



The project is supported by the European Union under grant agreement N° 101082169. Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.

Basics and good practices of collaborative governance in nutrient pollution handling and nutrients recycling

1st Capacity Building Session
28 July 2026

In collaboration with:



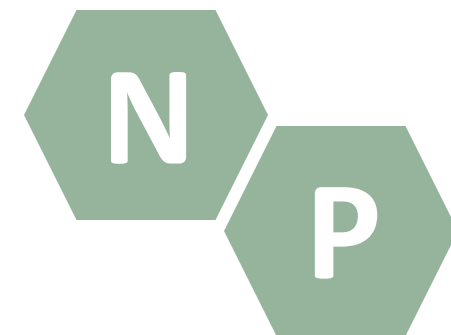
SEACURE-

Innovative solutions to prevent, reduce and remediate nutrient pollution along the land-river-sea system in the Mediterranean basin

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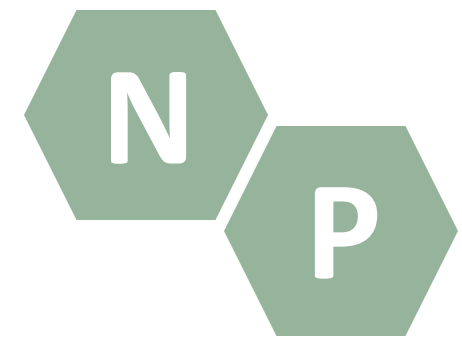
Upcoming activities



Introducing SEACURE

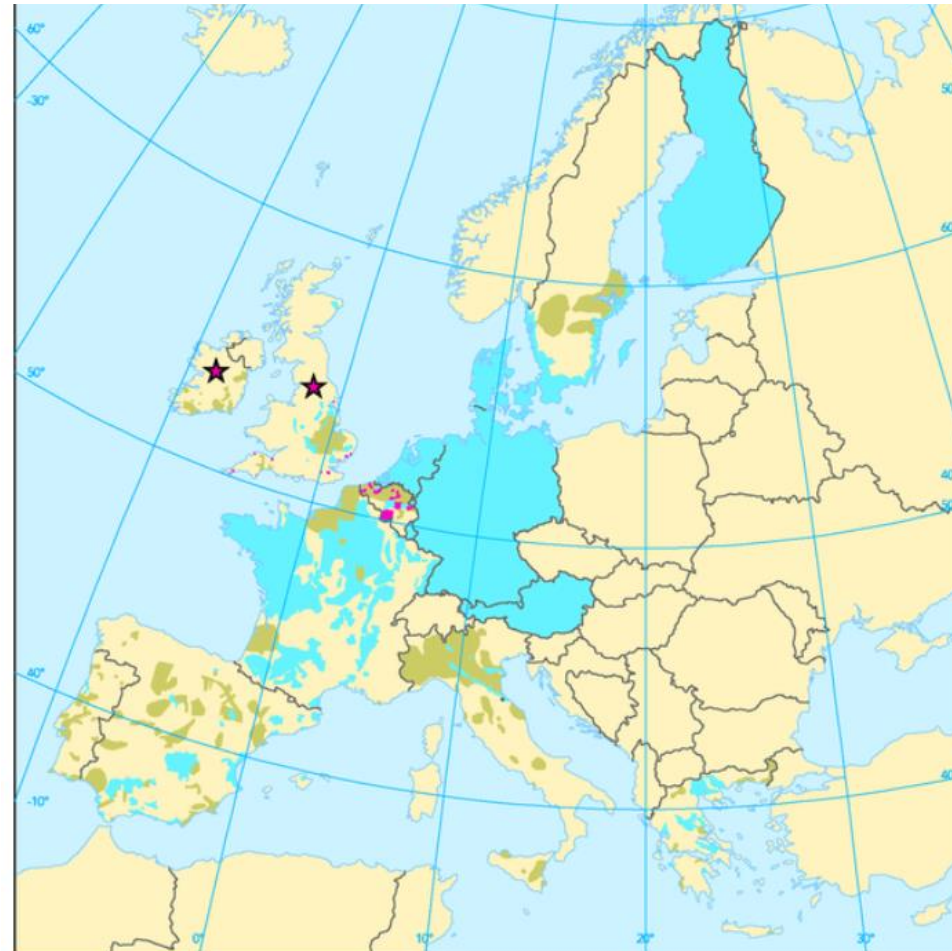


SEACURE Project: Combatting Nutrient Pollution in the Mediterranean



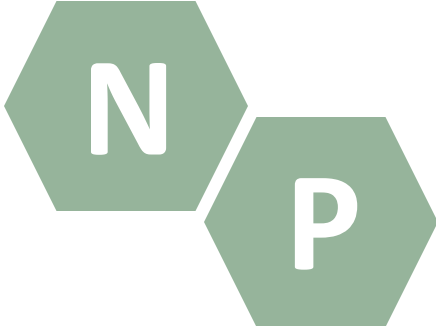
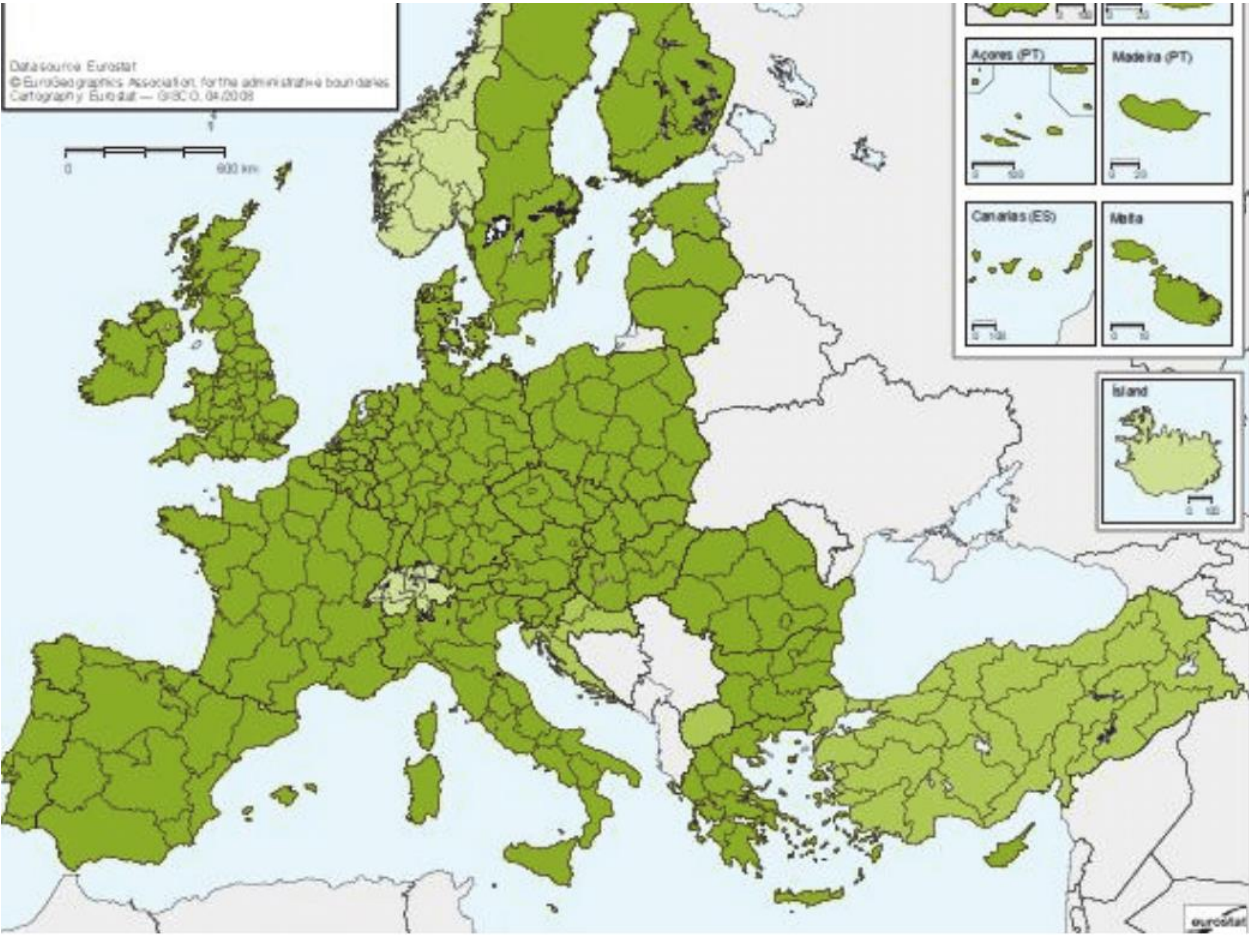
Status of water

The deadline set by the Water Framework Directive (WFD) for European rivers, lakes, transitional, coastal and groundwaters to meet good status was 2015. That was not met and there has been little improvement since 2010. In 2021, only 37% of Europe's surface water bodies achieved a good or high ecological status. 29% achieved a good chemical status.



