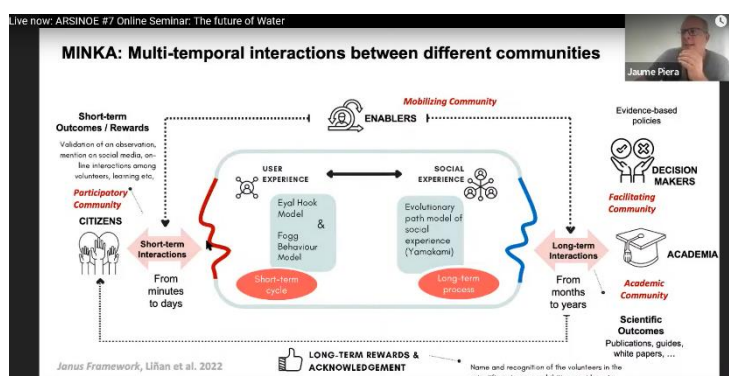
Jaume Piera

Engagement strategies to maximize long term participation in volunteer monitoring programs

Tenured Scientist. Head of the EMBIMOS research group. Institute of Marine Sciences (ICM-CSIC). Expert in environmental monitoring technologies based on innovative methods

To engage people and maximize long-term participation in projects such as ocean observatories, citizen observatories, and citizen science, it is important to have a platform that ensures a long-term perspective. This platform is called MINKA. MINKA is a citizen science platform for collecting biodiversity and environmental data, with a focus on the Sustainable Development Goals (SDGs). The term MINKA means ‘collective work for the community’ in the Quechua pre-Columbian language and embodies the spirit of participation. MINKA stands out as a pioneering platform that embraces a participatory approach to data collection for the SDGs through an open platform.

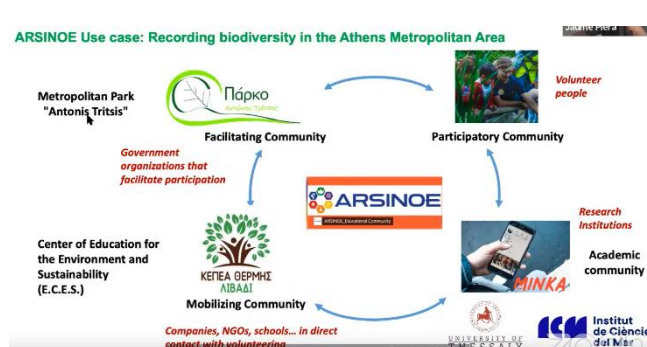
This platform enables users to collect and store data while facilitating its publication for accessibility by researchers and policymakers. A collaborative validation process involving experts ensures the accuracy and reliability of observations. The platform empowers citizen scientists, bridging the gap between scientific expertise and the public, and promoting community engagement and knowledge sharing. Local projects dealing with local actions are collected and integrated into a larger framework to address global issues such as ‘Resilience in a changing climate.’ Government organizations usually facilitate the participation of quintuple helix participants.



Within the platform, there are two different levels of dialogues, as illustrated in Figure XX. The platform, represented at the centre, interacts directly with citizens in short-term interactions, providing feedback within hours or a few days. Conversely, interacting with decision-makers and academia requires time to digest information to create products that are later useful for academic and policy-making processes.

The platform needs to interact with different local communities; therefore, it is important to understand how these communities work. Each community interacts with the platform in its own language.

The example illustrated relates to the ARSINOE Athens Case Study, which is recording biodiversity in the Athens Metropolitan Area. As displayed in Figure XX, the multi-partner approach of collaboration includes quintuple-helix actors: the community is represented by the volunteers who collect observed data, supported by NGOs and private companies such as the Center of Education for the Environment and Sustainability that mobilize the community. The academic institutions interface with the platform, while government organizations facilitate participation. Forty-two Environmental School Teams were created, involving teachers and students in recording and sharing their observations through the platform, leading to 8,600 observations of 1,321 species.



By supporting the SDGs, this platform contributes to global priorities for environmental sustainability and helps monitor progress toward specific targets. Advantages include accessibility, scalability, community engagement, and long-term impact. It introduces a novel approach to citizen science, combining user-friendly interfaces, collaborative validation, and a visualization tool for supporting evidence-based discussions.

