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Scaling up the SEACURE solutions across Associated Regions'

SEACURE Open Call for “Associated Regions”

Financial Support to Third Parties (FSTP)

Call for Proposals - Terms of Reference and Applicant Guidelines.

Co-funded by
the European Union

Preface

This document includes the Guidelines of the SEACURE Open Call for Associated Regions, in the framework of SEACURE project, funded by the European Commission through HORIZON EUROPE under the topic HORIZON-MISS-2023-OCEAN-SOIL-01-01.

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A

ABs
Advanced Biostimulants
AGA
Annotated Grant Agreement
AR
Associated Region
ARs
Associated Regions

B

BBFs
Bio-Based Fertilizers
BIOBOX
Nitrate removal patented technology
BS
Bioswale

C

CCC
Cover Catch Crops
CW&AP
Combined system of unsaturated/saturated Constructed Wetlands and Algal Pond
CW&BC
Constructed Wetlands & BioChar
CW&RSR
Hybrid System of Constructed Wetlands and Raceway Solar Reactor

D

DNSH
Do No Significant Harm

E

EBPR&MR
Combined Enhanced Biological P removal and Micro-Algae Reactor
EC
European Commission
EU
European Union

F

FAIR
Findable, Accessible, Interoperable, and Reusable
FSTP
Financial Support to Third Parties
FW
Floating Wetlands

G

GDPR
General Data Protection Regulation
GEP
Gender Equality Plan

I

IPR
Intellectual Property Rights

L

LSH
Living Soil Horticulture technique

N

N
Nitrogen
NDA
Non-Disclosure Agreement

O

OF
Online Fertigation
OLAF
European Anti-Fraud Office

P

P
Phosphorus
PA
Precision Agriculture
PC
Perennial Crops

R

RV
Riparian merging vegetation

S

S1
Solution 1
S2
Solution 2
S3
Solution 3
S4
Solution 4
S5
Solution 5
S6
Solution 6
SOM
Soil Organic Matter

T

TMFs
Tailor-Made Fertilizers

W

WP
Work package

1. Introduction

This document is the **Terms of Reference and Applicant Guidelines** of the Financial Support to Third Parties (FSTP) procedure implemented as part of the SEACURE project, also referred as the SEACURE Open Call for Associated Regions (SEACURE ARs).

The title of the call is *Scaling up the SEACURE solutions across Associated Regions'* as the main aim of this Open Call is expanding the reach of its value innovations and project outcomes and demonstrating the viability, adaptability, and scalability of the project's solutions in new geographic regions, with particular focus on Euro-Mediterranean geographic regions not represented within SEACURE demos.

The documents associated with this SEACURE ARs are the following:

- Terms of Reference and Applicant Guidelines with the Annex 1 (the current document).
- Application Form
- Budget Template

The SEACURE Open Call, and the applicants must follow the obligations of the Grant Agreement and EU standards. Please check the **Annotated Grant Agreement**[1] to check the Articles that the following guidelines mention.

2. The SEACURE project

The Open Call is part of the SEACURE project, funded by the European Commission through HORIZON EUROPE under the topic HORIZON-MISS-2023-OCEAN-SOIL-01-01.

The Mission "A Soil Deal for Europe" has identified that 65 to 70% of agricultural soils have nutrient inputs at levels risking eutrophication and negatively affecting soil, water and sea biodiversity. In alignment with this, the "Restore our Ocean and Waters" mission emphasizes the urgency to comply with the "Zero Pollution Action Plan". To achieve this goal, the mission is implementing Lighthouses as sites to pilot, demonstrate and deploy the Mission activities across EU sea and river basins. In the Mediterranean, Lighthouses will act as hubs and platforms for the development and deployment of transformative innovations of all forms – technological, social, business, governance – that can tackle in a first phase the Mission objective 2 "Prevent and eliminate pollution" ensuring local business participation and citizen engagement and outreach. Here, the mission tasked the project BlueMissionMed to support the set up and implementation of the Mediterranean Lighthouse.

With a land-river-sea system approach working on sustainable land management practices (especially agricultural ones), improved wastewater treatment and water management and feasible nature restoration strategies; the SEACURE project will aim at demonstrating, scaling up and replicating effective innovations for the systemic prevention, reduction and remediation of nutrient pollution in the Mediterranean Sea basin (Figure 1).

[1] European Commission (2025). *Annotated Grant Agreement. EU Funding Programmes 2021-2027.* Available at: Annotated Grant Agreement for all EU funding programmes 2021-27 | European Digital Innovation Hubs Network

This is being done by following a front-runner/follower approach:

- Six territorial units (encompassing one or more basins) selected across 3 Mediterranean countries (Spain, Italy and Greece) to adapt and demonstrate feasible solutions to tackle nutrient pollution from a systemic perspective, and test effective governance strategies to boost the large-scale adoption of solutions within the basins and elsewhere. They are front-runner regions for both Missions to combat nutrient pollution (Figure 2).

- Associated Regions will be selected via this Open Call to exchange knowledge and be supported by SEACURE consortium, acting as follower regions preparing for the wide adoption of solutions in line with EU Missions, EU plans and multi-lateral policies.

Figure 1. SEACURE project overview infographic.