Nitrate vulnerable zones, EU
Map (static) | Published 12 Nov 2009 | Modified 20 Sept 2024





Member State	Implementation approach	Approx. NVZ area (% of national territory)
Austria	Designated NVZs	~15%
Belgium	Designated NVZs (regional)	~60%
Bulgaria	Designated NVZs	~45%
Croatia	Designated NVZs	~15%
Cyprus	Designated NVZs	~25%
Czechia	Designated NVZs	~18%
Denmark	Whole territory	100%
Estonia	Designated NVZs	<10%
Finland	Designated NVZs	~8%
France	Designated NVZs	~55–60%
Germany	Designated NVZs	~28–30%
Greece	Designated NVZs	~20%
Hungary	Designated NVZs	~70%
Ireland	Whole territory	100%
Italy	Designated NVZs	~25–27%
Latvia	Designated NVZs	~15%
Lithuania	Designated NVZs	~45–50%
Luxembourg	Whole territory	100%
Malta	Whole territory	100%
Netherlands	Whole territory	100%
Poland	Whole territory (since 2018)	100%
Portugal	Designated NVZs	~20%
Romania	Whole territory	100%
Slovakia	Designated NVZs	~60%
Slovenia	Designated NVZs	~15%
Spain	Designated NVZs	~35–37%
Sweden	Designated NVZs	~15%



SEACURE Objectives



The project SEACURE aims at demonstrating, scaling up and replicating effective innovations for the systemic prevention, reduction and remediation of nutrient pollution in the Mediterranean Sea basin

O1. To co-assess with regional actors the territorial unit context

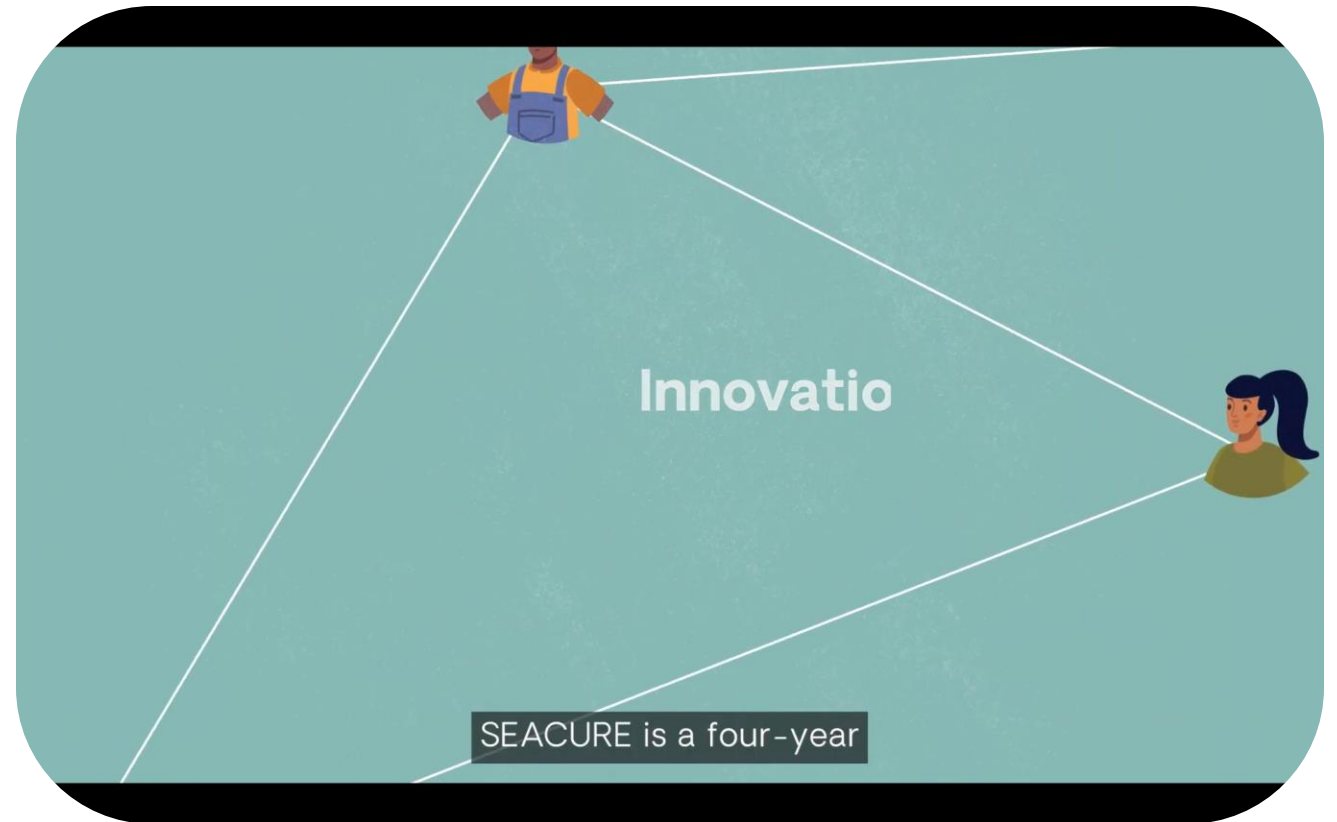
O2. Demonstrate the effectiveness of nutrient management strategies at TRL7 across demonstrators

O3. To evaluate the multi-criteria feasibility and large-scale impact of nutrient management strategies

O4. To work on regional innovation enablers to ease the post-project upscale of solutions.

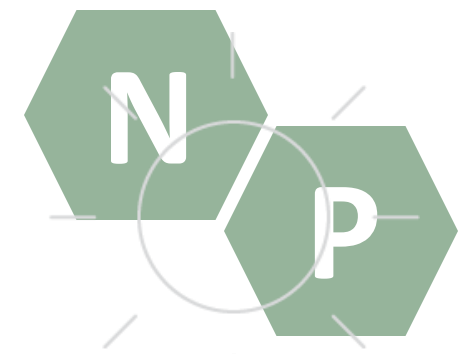
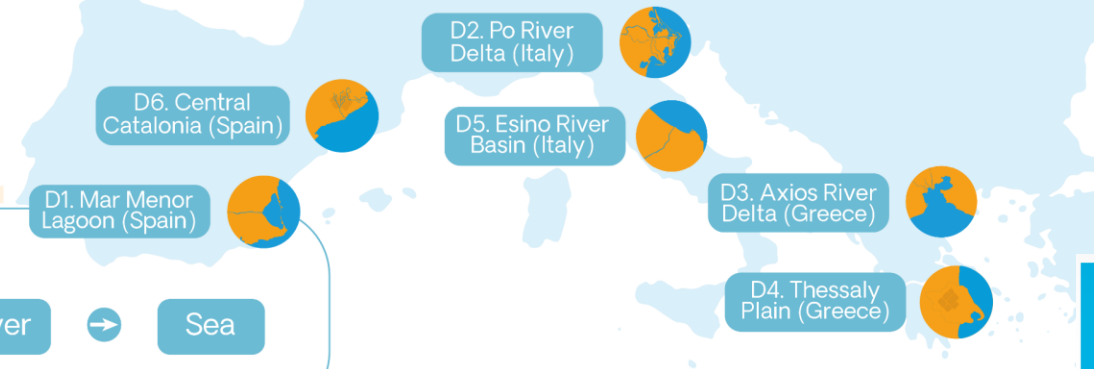
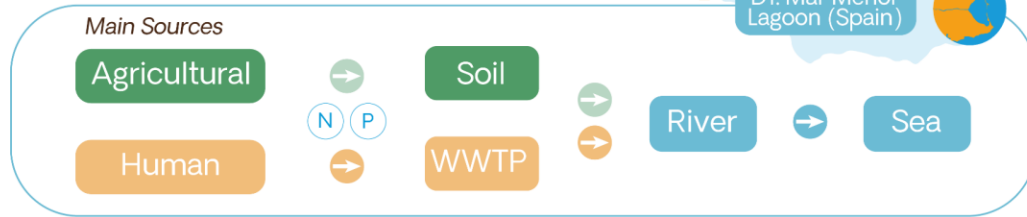
O5. Promote knowledge exchange and replication in Associated Regions