Overall, the platform is important for democratizing environmental monitoring, fostering an understanding of biodiversity and environmental patterns and human impact, and enabling evidence-based decision-making and sustainability strategies for a more viable future.

1.4 TransformAr

Fred Hattermann

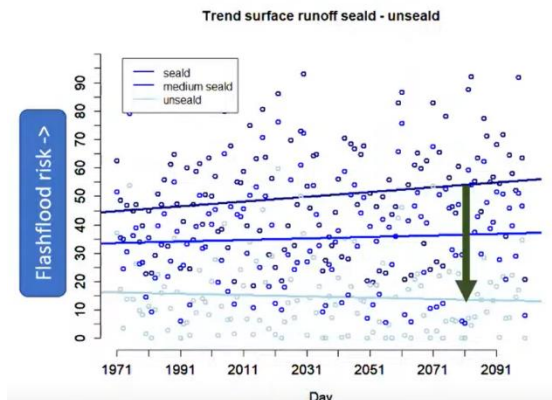
Improving climate resilience of the Water-Energy-Food Nexus: Demonstration of water-related innovation packages

Professor and Deputy Head of Research Department on Climate Resilience at Potsdam Institute for Climate Impact Research and Leader of Working Group on Hydroclimatic Risks

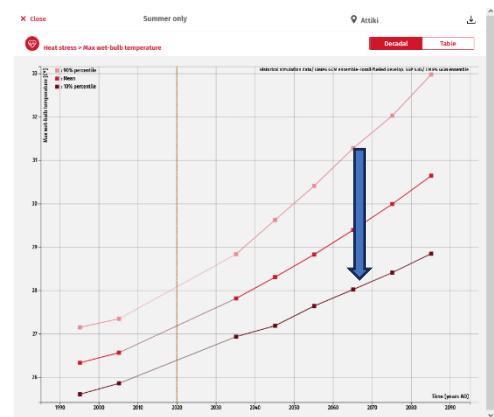
The extreme events of recent years have shown that the communities and infrastructure in Europe are not prepared for the coming extremes. It is likely that only a combination of various nature-based and technical measures will help to avert excessive consequences for the population. How these can be designed for different extremes or even combined with mitigation measures is often unknown and has great potential for further applied research. It is the aim of the EU-funded project to develop and demonstrate solutions and pathways to achieve rapid and far-reaching transformational adaptation across the EU.

TransformAr works in six demonstrators to highlight this nexus. As an example, the Sponge City concept is illustrated (see Figure XX) as a measure to address climate change in urban areas. Rainwater is collected in various ways instead of ending up in the sewage system. This water infiltrates the ground to slow down flash floods, cool the local environment, recharge aquifers by seeping into the groundwater, and increase evapotranspiration.





Regarding the nexus with health, the Wet Bulb Globe Temperature (WBGT) is a metric used to evaluate the risk of heat-related illnesses based on current temperature, humidity, wind speed, and solar radiation. As shown in Figure XX, the simulation for Egaleo indicates a reduction in health risks for the population following the implementation of Sponge City measures. This outcome highlights the effectiveness of proactive measures in addressing climate change and mitigating the effects of heat waves in urban areas.



The intervention concluded with the announcement of the TransformAr webinar on the topic ‘Nature-based solutions: devising actions to achieve rapid and far-reaching transformational adaptation’, highlighting the alignment and mutual support among the cluster projects for their respective activities.