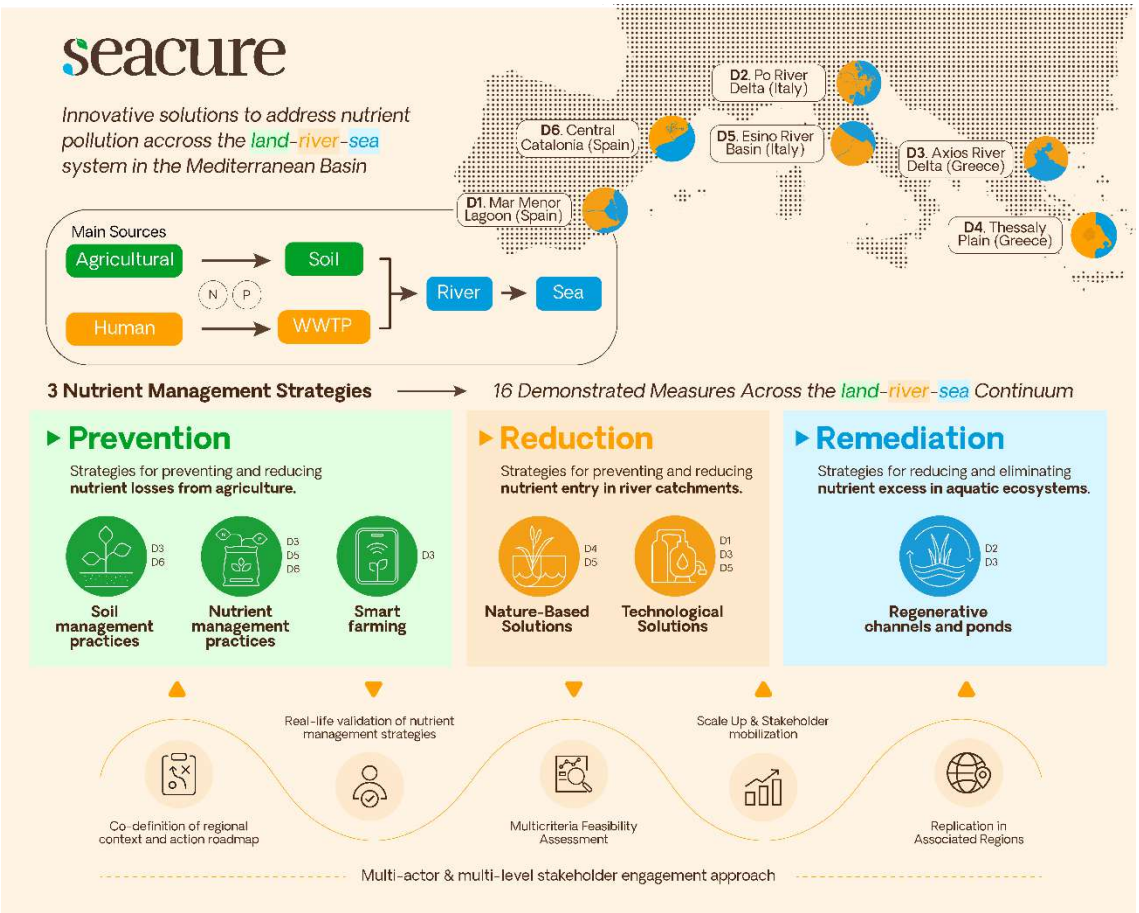
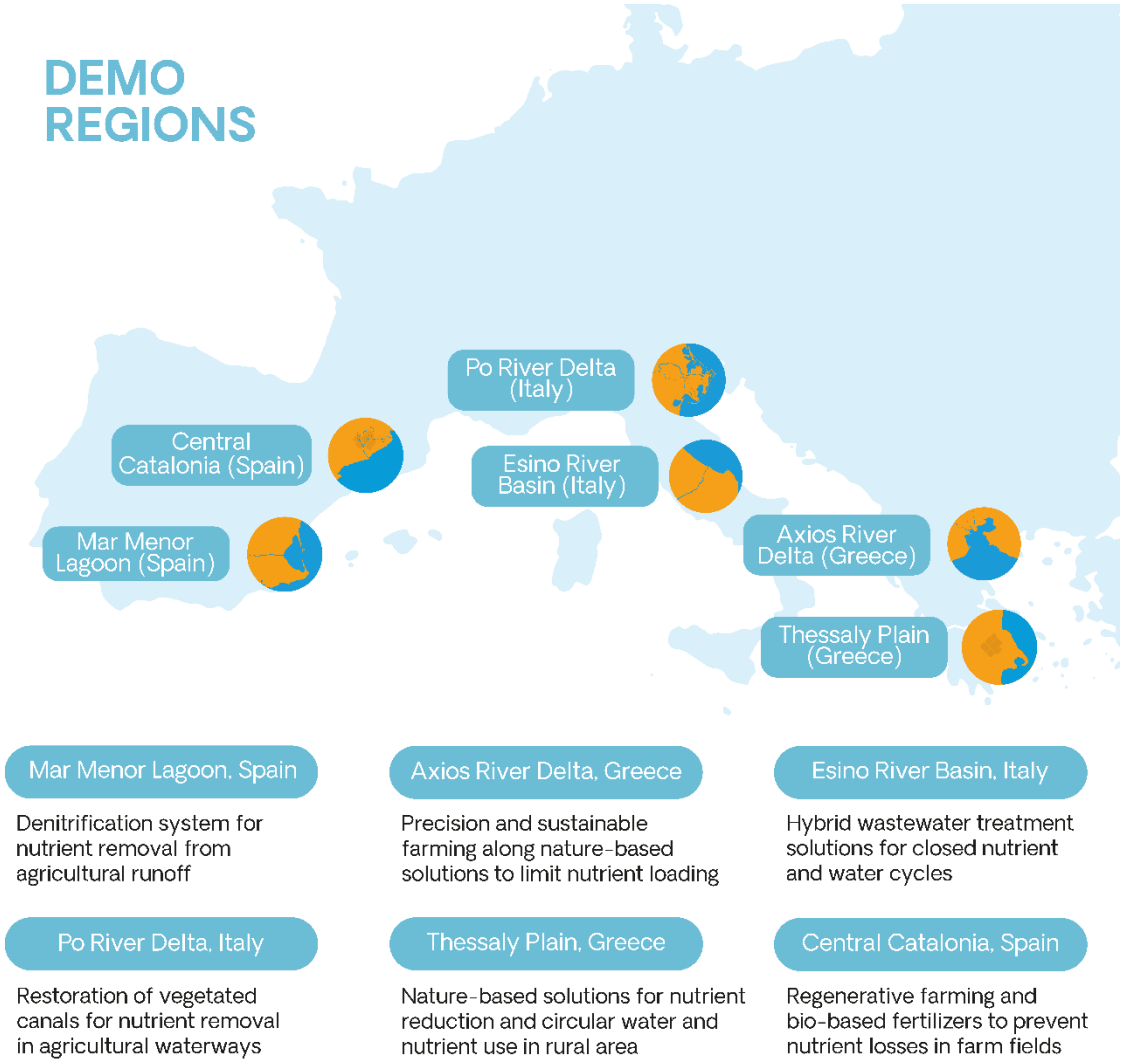


Figure 2. SEACURE demonstration sites (Demo Regions).



2.1. The SEACURE solutions

The SEACURE solutions follow a holistic approach, addressing the different stages of the nutrient flow cycle along the land-river-sea system. In that sense, the SEACURE project demonstrates three solution types: (1) Prevention (2) Reduction and (3) Remediation.

1. **PREVENTION solutions** are strategies for preventing and reducing nutrient losses from agriculture. For this solution type, the primary goal is to establish more C-, N- and P- efficient agro-ecosystems by introducing effective combinations of existing technologies and high-potential innovations in nutrient recycling technologies and soil & crop management practices, thus improving the sustainability of farm systems, reducing negative impacts on soil, water, air and climate. To achieve this, SEACURE is implementing three types of prevention solutions:

    1.1. **Innovative soil management practices** (S1)**.** SEACURE demonstrates solutions to improve nutrient retention in the soil through perennial crops and regenerative agricultural practices

to decrease nitrate leaching and enhance Soil Organic Matter (SOM). This solution category includes: **Living Soil Horticulture technique** (LSH), **Perennial Crops** (PC), and **Cover Catch Crops** (CCC).

1.2. **Innovative nutrient management practices** (S2). SEACURE implements solutions to reduce the use of traditional/mineral fertilizers and considers alternatives that would achieve, and overall, decrease N and P losses from soil, promoting circular and sustainable practices in the agro-farming sector, which include: **Tailor-Made Fertilizers** (TMFs), **Bio-Based Fertilizers** (BBFs) and **Advanced Biostimulants** (ABs).

1.3. **Smart Farming** (S3). SEACURE will bring one step further the development and implementation of different smart farming tools aiming to improve agricultural management, preventing and reducing nutrient losses, while also maintaining (or even increasing) crop yields, by optimizing, testing, and validating them in a relevant real-life demonstrative context. This solution includes **Precision Agriculture** (PA) and **Online Fertigation** (OF).

2. **REDUCTION solutions** are strategies for preventing and reducing nutrient entry in river catchments. These measures focus on reducing nutrient flows into rivers by curbing nutrient losses in rural areas (partly caused by intensive agricultural practices), or in urban areas through improved wastewater treatment. To achieve it, SEACURE is implementing two categories of reduction solutions:

   2.1. **Nature-Based Solutions** (S4). Including, **Combined system of unsaturated/saturated Constructed Wetlands and Algal Pond** (CW&AP), **Bioswale** (BS), and **Constructed Wetlands & BioChar** (CW&BC).

   2.2. **Technological solutions** (S5). Including **Nitrate removal patented technology** (BIOBOX), **Hybrid System of Constructed Wetlands and Raceway Solar Reactor** (CW&RSR) and **Combined Enhanced Biological P removal and Micro-Algae Reactor** (EBPR&MR).

3. **REMEDIATION solutions** are strategies for reducing and eliminating nutrient excess in ecosystems to prevent eutrophication. The main aim of this strategy is to demonstrate measures for reducing water eutrophication and remediating nutrient excess before reaching the Mediterranean Sea. In this stage, SEACURE implements **Regenerative channels and ponds** (S6) including **Riparian merging vegetation** (RV) and **Floating Wetlands** (FW).

For more detailed information and a description of the solutions being implemented by the SEACURE project, please refer to **Annex 1** of these guidelines, which contains the **factsheets for the six categories of SEACURE project solutions**.