O6. Dissemination, communication and exploitation of results at the EU-Mediterranean level



Innovative solutions to address nutrient pollution accross the **land-river-sea** system in the Mediterranean Basin

concept



3 Nutrient Management Strategies — 16 Demonstrated Measures Across the **land-river-sea** Continuum

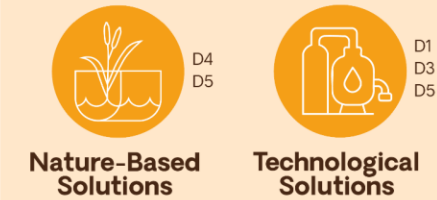
► Prevention

Strategies for preventing and reducing nutrient losses from agriculture.



► Reduction

Strategies for preventing and reducing nutrient entry in river catchments.



► Remediation

Strategies for reducing and eliminating nutrient excess in aquatic ecosystems.



Total Budget

8.5M

Partners

25

Project duration

48months

Countries

5

Pilot Areas

6

From

01.09.2024

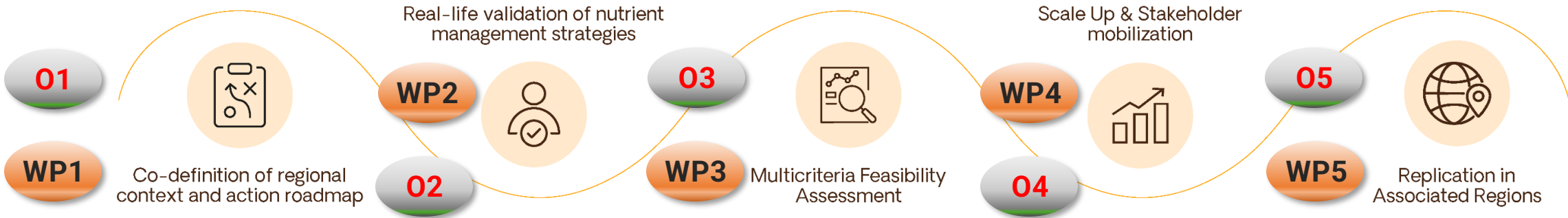
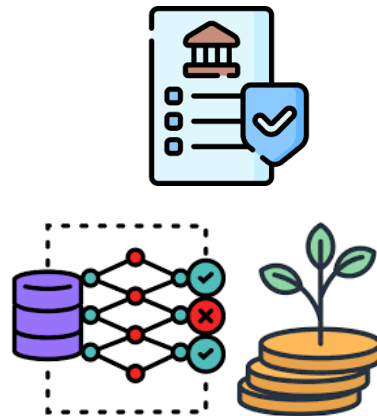
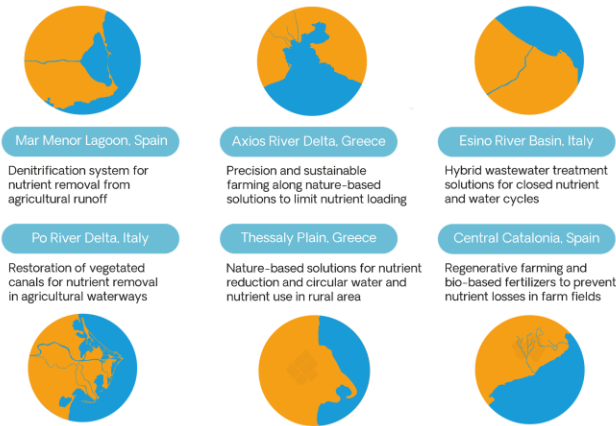
to