1.5 IMPETUS

Matteo Dall'Amico

The Digital Twin of the catchment area: a new concept for water monitoring and prediction

Hydrologist and snow scientist. CEO of Waterjade Srl, a company devoted to decision making support for water supply planning. Shortlisted for WIE 2024 Award under the category 'Digital Water'

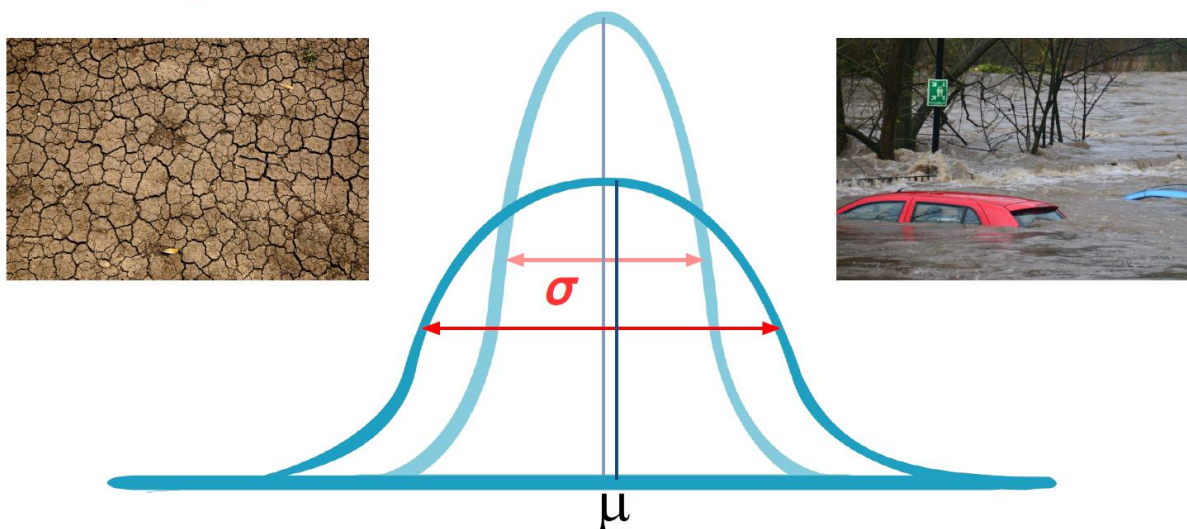
"How much water is there and when will it be available?"

The amount of water available for withdrawal is the result of a complex hydrological balance that takes place in the upstream basin. The hydrography, soil and water table characteristics, evapotranspiration, snow melt, as well as the presence of anthropogenic structures such as dams and intake structures, influence the time needed by water to get to the withdrawal point.

Current forecasting approaches, based purely on historical data, do not take into account actual basin conditions and current climate change, resulting in low reliability and serious repercussions in water supply planning such as wastage, service discontinuity and damage from extreme events. In this presentation we show a novel approach, called the Digital Twin of the Catchment, a mix of physical models and machine learning that wants to digitally reproduce the water cycle at the catchment scale.