3. Call Overview and Requirements

3.1. Scope, Objectives and Funded Activities

SEACURE Open Call for Associated Regions aims to finance activities that promote the implementation of holistic strategies related to the prevention, minimization, reduction and remediation of nutrient pollution, **empowering regions facing similar nutrient pollution issues in the Mediterranean basin and beyond and strengthening their capacity to replicate innovative solutions developed within the SEACURE project.**

The main objective is to **empower regions where eutrophication is a significant issue to effectively manage biogeochemical cycles, particularly those of Nitrogen** (N) **and Phosphorus** (P)**, by leveraging and expanding the rollout of systemic innovative solutions developed within the project.** This empowerment includes enhancing the capabilities of the awarded ARs in implementing innovative approaches, supported by technical assistance from SEACURE consortium partners.

Through this Open Call, SEACURE intends to mobilize geographic areas in the Mediterranean Basin (and beyond) into action, assessing the replicability potential of SEACURE strategies in the awarded ARs, and directing efforts towards the collaborative development of public policies, strategic plans and enabling mechanisms. It also aims to engage regional stakeholders to strengthen their capacity to address water and soil health challenges, while enhancing their skills, capabilities and knowledge exchange. Together, these actions aim to enable the future scale-up of the most suitable SEACURE solutions in the region.

The SEACURE Open Call is structured around five pillars, each of which must be addressed in the Application Form:

1. **SEACURE solutions**. Based on their regional nutrient pollution context, each AR should identify and prioritize in the Application Form the SEACURE solution(s) that best address their specific challenges (see Annex 1).

2. **Open Call's specific objectives.** Each AR must indicate the specific Call objectives they aim to pursue through their activities (see section below).

3. **Open Call expected outcomes**. Regardless of the specific objectives chosen, all ARs must comply with the expected outcomes (see section below).

4. **Activities funded.** The expected outcomes must be achieved through the activities funded under the SEACUE Open Call for Ars (see section below).

5. **SEACURE Technical Assistance**. The SEACURE consortium will provide Technical Assistance to ARs to support their action plans. The assistance will be tailored according to the chosen activities (see section below).

Each Pilar of the SEACURE Open Call for ARs is detailed below.

Specific objectives:

In the application form, ARs should indicate the specific objective(s) of this call that their action plan aims to address. It is not necessary to cover all objectives; selecting some of them will help ARs better focus their activities and align them with the expected outcomes. The Specific Objectives of the SEACURE Open Call for ARs are as follows:

1. **Identify and prioritize the most suitable SEACURE solution for each AR** for the prevention, reduction and remediation of nutrient pollution, preparing the ground for the further implementation and scale-up of this holistic strategy after the technical assistance project

2. **Establishing and Strengthening Regional Innovation Ecosystem** by bringing together and mobilizing diverse stakeholders from the key 4-ple Helix, including representatives from Academia (e.g., university research teams or agricultural innovation centers), Public Authorities (e.g., river basin managers, municipalities, or public utility companies), Business and Industry (e.g., fertilizer producers, technology providers, or agricultural cooperatives), and

Civil Society (e.g., farmers' organizations, land managers, and environmental NGOs), to foster collaboration and support the demonstration and large-scale deployment of transformative solutions.

3. **Provide capacity building** to empower the key 4-ple helix actors from the Regional Innovation Ecosystem mentioned above in the specific objective 2, through training, workshops, and knowledge-sharing activities to equip them with the skills and knowledge needed to take effective action in soil and water conservation, nutrient management, and pollution prevention.

4. **Raise Societal awareness** to increase public awareness about the significance of soil and water conservation and restoration, emphasizing the imperative need for sustainable land and water management practices.

5. **Re-assessment and Enhancement of Environmental Management Programs** revisiting and updating regional and local-level environmental management programs, such as river basin management programs, land management policies, etc.

6. **Attracting Additional Funding and Resources and planning specific projects on nutrient management** involving both public and private sector actors, to enable the scale-up and long-term adoption of solutions beyond the duration of the technical assistance.

The activities implemented by the Associated Regions should lay the groundwork for a fully-operational regional innovation ecosystem, ensuring that relevant stakeholders, governance mechanisms, capacities, partnerships, and investment pathways are in place, so that the most suitable SEACURE solutions can continue to scale and become sustainably embedded in the regions after the project ends.

Expected outcomes

The following three expected outcomes must be addressed in the AR Action Plan. Each expected outcome is linked to one of the WPs of the Application Form, where applicants must explain how this outcome will be achieved.

- **Identification of the most appropriate SEACURE solutions** to address nutrient pollution in each associated region: replicability assessment of SEACURE solutions in the awarded ARs. Applicants must explain in WP1 of the Application Form how this outcome will be achieved.

- **Engagement with key actors within the regional innovation ecosystem** to enable coordinated actions to tackle nutrient pollution. This outcome could be achieved through the implementation of capacity-building activities, actions to raise societal awareness, and activities to strengthen the bonds between ecosystem actors, or through a combination of all three activities together. Applicants must explain in WP2 of the Application Form how this outcome will be achieved.

- Tailor-made **roadmaps for replicating and scaling up the selected solutions in the Associated Regions**, including the development of public policies, strategic plans, or implementation mechanisms, such as mobilizing new funding and resources, or planning specific projects. Applicants must explain in WP3 of the Application Form how this outcome will be achieved.

Activities funded

Based on their regional nutrient pollution context, each AR should identify and prioritize in the Application Form the SEACURE solution(s) that best address their specific challenges and define the specific Call objectives to be pursued through their activities, ensuring that these activities contribute to achieving the three expected outcomes of this Call.

The activities that can be funded to achieve the expected outcomes are listed below. Depending on the specific objectives that the ARs wish to address, they may choose among the different activities. For each selected activity, applicants will be asked to further provide a description of its implementation in the Application Form, which will be further adjusted with the SEACURE Technical Assistance for the awarded ARs.

- Attendance at **SEACURE's physical events.** Attendance at some SEACURE physical events will be mandatory (General Assemblies or other events related to the activities in the AR). Applicants must include budget allocation for these activities, although the specific events required can be further defined later, when shaping the Action Plans of each AR.
- **Mobilization of regional actors' ecosystem** through networking and participatory approaches including stakeholder-engagement activities such as consultations, site visits, workshops, and other relevant actions.
- **Capacity building** for regional actors.
- **Social awareness** and/or **citizen science** to improve data collection and sharing.
- Preparation or update of **Environmental Management Plans/Policies.**
- Design of **regional upscaling plan.**
- The purchase of small equipment, plants, etc., may be eligible if necessary for the future replication of a specific solution on a small scale, but it must be properly justified, considering that the maximum budget is €100,000, and priority will be given to the main eligible activities.

The selected activities will inform the **Technical Assistance Action Plan** that SEACURE consortium will prepare together with the awarded projects.

SEACURE Technical Assistance

To ensure successful knowledge exchange between the SEACURE project and the ARs, the funded activities will be accompanied by Technical Assistance provided by the SEACURE consortium. Support provided will be tailored depending on the eligible activities the applicant selects under the call.

SEACURE will provide Technical Assistance revolving around:

- **Knowledge exchange in bilateral discussions** (attending at least 2 sessions held after SEACURE's General Assemblies) and **ad-hoc meetings.** This assistance will be provided to all ARs,

- **Advice on the design and implementation of nutrient management strategies and measures**: ad-hoc technical assistance provided by project partners on technologies with the potential to be transferred to the Associated Region. This assistance will be provided to all ARs. The replicability potential will be further evidenced using **SEACURE'S Decision Support Tool** provided by ACR+. Furthermore, the methodology of SEACURE's Regional Business Plan for Upscaling will be shared to transfer lessons learnt and best practices

- **Training in participatory methodologies for multi-actor planning** and regional action on nutrient pollution. The training will be tailored and provided according to the activities planned in WP2 of each AR's Application Form.

- **Advice on the design and implementation of societal awareness campaigns**, including access to SEACURE dissemination and communication toolkits, as well as support for citizen science programs, in cases where the ARs are implementing social awareness or citizen science activities in WP2 of their Application Form.

- **Advice on design or update of policies and plans to facilitate scaling-up**, based on the lessons learned from the SEACURE project, and taking stock on the work implemented by Mission's projects. This technical assistance will be provided within the framework of WP3 of the Application Form.