31.08.2028



Multi-actor & multi-level stakeholder engagement approach

Workplan and activities

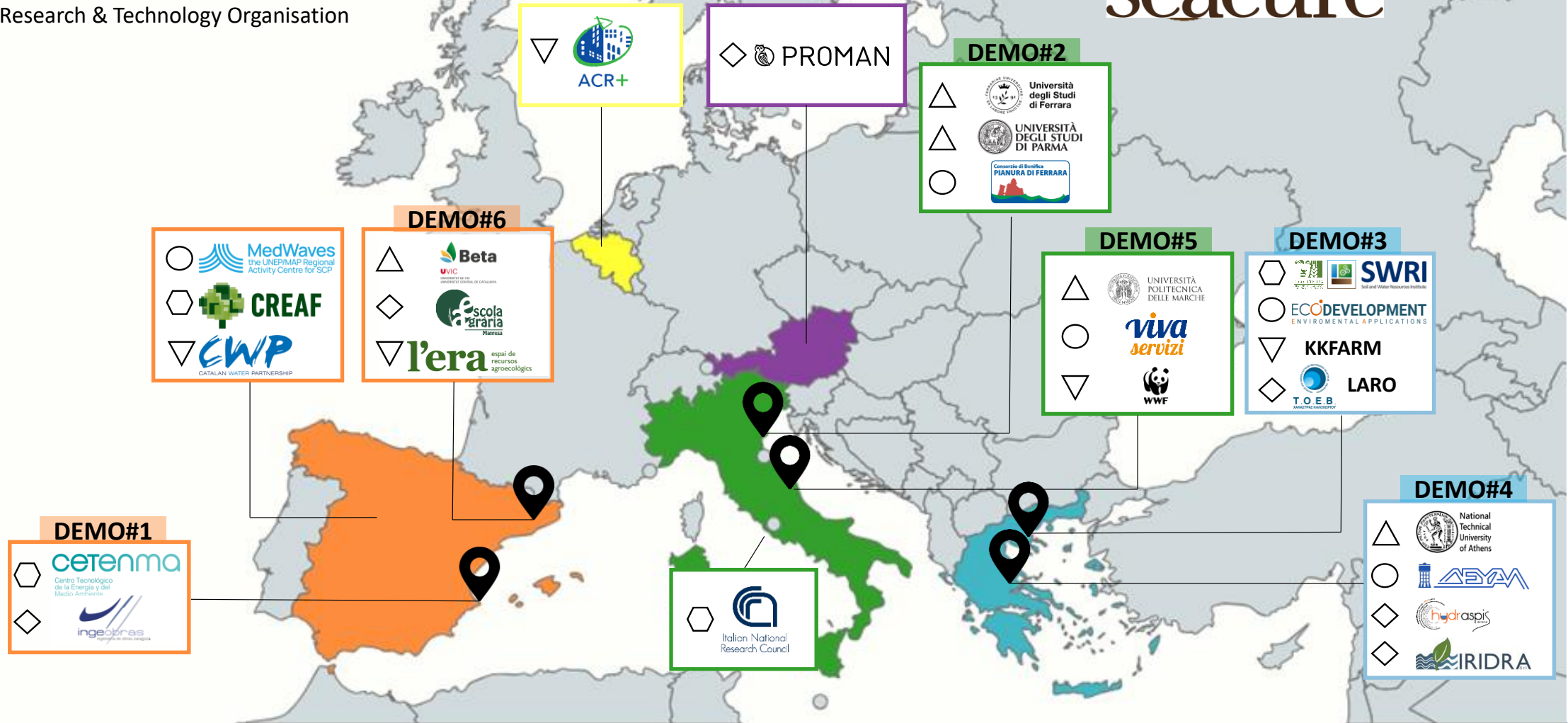


Multi-actor & multi-level stakeholder engagement approach

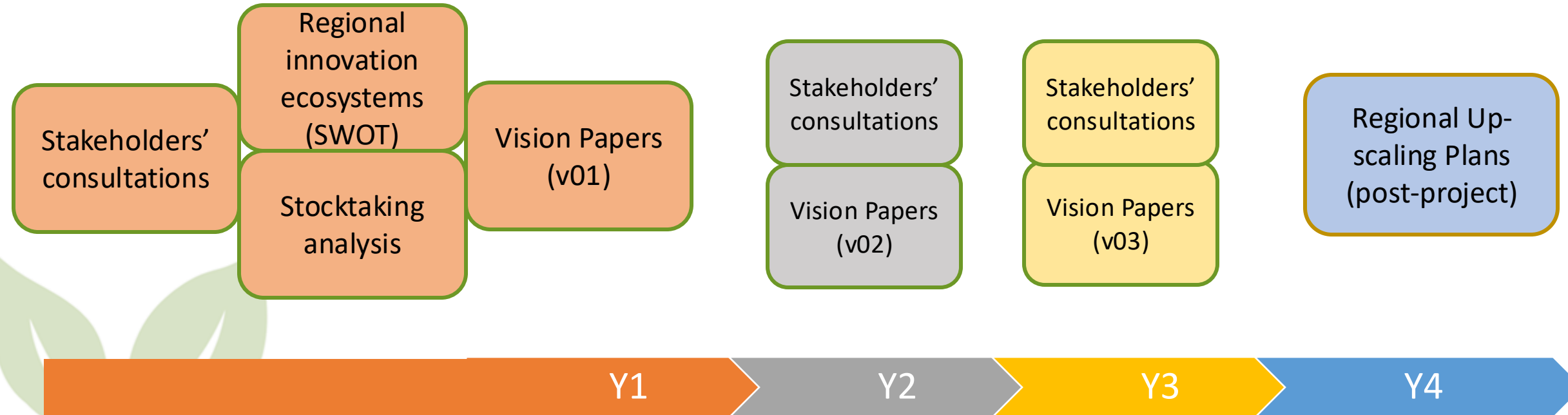
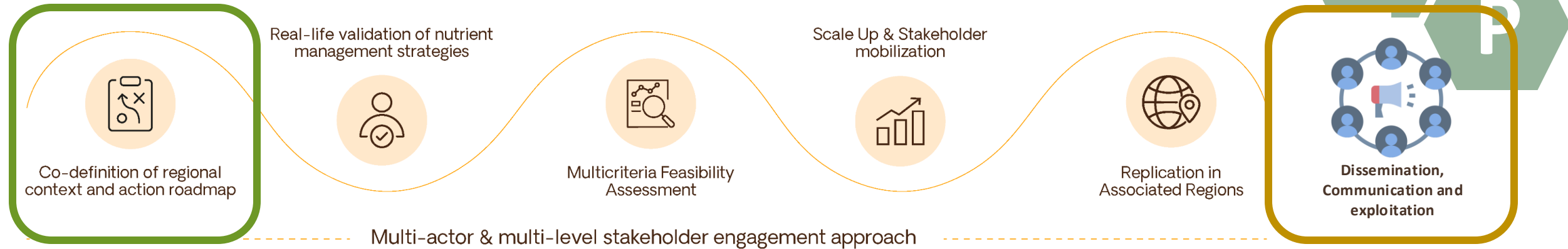


CONSORTIUM

- △ University
- Public Administration
- ◇ Small and Medium Enterprise
- ▽ Non-Governmental Organisation
- ⬡ Research & Technology Organisation



Governance analysis approach in SEACURE





SEACURE - Comprehensive Action-oriented Vision Papers

What?

6 Papers that detail **long-term visions, regional goals, and pathways for tackling nutrient pollution** in each demo region

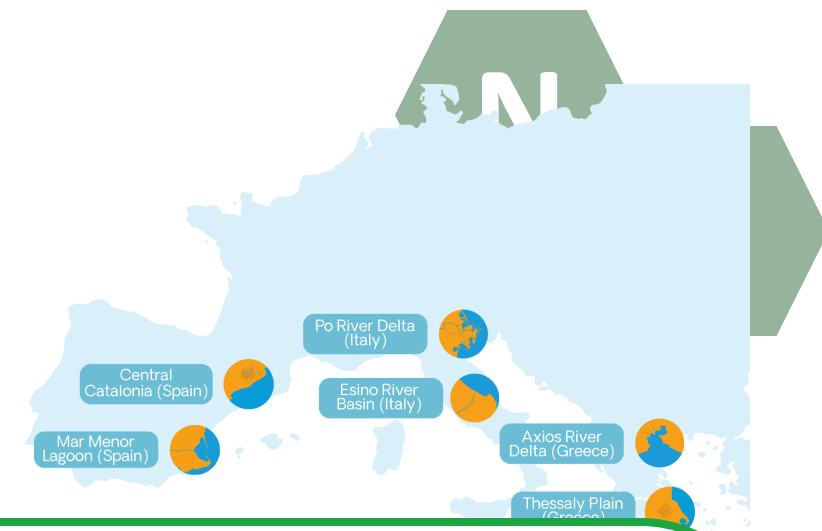
- Describes priorities and roadmaps for achieving this vision.
- Serves as a basis for developing policies, strategic initiatives, or actions.
- Incorporates local or thematic data, often in the context of specific meetings, consultation processes, or analyses.

Why?

Anchor project innovations in territorial realities and stakeholders' priorities, guide SEACURE's next steps, supporting demonstrations, scaling, and policy impact

For?

Decision-makers, land and water managers, regional and national authorities, farmers' organizations, civil society actors, and researchers working on soil and water quality

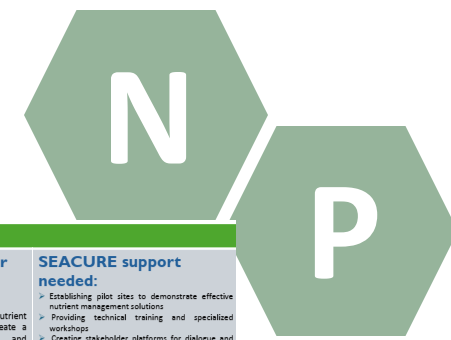


How?

- Territorial context and nutrient-related challenges identified during stakeholder roundtables held in each demo region
- Literature research and SWOT analysis of the regional innovation ecosystems of the demo regions ([D1.2. Strategic Orientation Analyses. Integrated result of the quantified SWOT analyses of the regional innovation ecosystems within the basins/territorial units](#))
- Research and analysis of the past interventions in the demo regions (D1.3 Regional Stocktaking Analysis. Integrated results of the stocktaking exercises past implemented solution)

1st version was published in October 2025, 2 more versions to be published by 2028

SEACURE - Comprehensive Action-oriented Vision Papers- Content



Thessaly Plain- Greece

This Vision Paper serves as a bridge between the co-defined territorial unit context and nutrient-related threats, the strategic insights gained from the regional ecosystem analyses, and the learnings from past experiences implemented. This will suggest adequate regional goals and possible intervention options.

Introduction	Challenges
The DEMO site in Thessaly Plain is designed to test and demonstrate innovative nature-based solutions (NBS) for reducing nutrient loads from both point and diffuse sources, with the goal of enabling sustainable water reuse for agricultural irrigation. Two main nutrient management strategies are implemented: a combined UNSAT/SAT constructed wetland system integrated with a high-rate algal pond (HRAP), which treats urban wastewater; and a bioswale system used to treat rural and stormwater runoff using clonoptilolite (Na-zeoilite), a novel filling material with high nutrient adsorption capacity. Together, these systems offer efficient, low-cost, and environmentally sustainable approaches to nutrient removal and water quality enhancement in agricultural settings.	Thessaly's soil and water systems face mounting pressure from nutrient pollution—mainly nitrogen and phosphorus—from agriculture, agro-industry, and urban discharge. These nutrients accelerate eutrophication, disrupt aquatic ecosystems, and compromise water quality. Water scarcity, worsened by over-abstraction, inefficient irrigation, and droughts, compounds the stress. Storm Daniel (2023) exposed critical vulnerabilities: flooding mobilized nutrients and agrochemicals from farmland into rivers and coastal waters, while a wastewater treatment plant overflowed, releasing additional loads. Soil erosion and contamination further accelerated land degradation, revealing gaps in the region's capacity to respond to climate shocks.