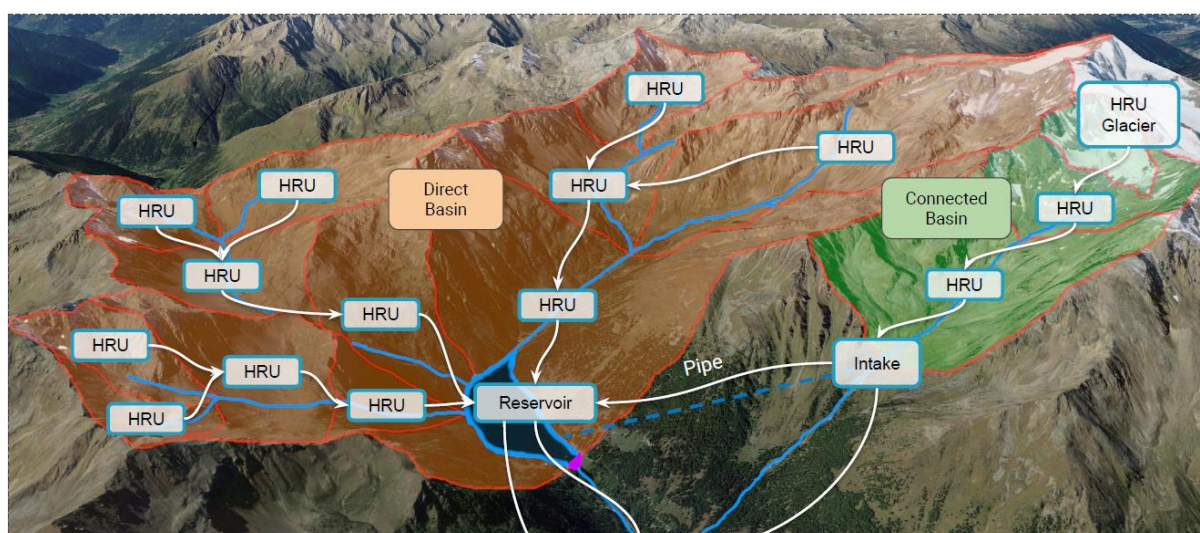
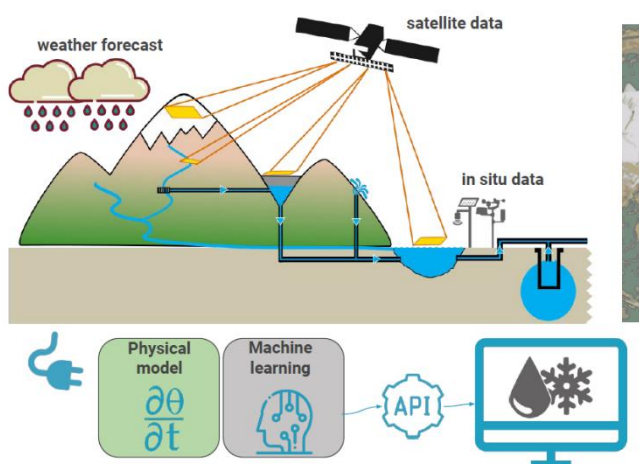
Another important question arose: how can extreme events be anticipated? Climate change is making historical data time series poor predictors for extreme events. The mean and variance of the curve are changing, and climate change effects are expanding the curve, as shown in Figure XX, resulting in an increased possibility of droughts and floods and the likelihood of transitioning from one to the other.

Challenges



To address this challenge, a new decision-making concept was proposed: building a Digital Twin of the catchment. This method relies on several data sources, such as weather forecasts, satellite data, in situ data, physical models, and machine learning as highlighted in figures xx and xx. This approach allows for digitally reconstructing the water cycle at the basin scale, incorporating both the natural environment and anthropogenic interventions. Once the Digital Twin is ready, it can be used for seasonal forecasts of droughts and floods, and for long-term predictions of CO2 climate projections.

The Digital Twin of the catchment



1.6 Q/A session

The panel discussion revolved around two key topics:

- *What are the most significant challenges the water sector faces in adapting to climate change, and how can they be overcome?*
- *In the context of the broader vision for the future of water, could each of you share one critical 'Do' and one crucial 'Don't' for ensuring sustainable water management in the coming decades?*

Take aways

- **The question of water is a question of sustainability across all sectors: environmental, social, political, and economic.** Health is affected by drought and flood, which are water-based problems, and also by the domino effects of not addressing these water-based problems correctly
- Unexpected aspects are indirectly connected to the water crisis. **All the effects of climate change on water are exacerbated by conflicts and mass migrations, which in turn lead to worsening gender inequality**
- A new phenomenon called 'environside'¹ refers to conflicts now seeking to destroy the basis of life in a certain region, with water being the first target. Health, migration, gender equality, and conflict are intricately linked, and they are all connected to climate change, which is manifested through water. Thus, the water sector not only has a responsibility to accept a central role in these social and political issues, but political actors also need to acknowledge the importance of the water sector as a political issue
- The water sector needs to be less hermetic when it comes to knowledge sharing with the general public. A first step is to allow 'data to knowledge,' meaning the flow of data and technical solutions from the ground to decision-making and action against climate change. But data needs to become knowledge, accessible to all who require it. As a result, data and knowledge can lead to action
- The one-health approach includes human health, and also environmental and ecosystem health, which are all deeply related to water
- EU-funded projects have an improved impact on local communities when citizens are involved. This means that citizens in these local communities contribute by sharing their needs, challenges, and the solutions they require from the research community. This can be facilitated by WOLLS and water local forums. In this way, citizens are not just passive