3.2. Timeline

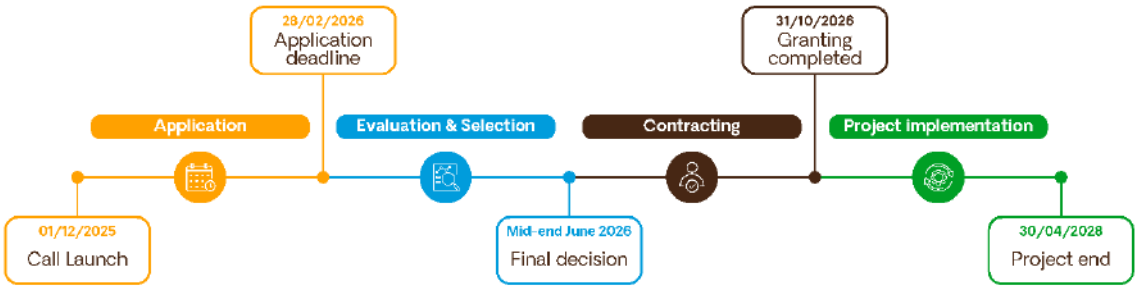
The **Call for ARs will be launched December 1, 2025, and will be open until February 28, 2026**.

The **evaluation and selection process** will start after the submission deadline, and the final decision is expected for mid-end June 2026.

Once awarded ARs are selected, the **negotiation and contracting phase** will take place between June 2026 and October 2026. The sub-grant agreements will be signed by October 31, 2026, at the latest.

The **project implementation** will span a maximum of 18 months, from November 1, 2026, to April 30, 2028.

Figure 3. SEACURE Open Call for ARs timeline



A **webinar** will be organised during the application phase to promote the Open Call and provide guidance for participation, with the collaboration of other projects that have Associated Regions. Additional communication activities will also be carried out to further promote the call and respond to applicants' questions.

3.3. Funding

The SEACURE Open Call for ARs is allocated **a total budget of EUR 700.000**, which will be distributed as direct financial support to **7 winning ARs**.

Each organization or consortium may receive a **maximum of EUR 100.000 in funding** through grants from SEACURE. Successful proposals will receive the requested financial contribution in the **form of a lump sum,** a global amount intended to cover all costs of the action.

4. Eligibility criteria

All applicants and submitted proposals will undergo a comprehensive evaluation to ascertain their admissibility and eligibility for consideration. The following admissibility and eligibility criteria shall be collectively assessed. Proposals that do not meet these criteria will be promptly excluded following the closing date of the Open Call.

4.1. Beneficiary profile (applicant)

SEACURE Open Call for ARs will fund projects to **individual organizations or consortiums representing public authorities involved in local and regional land and/or wastewater management**, including:

- Municipal governments
- Regional authorities, provincial councils, counties, delegations, or similar public bodies
- Metropolitan authorities or inter-municipal cooperation bodies
- Environmental Agencies
- Water and sewerage authorities
- Other Public Authorities or Agencies with proven responsibilities affecting nutrient management

Applicants will be asked for **proof of their legal status**, showing that it is defined as a local or regional authority to be eligible.

Private entities are not permitted to join the consortium. However, once local or regional authorities have been awarded the contract, it may consider alternative collaboration methods with these entities, such as subcontracting.

4.2. No prior funding

Proposals must confirm they **have not previously received funding** from national or European public funds for activities related to the proposal idea.

Double funding is strictly prohibited: the same activity **cannot be funded twice** from the EU budget.

Each **Associated Region** can benefit from the **Financial Support to Third Parties (FSTP)** under the topic **HORIZON-MISS-2023-OCEAN-SOIL-01-01 only once**.

4.3. Compliance to EU standards

Applicants should adhere to **EU standards of transparency, equal treatment, conflict of interest, and confidentiality.**

Applicants must be **eligible for participation in the EC Horizon Europe Framework Programme**.

Applicants must ensure the following **obligations of the Grant Agreement**, namely articles:

- **Article 12** (conflict of interest),
- **Article 13** (confidentiality and security),
- **Article 14** (ethics),
- **Article 17.2** (visibility),
- **Article 18** (specific rules for carrying out action),
- **Article 19** (information), and
- **Article 20** (record-keeping).

Applicants should comply with the EU's restrictive measures, also applicable for financial support to third parties. Applicants must **not be subject to any sanctions imposed by the European Union, nor be listed under any EU restrictive measures or sanctions lists** at the time of proposal submission. Please Consult the EU Sanctions Map. EU Sanctions Map

4.4. Geographic location

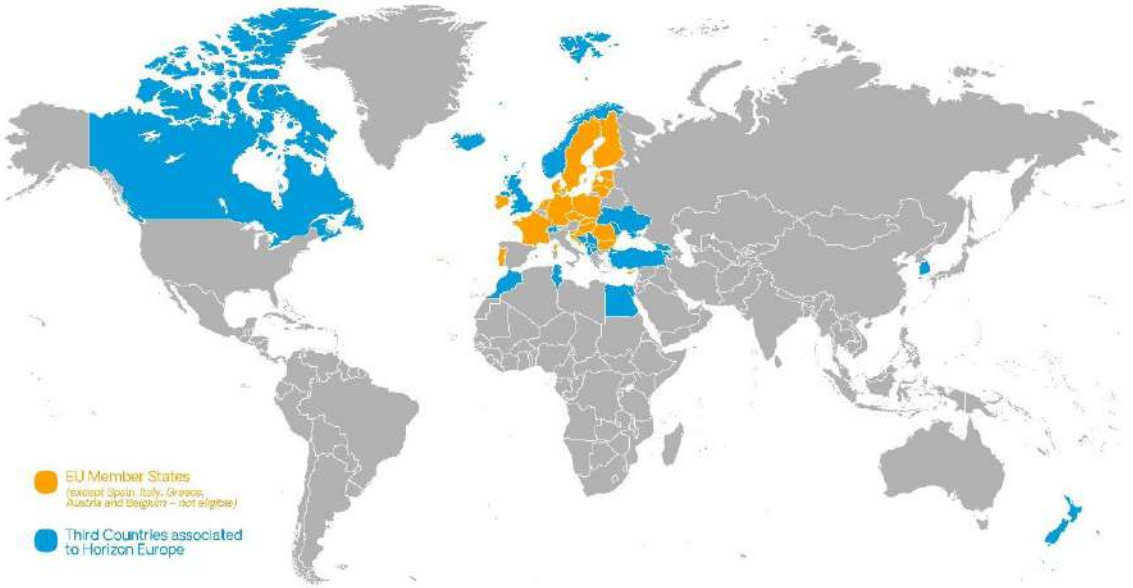
Eligible beneficiaries for SEACURE Open Call for ARs are **regional/local public authorities involved in land and/or wastewater management from regions situated in basins with similar nutrient pollution problems** (Mediterranean basin and beyond).

These authorities must be from the following countries:

- The **Member States of the European Union, except for Spain, Italy, Greece, Austria, and Belgium, as these countries are already part of the project consortium.** Germany, Bulgaria, Cyprus, Croatia, Denmark, Slovakia, Slovenia, Estonia, Finland, France, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Czech Republic, Romania, and Sweden are eligible for this Call.
- **Third countries associated to Horizon Europe**. Albania, Armenia, Bosnia and Herzegovina, Canada* (Pilar II), Faroe Islands, Georgia, Iceland, Israel, Kosovo, Moldova, Montenegro, New Zealand* (Pilar II), North Macedonia, Norway, Republic of Korea, Serbia, Tunisia, Türkiye, Ukraine, United Kingdom*, Egypt, Morocco and Switzerland. list-3rd-country-participation_horizon-euratom_en.pdf

Participants from countries that are part of the Project Consortium, Spain, Italy, Greece, Austria and Belgium are NOT eligible for this funding. Other Third countries are NOT eligible for this Call.

Figure 4. Map of countries eligible for the SECURE Open Call for ARs.