Causes	SEACURE Strategies to address nutrient-related challenges
Nutrient pollution in Thessaly mainly stems from diffuse agricultural runoffs, with intensive fertilizer use and livestock waste as major contributors. Nutrient loading is highest in downstream lowlands and irrigation zones, causing eutrophication and soil degradation. Previous mitigation measures have proven ineffective due to fragmented governance structures, inadequate monitoring systems, insufficient enforcement of the polluter-pays principle, limited stakeholder engagement, aging infrastructure, and lack of appropriate incentive mechanisms. Sustainable practices like regenerative agriculture and precision management are still underused.	To achieve sustainable nutrient and water management, integrated interventions must tackle challenges through collaboration, modern infrastructure, and tailored nature-based solutions. The Thessaly DEMO site tests methods to reduce nutrient loads from point and diffuse sources in the rural plain. Key technologies include a constructed wetland with algal ponds for wastewater treatment and a bioswale using clonoptilolite to filter runoff nutrients. These pilots demonstrate impact, scalability, and support water reuse for irrigation.
Identification of risks	
The Region faces escalating environmental, economic, and social risks from nutrient pollution and systemic vulnerabilities, worsened by climate change. Storm Daniel (2023) exposed the region's vulnerability to extreme weather and inadequate climate-adaptive infrastructure. Environmental challenges like eutrophication, soil contamination, aquifer depletion, and ecosystem degradation threaten sustainability. Economically, rising costs, lower productivity, and land loss endanger farmers and food security. Socially, rural depopulation, smallholder marginalization, and health risks increase community vulnerability.	
Past implemented solutions.	Regional innovation ecosystem
In the Region, solutions have been applied to prevent and reduce nutrient pollution, including research on water resilience, nutrient monitoring, and sustainable farming practices. Efforts also target nitrate pollution from agriculture and public awareness campaigns. Strong research institutions and innovation centers support ongoing scientific and technological progress. Past initiatives have shown measurable success, highlighting the Region's ability to manage environmental challenges effectively.	The regional innovation ecosystem in Thessaly is a dynamic network of universities, research centers, public agencies, private companies, agricultural cooperatives, and civil society organizations. Universities and research institutions lead scientific research and technological innovation, generating knowledge and tools to address pressing soil-water challenges. Public agencies shape policy, oversee regulation, and manage infrastructure, while private enterprises and SMEs bring innovative technologies to market. Agricultural cooperatives help smallholders access funding and adopt sustainable practices, and NGOs foster awareness and public engagement. However, several governance barriers hinder effective decision-making: fragmentation of responsibilities and overlapping jurisdictions create inefficiencies; bureaucratic delays slow down urgently needed interventions; insufficient use of data limits evidence-based planning; and stakeholder exclusion results in top-down measures misaligned with local realities. A short-term policy focus further undermines long-term sustainability. Overcoming these systemic barriers is essential for transforming Thessaly into a resilient and innovation-driven region.

The leader in nutrient management	Main Actions
- Central government & relevant ministries - Regional authorities - Advisory services - Cooperative federations - Research institutions	- Create Mandate: comprehensive soil testing and nutrient analysis to enable site-specific fertilization and reduce nutrient runoff - Provide financial incentives (grants, low-interest loans, performance-based payments) for adopting nutrient-efficient practices - Expand capacity-building programs through certified advisory services focused on nutrient management and precision agriculture
Limitations and barriers	
Who - Regional and local authorities – Limited coordination and overlapping responsibilities - Farmers and agricultural cooperatives – Low awareness and limited technical expertise - Financial institutions – Insufficient funding for infrastructure and sustainable practices - Water utilities and environmental agencies – Limited capacity for monitoring and enforcement What - Fragmented governance and poor coordination among multiple authorities - Lack of financial resources to invest in sustainable infrastructure and practices - Limited farmer knowledge on nutrient management and precision agriculture - Outdated irrigation and drainage systems affecting water efficiency - Weak enforcement of environmental regulations - Insufficient monitoring tools and data for effective decision-making	
	- Invest in digital infrastructure, including broadband and data platforms, for real-time nutrient tracking and transparent reporting - Support cooperative federations to coordinate input procurement and share sustainable nutrient management knowledge - Strengthen regulatory enforcement with audits and penalties, balanced by incentives to promote environmental compliance

Stakeholders' vision for strategic nutrient management	SEACURE support needed:
The stakeholders' vision for strategic nutrient management in Thessaly aspires to create a resilient, environmentally sustainable, and socially active region where soil and water resources are responsibly managed, protected, and restored. The aim is to address critical environmental challenges through innovation, nature-based solutions, and inclusive governance. Achieving this vision requires systemic transition, cross-sector collaboration, and community engagement. Key actors: - Regional and local authorities - Farmers and agricultural cooperatives - Research institutions and universities - Environmental NGOs and civil society groups - Water utilities and private stakeholders Practice adaptations needed: - Holistic management of water and soil resources for ecological balance and sustainability - Adoption of nature-based solutions for wastewater treatment and reuse - Implementation of evidence-based interventions to restore degraded ecosystems - Integration of scientific research and technology to guide nutrient and water management policies - Promotion of cross-sector collaboration among institutions, communities, and private actors Required KAS changes: Knowledge: Advanced understanding of nutrient pathways, ecosystem restoration, and innovative tools Attitudes: Strengthened environmental awareness and willingness to adopt sustainable practices Skills: Capacity to apply nature-based solutions, monitor resources digitally, and coordinate across sectors	- Establishing pilot sites to demonstrate effective nutrient management solutions - Providing technical training and specialized workshops - Creating stakeholder platforms for dialogue and knowledge exchange - Developing policy briefs, funding schemes, and decision-support tools - Promoting citizen science initiatives to enhance monitoring and civic engagement Alignment with EU Strategies - European Green Deal - EU Soil Strategy 2030 - Common Agricultural Policy (Regulation EU 2021/2115) - EU Zero Pollution Action Plan - Water Framework Directive (2000/60/EC) - Farm to Fork Strategy - Mission "A Soil Deal for Europe" Conclusions Transforming the Thessaly agro-ecological landscape demands a shift from isolated measures to an integrated, multi-level governance framework that synergizes policy incentives, technological innovation, and participatory leadership with effective nature-based solutions targeting nutrient pollution from both point and diffuse sources. Such a comprehensive approach is crucial to securing long-term nutrient balance, economic viability, and ecological resilience in the region. The SEACURE project plays a pivotal role in piloting, assessing, and embedding these solutions, establishing Thessaly as a leading regional exemplary for nutrient-smart management, sustainable agriculture, and basin-wide resource stewardship across Europe.

- Background information on demo site and nutrient pollution challenges

- Outline of the causes behind nutrient pollution
- Identification of economic-env-social risks
- Summary of past interventions
- Solutions investigated by SEACURE demo partners
- Overview of regional innovation ecosystem

- Actors involved and the responsibility shared between stakeholders
- Identified limitations and barriers
- Proposed actions to overcome barriers

- Stakeholders' vision for strategic nutrient management identified during roundtables
- Key actors for nutrient pollution management
- Conclusions on the strategic vision and SEACURE demo activities

SEACURE - Comprehensive Action-oriented Vision Papers- Development- Stakeholder roundtables

Stakeholder roundtables to comprehensively address the challenges of nutrient pollution and co-create actionable solutions with stakeholders.