¹ "Environside" is a term used to describe a deliberate strategy in conflicts where the natural environment is targeted to destroy the basis of life in a specific region. This typically involves the destruction or contamination of water sources, which leads to severe repercussions for the local population, including health crises, forced migrations, and exacerbation of social inequalities such as gender inequality. The concept highlights the interconnectedness of environmental sustainability and human security, emphasizing that the degradation of natural resources like water can be used as a weapon of war, further complicating efforts to address issues like climate change and social stability.

receivers of information from EU projects but take on a proactive and almost leadership role, which creates awareness and trust

- *What are the problems citizens are facing with regards to water? Would they like to co-design and co-implement solutions? Projects will provide the technical and scientific support needed. Trust is built because individuals trust their own involvement and contributions. They become citizen scientists, continuing the work they started with the support of EU projects. The scientific community benefits by acting as a science embassy, offering academic and scientific support when necessary*
- **The capacity to communicate is a central need of the scientific community.** *It is important to widen the recipients not only to peers and fellows but also, more importantly, to the general public and make knowledge more accessible. Clear communication creates an emotional response that fosters social continuity, which guarantees future political consensus, important for addressing issues such as climate change. This also supports resource mobilization*
- **Awareness is the first step to change a situation, so people need to understand climate change.** *School involvement is crucial, as it also provides feedback to improve climate interventions for adaptation and mitigation.*
- *We have the technical solutions, but the infrastructures are not ready to sustain the climate impact. Implementation takes time*
- **Early warning helps people survive; prompt communication is key**
- *Encourage interdisciplinary collaboration to eliminate siloed thinking*
- **A Digital Twin is a set of interconnected models that mimic and reproduce the physical behaviour of the physical world. It allows for simulations, observing the effects, and saving time and costs by avoiding the need for physical events to occur in the real world to study environmental behaviour**
- *Policy and science interface is reinforced by communication, leading to mutual understanding*
- **Water is a global topic that needs to be addressed locally**
- *Do: One way to tackle water challenges is to enlarge the perspective of local administrations and partners to include more global viewpoints and see how water is managed outside the local context*
- *Don't: Instil fear in people with dramatic scenarios. They are part of the solution, not the problem, and should be engaged constructively*
- *Do: Increase the resilience of the water sector with investment in infrastructure to ensure water security and mitigate climate impacts*
- *Mobilizing participation is essential, as there is a great need for knowledge, and knowledge must be shared*
- **The impact of climate change is huge; we need to be aware that it is happening and adjust our behaviours accordingly**
- **We need a common effort by all the actors of the quadruple-helix, including civil society, to stand together and find potential sustainable solutions for the long run**

Systems Innovation Approach (SIA) addresses the growing complexity, interdependencies and interconnectedness of modern societies and economies, focusing on the functions of the cross-sectoral system? as a whole? and on the variety of actors. The Climate Innovation Window (CIW) is the EU reference innovations marketplace for climate adaptation technologies. ARSINOE shapes the pathways to resilience by bringing together SIA and CIW, to build an ecosystem for climate change adaptation solutions. Within the ARSINOE ecosystem, pathways to solutions are co-created and co-designed by stakeholders, who can then select either existing CIW technologies, or technologies by new providers (or a combination) to form an innovation package. This package may be designed for implementation to a specific region, but its building blocks are transferable and re-usable; they can be re-adapted and updated. In this way, the user (region) gets an innovation package consisting of validated technologies (expanding the market for CIW); new technologies implemented in the specific local innovation package get the opportunity to be validated and become CIW members, while the society (citizens, stakeholders) benefits as a whole. ARSINOE applies a three-tier, approach: (a) using SIA it integrates multi-faceted technological, digital, business, governance and environmental aspects with social innovation for the development of adaptation pathways to climate change for specific regions; (b) it links with CIW to form innovation packages by matching innovators with end-users/regions; (c) it fosters the ecosystem sustainability and growth with cross-fertilization and replication across regions and scales, at European level and beyond, using specific business models, exploitation and outreach actions. The ARSINOE approach is show-cased in nine widely varied demonstrators, as a proof-of-concept with regards to its applicability, replicability, potential and efficacy.



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