4.5. Conflict of interest

Applicants and proposal participants must disclose any potential conflict of interest. In particular, applicants cannot be SEACURE consortium partners or affiliated entities, nor their employees or co-operators under a contractual agreement.

Check SEACURE consortium members

4.6. Alignment with SEACURE objectives and activities funded

Proposed activities must **align with the SEACURE objectives and priorities**. Activities deviating from these goals may not be considered eligible.

It should be clearly indicated in the Application Form which SECURE innovative strategy will be implemented or prioritized, as well as the specific objectives of the Open Call that the ARs aim to address, and the activities through which the expected outcomes will be achieved. Based on this information, SECURE Technical Assistance will be provided.

4.7. Language

The proposals submitted to the SEACURE Open Call for ARs must be in **English**. Submissions done in any other language may not be considered.

English is also the official language during the whole implementation of the awarded Associated Regions. That means that the submission of deliverables must be done in English.

4.8. Budget and Financial Support

Each organization or consortium may receive a **maximum of EUR 100.000** in funding through grants from SEACURE. Successful proposals will receive the requested financial contribution in the form of a **lump sum**, a global amount intended to cover all costs of the action.

During the submission procedure, the project leader should declare the requested amount, up to the maximum mentioned above, while **adhering to the basic eligibility conditions specified in the EU Annotated Grant Agreement (Article 61)**. This declared amount will serve as the basis for justifying or determining the lump sum amount.

The applicants must include a budget proposal with costs' details for personnel, subcontracting, travel, equipment and consumables and services. The breakdown of costs will include:

- **Direct Personnel Costs**: expenses related to the hours worked by the beneficiary's staff dedicated to actual project tasks.
- **Subcontracting**: Work conducted by a provider who has established a business agreement with the beneficiary.
- **Other direct costs**: these encompass travel expenses, equipment (depreciation costs), consumables, services and other directly incurred costs.
- **Indirect costs**: flat rate, 25% of direct costs.

The budget proposed in the submission must **adhere to the defined limits and to the EC Horizon Europe** rules.

4.9. Ethical and Environmental Compliance

Proposals must comply with relevant ethical and environmental standards and clearly demonstrate responsible and sustainable practices. In particular, all proposed activities must align with the Do No Significant Harm (DNSH) principle and must not cause significant harm to any of the objectives outlined in the European Green Deal.

4.10. Gender

Proposals must actively promote gender equality and ensure balanced participation across all activities. Teams should strive for gender balance in leadership, decision-making roles, and stakeholder engagement processes. Organizations are required to have a Gender Equality Plan (GEP) in place at time if the Grant Agreement signature, as defined in Horizon Europe's Annotated Grant Agreement (AGA).

4.11. Data management

Project data management must ensure compliance with the FAIR principles: data should be Findable, Accessible, Interoperable, and Reusable. Additionally, any sensitive data related to intellectual property rights or other proprietary aspects of partner technologies must be handled with appropriate

confidentiality and protection measures, ensuring responsible and secure use throughout all phases of the project.

5. Application procedure and deadline

Applications must be submitted exclusively through the **REDCap form**, available at the following link: https://redcap.link/SEACURE_OpenCall_Submission

The call for Associated Regions will be open from **1 December 2025** until **28 February 2026, 17:00 CET (Brussels time).** Late submissions or proposals modified after submission will not be considered.

Applicants must complete the REDCap form and attach the documentation listed in the following section of these guidelines (section 5.1). If any of the required documents are missing, the proposal will not be considered.

5.1. Required documentation

The Associated Regions must submit all the documentation of the Call, including:

- **Application Form**.
- **Detailed budget Excel template.**
- **Optional Supporting Documentation.** Other supporting materials may also be submitted, such as annexes, recommendation letters, or any documents that support the proposal. These documents must be attached to the Application Form.

ARs must be prepared to provide proof of their legal status during the contracting phase.

6. Evaluation procedure

6.1. Eligibility check

UVIC-UCC will carry out an **initial screening of the proposals received**, ensuring that the submitted project proposals meet the eligibility criteria, listed in Section 4 of these Terms of Reference.

Proposals that do not meet any of the eligibility criteria will not proceed to the second stage of the evaluation procedure and will be considered rejected.

6.2. Evaluation

A **shortlist will be created with the proposals that meet the eligibility** criteria and have passed the first screening. These proposals will proceed to the second stage of the evaluation process.

The list of proposals that meet the eligibility criteria and, consequently, advance to the second phase of the evaluation process will be published on the SEACURE website. Applicants will be informed of the publication of this list by email.

6.2.1. The Independent Evaluation Panel

The proposals will be evaluated by an **Independent Evaluation Panel**, composed of **three external experts not belonging to SEACURE's consortium** partners, with extensive knowledge and experience in the domains of governance and nutrient pollution.

Before the beginning of the evaluation process, a thorough check for any potential conflict of interest and confidentiality agreements will be carried out to ensure transparency and impartiality.

6.2.2. Scoring procedure

To perform the scoring, each evaluator assigns a score from 0 to 5 for each evaluation criterion. The weighted score is calculated per evaluator, resulting in a final score out of 5. The scores of the three evaluators are then summed, resulting in a maximum total score of 15.

The scoring procedure will follow the steps detailed below:

1. Each evaluator will assess the application by **assigning scores for each criterion** of Table 1

Table 1. Selective criteria and scoring for proposal evaluation.

Selective Criteria	Potential Score	Relevance on overall score
Degree of complementarity with SEACURE strategies	0-5	35%
Quality of the suggested activities	0-5	25%
Regional Impact capacity	0-5	20%
Individual organisation or consortium capabilities	0-5	10%
Commitment and capacity to implement the project	0-5	10%

2. Each criteria will be **scored on a scale from 0 to 5** and the **minimum threshold is 3 out of 5 points**. This means that if a proposal receives less than 3 points in one criterion it will be automatically rejected. The scoring scale will be according to Table 2.

Table 2. Scoring scale.

Score		Definition
0	Fail	Proposal fails to address the criterion or cannot be assessed due to missing or incomplete information.
1	Poor	Criterion is inadequately addressed or there are serious inherent weaknesses.
2	Fair	Proposal broadly addresses the criterion, but there are significant weaknesses.
3	Good	Proposal addresses the criterion well, but a number of shortcomings are present.
4	Very Good	Proposal addresses the criterion very well, but a small number of shortcomings are present.
5	Excellent	Proposal successfully addresses all relevant aspects of the criteria. Any shortcomings are minor.

3. Once scores for each criterion have been assigned, **the relevance factor indicated in Table 1 will be applied to obtain the total score of the evaluator**. The maximum score provided by the evaluators will be up to 5.

4. The overall score for each application will be calculated by **summing up the individual assessment provided by the evaluator.** The **maximum overall score for a proposal will be 15 (5 per evaluator)**. This will be the total score for creating the Ranking list.

6.2.3. Ranking list

At the end of the evaluation and before publishing the final list of selected beneficiaries, a **Meeting will be held including the expert Evaluation Panel and SEACURE coordinator (UVIC-UCC) to create the final Ranking List**. The **top 7 highest-ranked proposals will advance to the Contract Preparation phase**, and any potential objections from the SEACURE coordinators will be discussed.

Before the final decision, **EC must approve the list of projects receiving funding**.

After EC confirmation, **the awarded applicants will be made publicly available through the SEACURE website**. Personal notifications with the final approval of the proposals and the shortcomings (if any) will be sent to the awarded beneficiaries.

7. Appeal procedure

After the publication of the list with the proposals that meet the eligibility, applicants will have 5 working days from the date of publication and receipt of the notification email to submit any requests, enquiries or complaints.

Once the final evaluation procedure has been completed, and following the publication of the list of selected projects and receipt of the notification email, the applicants will again have 5 working days to submit any requests, enquiries or complaints.

Requests, enquiries, or complaints in both phases of the evaluation procedure must be submitted through **the contact mailbox available on the SEACUE website, in the Open Call section at the following link Open Call – Seacure**. All submissions must clearly specify the subject of the enquiry or complaint.