The stakeholder roundtables

- The structure of the workshops and guidance for the interaction between stakeholders == prepared by WP leader and task partners and distributed to demo leaders in advance
- 6 roundtables organized by demo site leaders during Dec 2024 - Jan 2025
- Duration: half day
- Each roundtable was held in the local language, with in-person participation

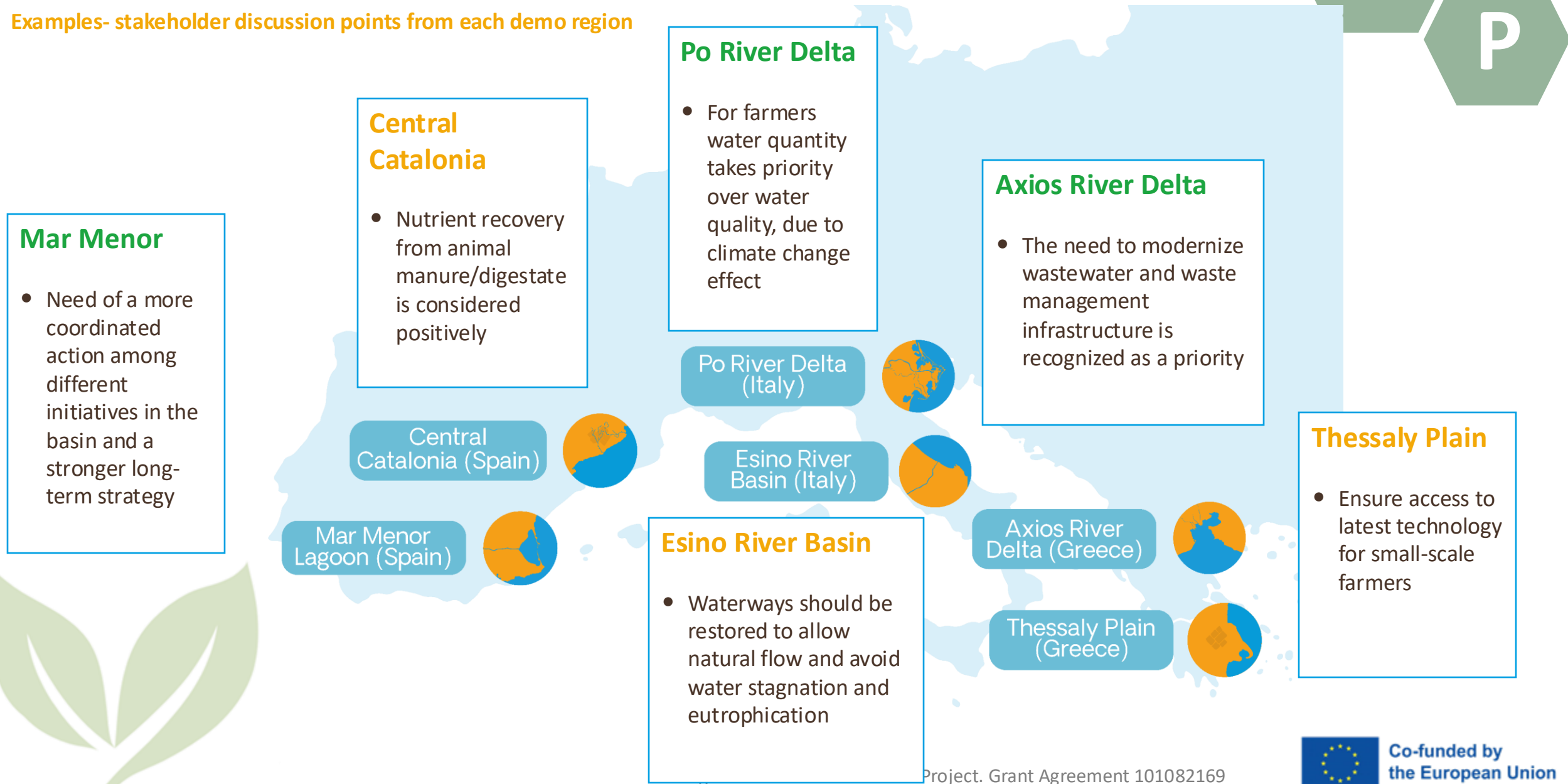
The workshops were organized around 3 sessions;

- **1. Co-Defining Nutrient Pollution Problems:** Engaging stakeholders in identifying the main sources and impacts of nutrient pollution in each basin.
- **2. Stocktaking of Past Implemented Solutions:** Reviewing existing solutions to nutrient-related challenges and assessing their effectiveness.
- **3. Exploring Regional Innovation Ecosystems:** Identifying opportunities for innovation and collaboration to improve nutrient management.

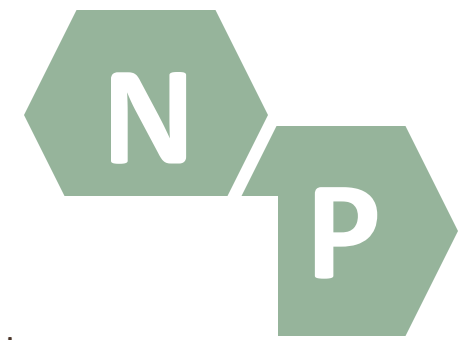


SEACURE – Preliminary results- Stakeholder roundtables

Examples- stakeholder discussion points from each demo region

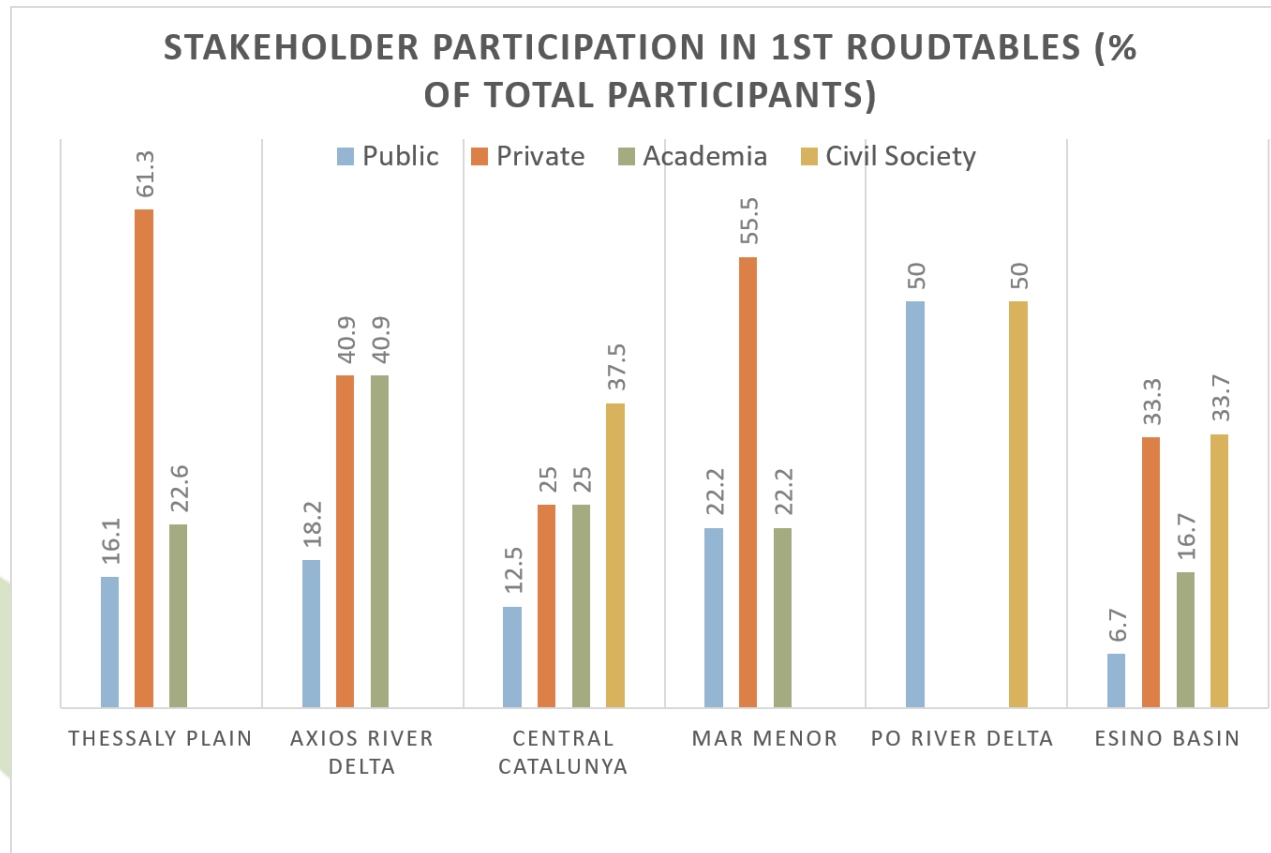


SEACURE – Preliminary results- Stakeholder roundtables



Participation

- Participation varied between demo regions. Though all relevant stakeholder groups were invited, 4-helix objective was not always met



Cross-cutting results

- improved wastewater management
- sustainable agricultural practices
- enhanced education and awareness
- stronger policy frameworks
- infrastructure modernization

The stakeholder consultation will be repeated for the second and third version of the vision papers.

SEACURE Vision Papers Development: Stocktaking of past interventions



Regional stocktaking analysis of past implemented solutions to equip regional stakeholders with key insights into the current configuration of technical and institutional responses to nutrient pollution

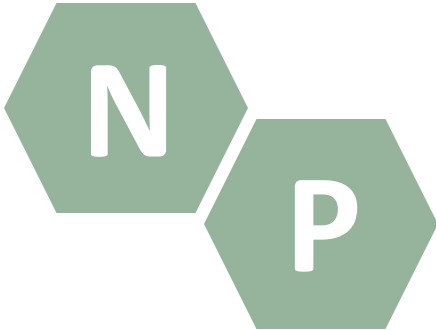
Example from the stocktaking analysis- Interventions categorized by the action area, key lever and impact

1. Identification of relevant past interventions and initiatives, through stakeholder consultation, and desk research
2. Evaluation of past implemented technical solutions across regions
3. Mapping of key levers that support or influence action

Name	Description	Authority	Action Area	Transformative Potential
 Tutorship of Mar Menor ⁷²	A new governance architecture (Royal Decree 90/2025) to implement the legal personality of the Mar Menor, through the Tutorship of the Mar Menor: (i) Committee of Representatives: responsible for strategic direction, and stakeholder representation, (ii) Commission of guardians: ensures rights are respected and provides public information to track compliance, (iii) Scientific Committee: provides scientific assessments and indicators.	Spanish Government, in coordination with the Regional of Murcia	T3	Deep
 "New Nitrogen Management: Legal Obligations" Training ²⁸	Training programme (2019-2023) to help farmers and livestock producers adopt new legal requirements on nitrogen management in nitrogen-intensive agricultural zones, including Campo de Cartagena. Activities include technical workshops, small-group working sessions, and on-farm demonstrations based on real case studies to improve compliance with nutrient-related regulations and maximise behavioural change.	Department of Water, Agriculture, Livestock, Fisheries and Environment (Region of Murcia), together with agricultural organisations and the Federation of Agricultural Cooperatives	T1	Shallow
 RECUPERA Mar Menor ⁷³	An innovative pre-commercial public procurement initiative to develop and test breakthrough technologies for denitrifying surface and subsurface flows (specifically Rambla del Albujón, D-7 channel and the Quaternary aquifer) entering the Mar Menor. The initiative runs from 2025 to 2027, and is structured in four phases: market exploration, technical definition, prototyping and validation in real conditions. It mobilises €5 million public investment to support the creation and validation of environmentally safe demonstrators capable of treating high water volumes, aiming to reduce eutrophication risk through scalable, non-commercial pilot solutions.	Centre for the Development of Industrial Technology (CDTI) under the Spanish Ministry of Science, Innovation and Universities, and the Department of Environment, Universities, Research and the Mar Menor (Region of Murcia)	T2	Intermediate



Action area categories;
Action Area Categories
Solutions targeting nutrient losses from agriculture (T1)
Solutions targeting nutrient entry into river catchments (T2)
Solutions targeting remediation of excess nutrients in aquatic ecosystems (T3)



Example from the stocktaking analysis- Results from Central Catalonia

Regional stocktaking of past implemented technical solution

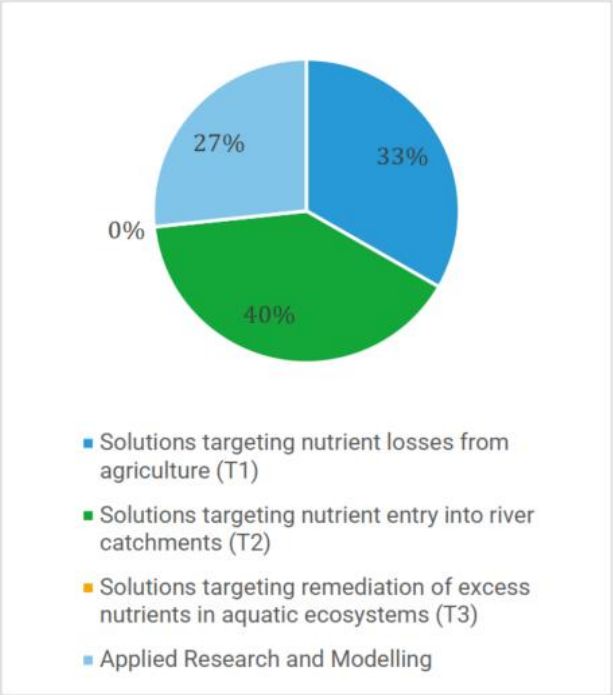


Figure 88. Central Catalonia – Distribution of Technical Solutions by Action Area