If the requests, enquiries or complaints are deemed justified, the Executive Board of the SEACURE project will review the case, based on the information provided by the applicant. The Board will determine whether a new evaluation is warranted and will inform the applicant of the next steps.

8. Contract preparation

At the end of the evaluation phase up to 7 proposals will be selected and invited to the Contract Preparation phase. UVIC will initiate the contract preparation process in collaboration with the coordinators of the selected proposals.

This phase will include the Validation of the Legal Documents and the preparation of the Sub-Grant Agreements. The awarded regions will discuss the proper inclusion of any comments from the proposal evaluation in the Sub-Grant Agreement contracts, as well as any other minor adjustments that need to be made.

If one or more of the selected proposals fails to sign the sub-grant agreement, the proposals with the highest rank from the reserve list will be invited to take their place.

9. Project Implementation and Reporting Procedures

The project implementation is subject to the work plan described in the Sub-Grant Agreements.

The Reporting procedure will include the following requirements:

- ***ARs Action Plan***. ARs will be asked to submit an *ARs Action Plan*, developed in collaboration with the SEACURE Consortium, as a deliverable in month 2 (M2) of the awarded project. This deliverable must include the alignment of the technical assistance provided by the SEACURE Consortium with the ARs' work plan (e.g., conclusions from the initial meetings with the SEACURE Consortium, planned activities to attend, tailor-made assistance according to the ARs' activities, etc.). The pre-financing payment will be linked to this Deliverable.

- ***Mid ARs Project Report***. In month 10 (M10) of the ARs project, ARs must submit a *Mid-Project Report* summarizing the main progress in the implementation of their work plans from month 1 (M1) to month 9 (M9). This *Mid-Project Report* must include a brief description of the actions carried out, the main results and achievements during the reporting period, the assistance provided by the SEACURE Consortium, any shared activities or participation in SEACURE events, and any deviations from the original project plan or unexpected changes in its implementation (if any). This reporting is mandatory and failure to deliver the document will result in non-payment of the last part of the grant.

- ***Final ARs Project Report***. After the completion of a project, each project participant is required to submit a Final Report submitted up to one month after the project end date, where the results of the project should be detailed . This reporting is mandatory and failure to deliver the document will result in non-payment of the last part of the grant.

Apart from these reporting tools, each AR must follow its work plan and prepare and submit the deliverables specified therein.

10. Financial support provided

The financial support will be provided in two payments with a lump sum format:

1. ***Initial payment***. 40% of the grant to be paid once receipt and approval of the ARs Action Plan in M2 of the ARs project.

2. ***Final payment***. The remaining 60% will be paid upon project completion, submission and approval of the technical report which will assess budget use against achieved results.

Eligible expenses and costs must be incurred only during project duration (from grant agreement signing to project end) and must **adhere to the defined limits and to the EC Horizon Europe** rules.

As such, there will be no need for traditional administrative-justification system (e.g., counting hourly dedication or calculating workload), but getting the funding will be associated with the full achievement of the relevant deliverables.

Beneficiaries remain subject to possible audits by the European Commission, the European Anti-Fraud Office (OLAF), or the European Court of Auditors under Horizon Europe funding regulations. For this reason, proper record-keeping system is advised.

11. Responsibility of the beneficiaries

11.1. Data protection and confidentiality

During the implementation of the Open Call for ARs activities and for a period of four years following the conclusion of said activities, all parties involved are obligated to maintain the confidentiality of any data, documents, or other materials (regardless of format) that have been designated as confidential at the time of sub-contract signing (referred to as 'confidential information').

Upon request by a selected organization/consortium, the European Commission and the SEACURE Consortium may agree to extend the confidentiality of such information beyond the initial four-year period. This extension will be expressly detailed in the sub-contract.

If information is designated as confidential during the execution of the sub-project or is communicated orally, it will be deemed as confidential only if accepted by the SEACURE coordinator and confirmed in writing within 15 days of the oral disclosure. Unless otherwise stipulated by mutual agreement, confidential information may only be used for the purpose of fulfilling the Agreement.

The selected organizations/consortia are permitted to disclose confidential information to the SEACURE Consortium and designated reviewers, provided that the latter parties are bound by specific Non-Disclosure Agreements

11.2. Promoting actions and giving visibility to the EU funding

The selected consortia are required to actively promote the Open Call activities, the SEACURE project, and its outcomes by strategically and effectively disseminating targeted information to various audiences, including the media and the general public. It is imperative to highlight the financial support received from the European Commission.

Unless otherwise requested or agreed upon by the European Commission or the SEACURE coordinator, and unless technically infeasible, all communication activities related to the action (including electronic channels, social media, etc.), publicity (such as conference presentations or seminars), information materials (brochures, leaflets, posters, presentations, etc.), infrastructure, equipment, and significant results funded by the grant must follow the Article 17.2 of the **EU Annotated Grant Agreement** and adhere to the following requirements:

- display the EU emblem;
- feature the SEACURE project logo; and
- include the following text:
    - For communication activities: "This project has indirectly received funding from the European Union's Horizon Europe research and innovation programme under project SEACURE (grant agreement No 101157327)."
    - For infrastructure, equipment, and major results: "This [infrastructure][equipment][insert type of result] is part of a sub-project that has indirectly received funding from the European Union's Horizon Europe research and innovation programme under project SEACURE (grant agreement No 101157327)."

When used alongside a logo, the European emblem must be given appropriate prominence. It is important to note that this requirement to use the European emblem does not grant exclusive usage rights and is subject to general third-party use restrictions, preventing its appropriation through registration or any other means. Consequently, beneficiaries are exempt from obtaining prior permission from the EC to use the emblem. Additional detailed information about the EU emblem can be found on the Europa web page.

Any publicity related to the project by selected consortia, regardless of format or medium, must clearly state that it reflects only the author's views, and the EC or the SEACURE project cannot be held responsible for any use made of the information contained therein.

The EC and the SEACURE Consortium are authorized to publish, in various forms and on different platforms, the following information:

- Names of selected organizations/consortium members.
- Contact addresses of selected organizations/consortium members.
- The project's general objectives.

- The anticipated financial contribution for the project (after the final payment) and the actual received financial contribution.
- Geographical locations where activities are carried out.
- A list of dissemination activities and/or patent (applications) related to foreground.
- Details/references and abstracts of scientific publications related to foreground, and if funded within the SEACURE project, the published version or the final manuscript accepted for publication.
- Publishable reports submitted to SEACURE.
- Any images, audio-visual materials, or web content provided to the EC and SEACURE as part of the project.

Selected organizations/consortia are responsible for ensuring that all necessary authorizations for such publications have been obtained and that the publication of this information by the EC and SEACURE does not infringe upon the rights of third parties.

Upon a well-substantiated request by a selected consortium coordinator, acting on behalf of any consortium partner, the SEACURE Consortium, if permitted by the EC, may agree to waive such publicity requirements. This may occur if the disclosure of the aforementioned information would jeopardize the security, academic, or commercial interests of the beneficiary.

12. Intellectual property rights

SEACURE Consortium partners will maintain full ownership of their respective Intellectual Property Rights (IPR) and will retain IPR control over their solutions and strategies. The Open Call Applicants will not acquire equity stakes in any project member organizations nor assert any ownership over their IPR.

To safeguard the intellectual property of SEACURE partners, each evaluator will be required to sign a Non-Disclosure Agreement (NDA) before gaining access to the proposal database.

However, SEACURE and the European Commission reserve the right to request applicants who have received funding to present their work at public relations and networking events. This allows for the demonstration of the benefits and outcomes of the SEACURE project.

The **results generated from the ARs** shall be regulated under the respective subgrant agreements.

13.1. Data ownership

The SEACURE Open Call will offer access to a diverse range of data, reflecting the varied contexts of nutrient pollution in water and soil environments. The available data may include both open and closed data, with varying levels of accessibility. SEACURE has established data policies to address the handling of data within its framework.