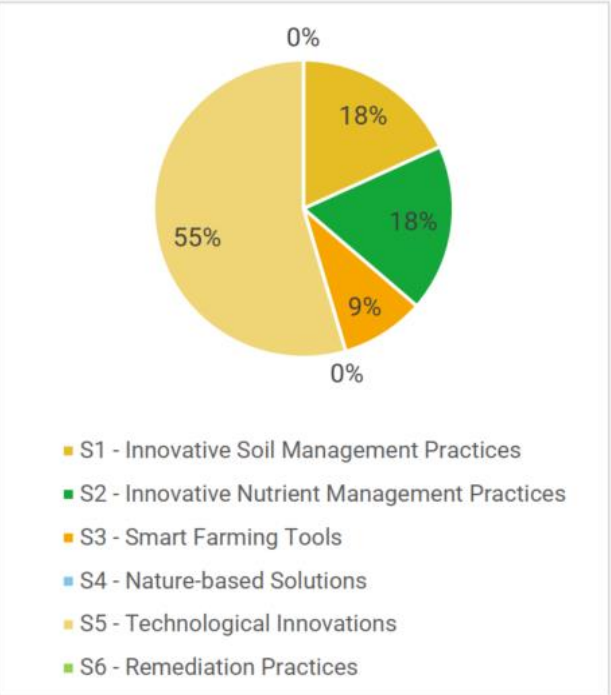


Figure 89. Central Catalonia – Distribution of Technical Solutions by Typology

Regional stocktaking on levers

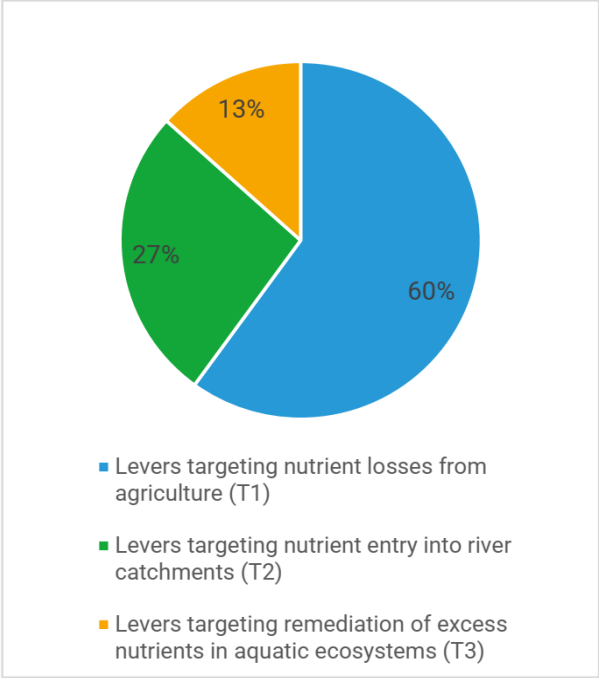


Figure 90. Central Catalonia – Distribution of Levers by Targeted Action Area

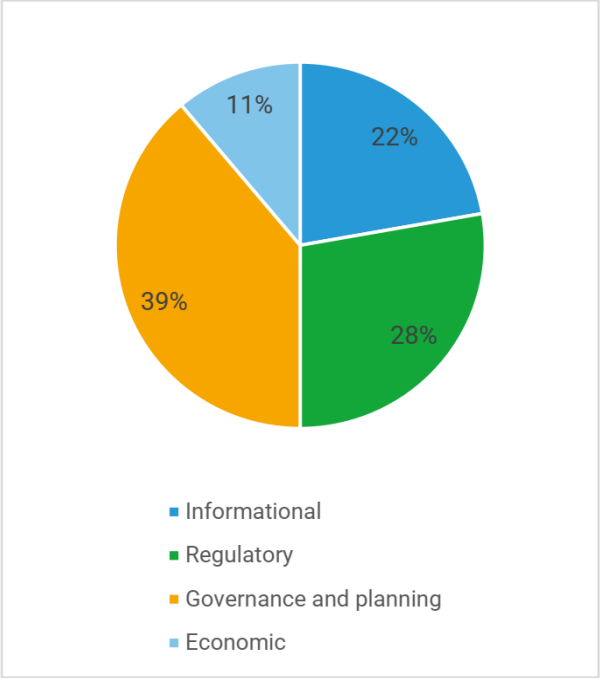


Figure 91. Central Catalonia – Distribution of Levers by Typology



SEACURE Vision Papers- Development- SWOT analysis of Regional Innovation Ecosystems

Definition

RIE: network of interconnected stakeholders, institutions, policies, and infrastructures within a specific geographic area that work together to drive innovation, economic development, and sustainability around a specific challenge

Objectives

To provide a strategic orientation analysis to identify hurdles and solutions for solutions uptake

- Analyse the regional innovation ecosystems of the six selected territorial units
- providing a strategic understanding of the innovation landscape
- focusing on key factors that can influence the development and implementation of nutrient pollution management

SWOT-framework approach (Strengths, Weaknesses, Opportunities, Threats)

Strengths and Capabilities

- research expertise
- technological infrastructure
- policy support
- stakeholder interactions

Weaknesses

- regulatory barriers
- funding limitations
- technological and knowledge gaps

External Opportunities

- emerging technologies,
- policy incentives,
- market demands,
- collaborative networks

Potential Threats

- environmental risks,
- regulatory uncertainties,
- economic constraints

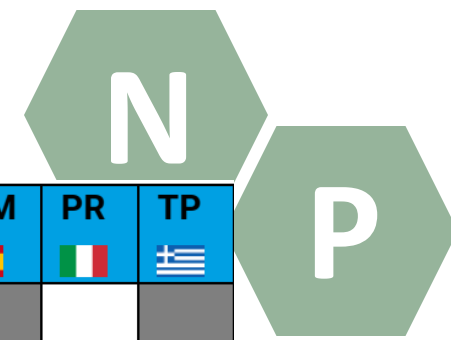
Method

- insights and opinions of key actors
- desk research
 - Stakeholder mapping
 - Literature review
 - Basin Management Plans
- Validation through interviews with demo leaders

Outcome

- defining joint action points where collaboration is beneficial
- region-specific strategies where tailored approaches are needed
- provide insights to guide the demonstration activities +the regional-level upscaling efforts + the development of Regional Upscaling Plans

SEACURE Vision Papers- Development- SWOT analysis of regional innovation ecosystems



Integrated SWOT analysis of the 6 demo regions, showing the shared SWOT elements

AR (Axios River Delta)
CC (Central Catalonia)
EB (Esino Basin)
MM (Mar Menor)
PR (Po River Delta)
TP (Thessaly Plain))

SWOT dimensions	Message	AR 	CC 	EB 	MM 	PR 	TP 
Strengths	Area of great ecological importance, conservation is essential for preserving biodiversity						
	Agriculture and the area's natural value hold significant cultural importance						
	Strong R&D infrastructure						
	Support from the administration, the private sector, and academia for research						
	Competent administration involved in the conservation of the area						
	Strong awareness among stakeholders regarding the conservation of the area						
	Area is classified as vulnerable or has some level of protection						
	New technologies for process improvement and monitoring are transferred and implemented						
	Agricultural activities highly important and play a key role in ecological and landscape conservation						
	Projects developed and platforms created to enhance conservation						

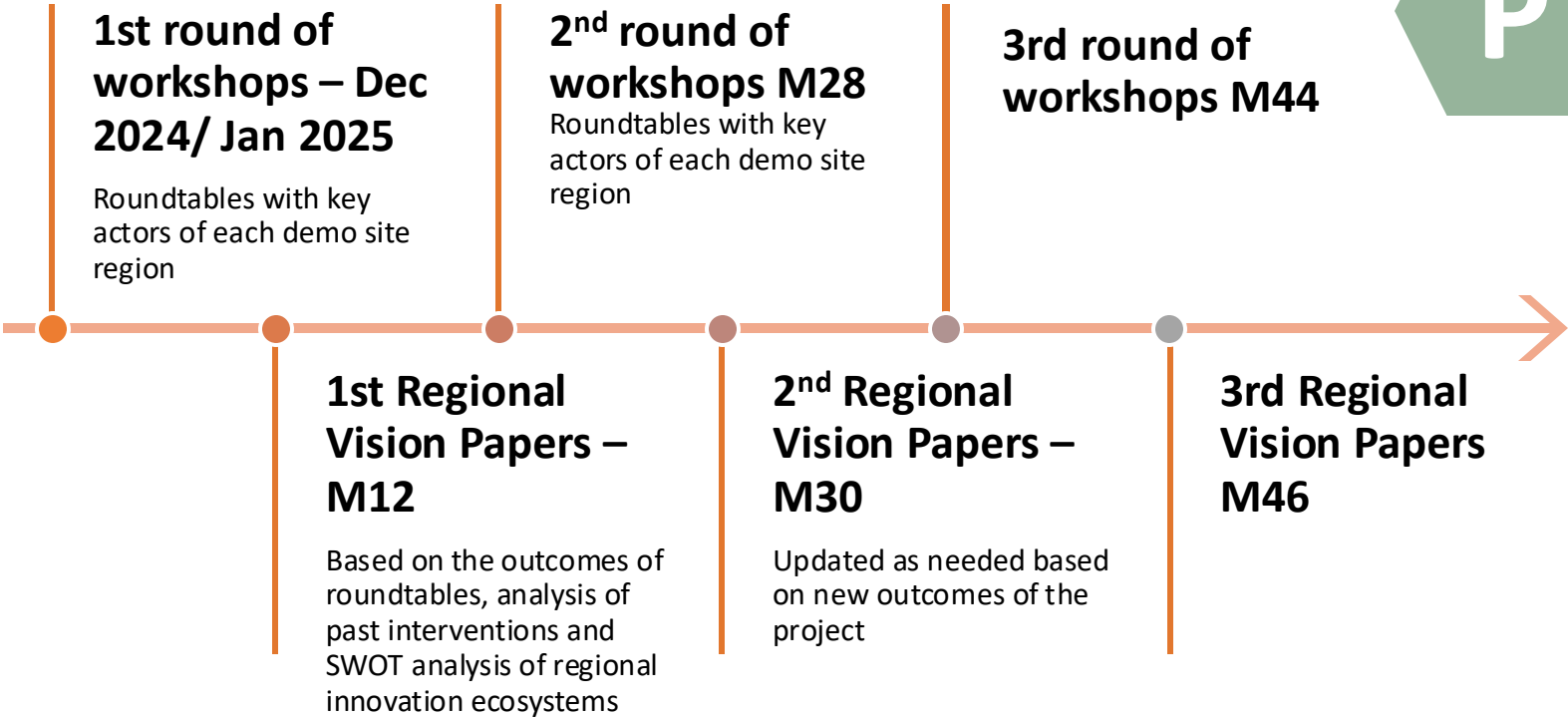


Upcoming Activities



Upcoming Activities

Design of the vision papers are an iterative process based on the feedback of the regional stakeholders and demo site results.





Nutrients recycling and
pollution handling



GREENHOOD
Nutrient management strategies for regional ecosystems across Europe



seacure

Thank you for your attention

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Co-funded by
the European Union

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