Selected applicants are responsible for understanding the specific conditions, associated licenses, and potential costs related to the data they intend to use. Additionally, they must ensure that their data processing solutions comply with the General Data Protection Regulation (GDPR).

Regarding GDPR considerations (the term "Parties" refers to both selected applicants and SEACURE project partners):

- Parties agree that any Background, Results, Confidential Information, or Shared Information provided during the project's implementation or for Exploitation activities will not include Personal Data as defined by the GDPR. However, Shared Information may contain anonymized data in accordance with applicable data protection laws.
- If there is an anticipated change affecting a Party's representation and warranty regarding the inclusion of Personal Data, that Party must promptly notify the other affected Parties in writing. Until the Parties reach a written agreement on how to handle such data, neither Party will provide access to any data that may contain additional Personal Data beyond Business Contact Information.
- Parties agree that Business Contact Information will only be processed to the extent necessary for managing the business relationship between the Parties and their Affiliated Entities. This processing will be in compliance with the relevant data protection regulations.
- Parties acknowledge that neither Party has an obligation to review Shared Information provided by the other Party to determine if it contains additional Personal Data beyond Business Contact Information. However, if either Party becomes aware of any additional Personal Data provided by the other Party, it will promptly delete or return the Personal Data.
- No Party shall engage in any activity, during or after the project, to re-identify the Shared Information by any means whatsoever. This prohibition includes activities such as singling out, linking back, or matching any dataset with any personal or pseudonymous dataset available to a Party.

13. SEACURE Open Call Data Protection

The General Data Protection Regulation (2016/679/EU) ensures that data processing adheres to fundamental rights, freedoms, and the dignity of data subjects, with particular emphasis on confidentiality, personal identity, and the right to data protection. By applying to the SEACURE Open Call for Associated Regions, applicants consent to the storage and use of their personal data for the execution of the project's objectives and work plan.

The project consortium commits to handling personal data confidentially, except for the publication of Call Results, which may include the project title, names of project partners, and a short project description, and the Completed Projects Information, which may include the project title, names of project partners, awarded funding, project description, and main public results and outcomes. During the execution of the ARs project, the ARs region may also be asked to publish other project-related information intended for public dissemination (only information and results that are publicly available).

Data processing will be conducted based on lawfulness and correctness, fully protecting applicants' rights and confidentiality in accordance with GDPR principles and Article 24.

Applicants can exercise their rights towards the data controller as per Article 12 et seq of the GDPR.

Application selection and evaluation will be performed under appropriate ethical conduct, respecting the confidentiality of the information received.

14. Checklist (self-assessment)

A self-assessment tool will be made available on the SEACURE project website to allow the ARs to verify that they meet the eligibility criteria for participation in the SEACURE open call.

15. Contact

Any doubts, questions, requests, enquiries, or complaints regarding this SEACURE open call must be addressed to the designated **contact mailbox available on the SEACUE website, in the Open Call section at the following link Open Call – Seacure**.

Annex 1. SEACURE Solutions

SOLUTION FACTSHEETS

seacure

Co-funded by the European Union

TABLE OF CONTENTS

SEACURE SOLUTIONS

The SEACURE project adopts a holistic approach in addressing the issue of nutrient pollution with solutions targeting the different stages of the nutrient flow cycle across the landscape-river-sea system. In that sense, SEACURE solutions can be classified into three different overarching strategies: (1) Prevention, (2) Reduction, and (3) Remediation.

PREVENTION

Prevention solutions are strategies for preventing and reducing nutrient losses from agriculture For this solution type, the primary goal is to establish more C-, N- and P- efficient agro-ecosystem by introducing effective combinations of existing technologies and high potential innovations in nutrient recycling technologies and soil & crop management practices, thus improving the sustainability of farm systems, reducing negative impacts on soil, water, air and climate. To achieve this, SEACURE is implementing three types of prevention solutions:

S1. Innovative management practices

S2. Innovative soil management practices

S3. Smart farming

REDUCTION

Reduction solutions are strategies for preventing and reducing nutrient entry in river catchments. These measures focus on reducing nutrient flow into rivers by curbing nutrient losses in rural areas due to intensive agricultural practices, or in urban areas through improved wastewater treatment. To achieve it, SEACURE is implementing two categories of reduction solutions:

S4. Nature-Based solutions

S5. Technological solutions

REMEDIATION

Remediation solutions are strategies for reducing and eliminating nutrient excess in ecosystems to prevent eutrophication. The main aim of this strategy is to demonstrate measures for reducing water eutrophication and remediating nutrient excess before reaching the Mediterranean Sea. In this stage, we apply remediation measures to rivers, canals and ponds:

S6. Regenerative channels and ponds

PREVENTION

Solutions for preventing and reducing nutrient losses from agriculture

S1. INNOVATIVE SOIL MANAGEMENT PRACTICES

SEACURE demonstrates solutions to improve nutrient retention in the soil through perennial crops and regenerative agricultural practices to decrease nitrate leaching and enhance Soil Organic Matter (SOM) in the soil. The implementation of these practices in areas characterized by intense agriculture is expected to have beneficial effects on soil fertility while preventing nutrient losses.
This category includes:

Living Soil Horticulture (LSH)

Perennial Crops (PC)

Cover Catch Crops (CCC)

Living Soil Horticulture (LSH)

The Living Soil Horticulture (LSH) technique enhances soil organic matter (SOM) and biological porosity by **incorporating large amounts of lignified plant materials into horticultural soils.** This promotes a rapid increase in SOM and stimulates soil organisms, such as earthworms, that create stable, biologically driven porosity within 1-3 years, replacing the temporary porosity created by tillage and mechanical soil operations.

Current studies indicate that LSH activates physical and microbial mechanisms that enhance carbon retention and stabilisation in soil aggregates. Within SEACURE, this practice is being demonstrated in Central Catalonia (DEMO 6) to evaluate long-term effectiveness in improving soil structure, fertility, and reducing nutrient leaching in horticultural systems.

Benefits

- Improves **soil structure, fertility**, and **biodiversity**
- Reduces **fertiliser needs** and **tillage requirements**
- Enhances **water retention, root growth,** and **nutrient cycling**
- Reduces **nitrate (NO3−)** and **phosphorus (PO43−) leaching** and runoff

Replicaiton potential

Transferable to **horticultural systems** across regions seeking to **improve soil health and reduce fertiliser dependency**. Particularly suitable for degraded or **low-organic-matter** soils prone to nutrient leaching.

Perennial Crops (PC)

In Central Catalonia (DEMO 6), SEACURE is validating the cultivation of intermediate wheatgrass (Thinopyrum intermedium), **a deep-rooted perennial crop (PC)** with long life cycles that promotes continuous soil carbon accumulation. Its extensive root system enhances **access to deep soil water and nutrients**, improving resilience under variable climatic conditions. This species represents an innovative **alternative for Mediterranean systems traditionally dominated by annual crops.**

Building on promising results from the NUTRIBUDGET project, SEACURE will assess the crop's optimal establishment and its long-term effects on reducing nutrient losses and improving soil condition.

Benefits

- Improves **water retention** and builds **labile carbon stocks**
- Reduces **nitrate (NO_2^-)** leaching and protects **groundwater quality**
- Enhances **soil ecosystem services** and **resilience to climate variability**
- Offers **added economic potential** as a dual-use crop (grain and forage)

Replicaiton potential

Suitable for **farming systems** aiming to reduce nutrient losses and improve soil water balance, particularly in regions **affected by nitrate pollution, groundwater contamination, or soil degradation** linked to intensive agriculture.

Cover Catch Crops (CCC)

In SEACURE, the introduction of **different cover catch crop (CCC) species** is being implemented in rice paddies of local farmers within the Axios River Delta (DEMO 3) to manage soil nutrient dynamics and assess their effectiveness under diverse environmental and agronomic conditions. The demonstration in a real operational environment managed by Kostantinos Farm (KKFARM), offers a unique opportunity to study its responses to diverse environmental conditions, interactions with other crops, the influence of species selection on nutrient retention, and its **ability to overcome nutrient-pollution challenges over time**.

By determining its long-term performance, this approach provides critical basis for evaluating reductions in NO3-leaching, increases in soil organic matter (SOM), and improvements in water-retention capacity, demonstrating the effectiveness of s**ustainable practices in preventing and reducing nutrients losses from agriculture**. Overall, these demonstrations are expected to generate evidence that will boost the adoption of similar systems in other regions with similar needs and characteristics.

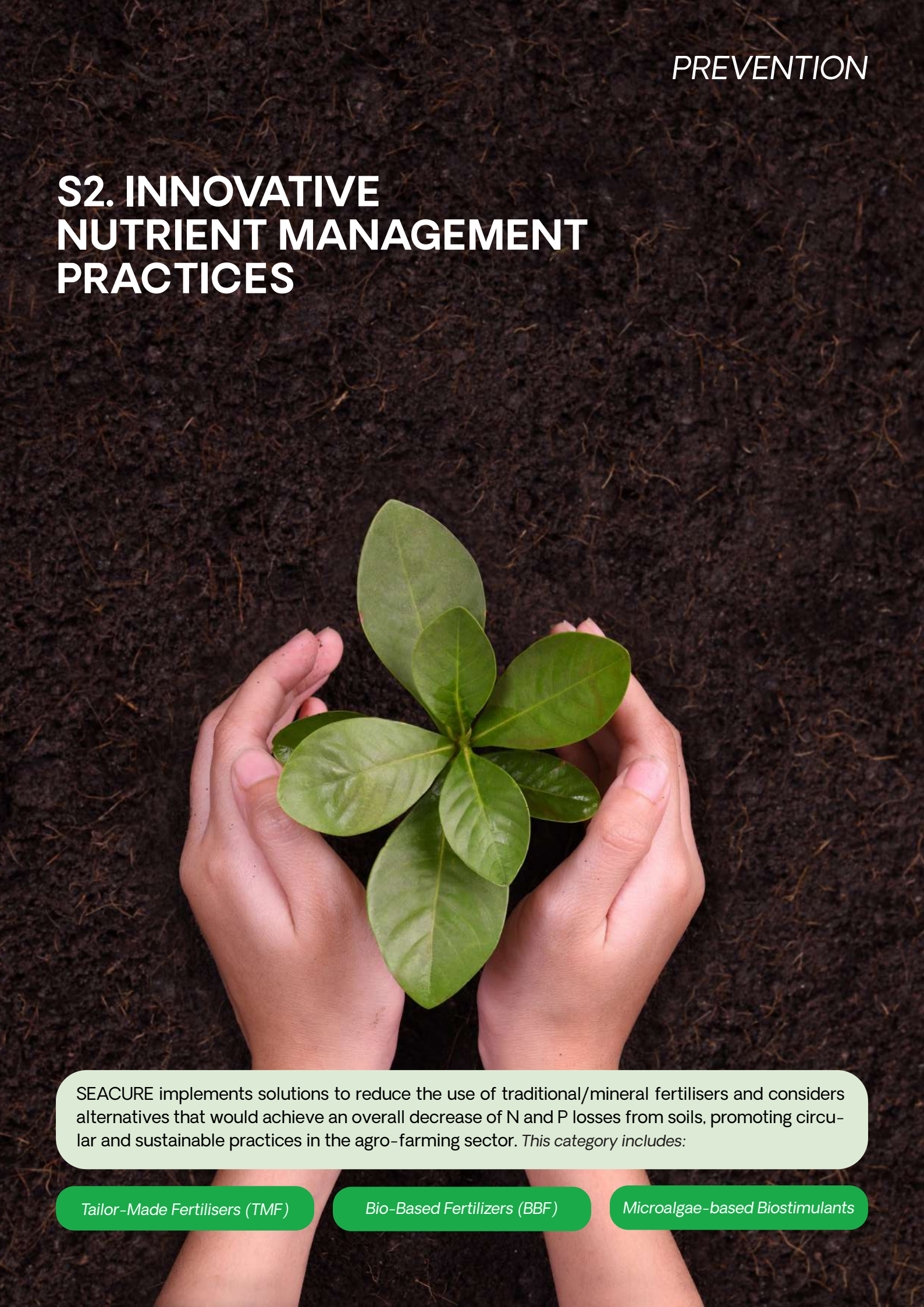
Benefits

- Increased **Soil Organic Matter (SOM)** by around 1.6%
- Improved **water infiltration** and **reduced surface runoff**
- Reduction of **nutrient leaching** by 40–50%
- Improved **soil structure** and **water retention capacity**
- Contribution to the reduction of nitrate (NO_2^-) losses

Replicaiton potential

Suitable for farming systems aiming to reduce nutrient losses and enhance soil resilience, particularly in Mediterranean and semi-arid regions **affected by soil degradation and nutrient leaching linked to intensive agriculture.**

S2. INNOVATIVE NUTRIENT MANAGEMENT PRACTICES



SEACURE implements solutions to reduce the use of traditional/mineral fertilisers and considers alternatives that would achieve an overall decrease of N and P losses from soils, promoting circular and sustainable practices in the agro-farming sector. *This category includes:*

Tailor-Made Fertilisers (TMF)

Bio-Based Fertilizers (BBF)

Microalgae-based Biostimulants

Tailor-Made Fertilisers (TMF)

In Central Catalunya (DEMO 6), SEACURE implements **tailor-made fertilisers (TMFs) derived from livestock manure** to optimise nutrient management while maintaining crop yields. By recovering nutrients from manure, TMFs help close nutrient cycles between crop and livestock systems, preventing nutrient losses in the environment. TMFs are customised fertilisers designed to match crop nutrient requirements based on soil type, fertility status, and local conditions. Combining **recovered bio-based and mineral components**, they achieve balanced nutrient ratios, enhance fertiliser precision, and reduce nutrient losses.

Building on experience from the H2020 FERTIMANURE and NOVAFERT projects, SEACURE demonstrates that partially **substituting conventional manure fertilisation with TMFs reduces nutrient losses while maintaining yields**. The demonstration also assesses long-term effects on groundwater and soil fertility, and the economic viability for farms of different scales.

Benefits

- Improves **nutrient-use efficiency and soil fertility**
- Enables **cost-efficient fertilisation** (potential savings of 24-37%) **without yield reduction**
- Reduces **nitrate leaching and surface nutrient runoff**
- **Reconnects nutrient flows** between crop and livestock systems

Replicaiton potential

Particularly relevant for **livestock-intensive regions facing nutrient surpluses and fertiliser-dependent areas aiming to reduce mineral inputs**. This solution offers a replicable model for nutrient recovery and recycling, contributing to circular, bio-based fertilizer value chains across diverse agricultural systems.

Bio-Based Fertilisers (BBFs)

SEACURE is validating the production of **bio-based fertilisers (BBFs) derived from biosolid wastes in wastewater treatment plants** (WWTPs), transforming them into comprehensive resource recovery facilities. Building on knowledge from the H2020 SEA2LAND and PROMISCES projects, thermochemical processes are applied under oxygen-limited conditions to recover nutrients from sewage sludge and organic wastes, concentrating nutrients in biochar while removing organic contaminants and toxins.

In the Esino River Basin (DEMO 5), SEACURE mixes nutrient-rich biomasses from a combined EBPR/microalgae reactor (see S5) and constructed wetlands installed in a WWTP (see S4) with co-digested sludge, agro-wastes, and wood residues to produce nutrient-rich biochar through **non-oxidative thermochemical conversion** (i.e., pyrolysis or gasification). The resulting BBFs are tested for their phosphorus and nitrogen content and for their potential to improve nutrient recovery efficiency through wet chemical extraction.

Benefits

- Improved **resource recovery**
- Decreased **dependency on mineral fertilisers** through **local nutrient recycling**
- Reduction of **nutrient discharges from wastewater**
- **Valorisation** of nutrient-rich **biosolid wastes** into **high-quality fertilisers**

Replicaiton potential

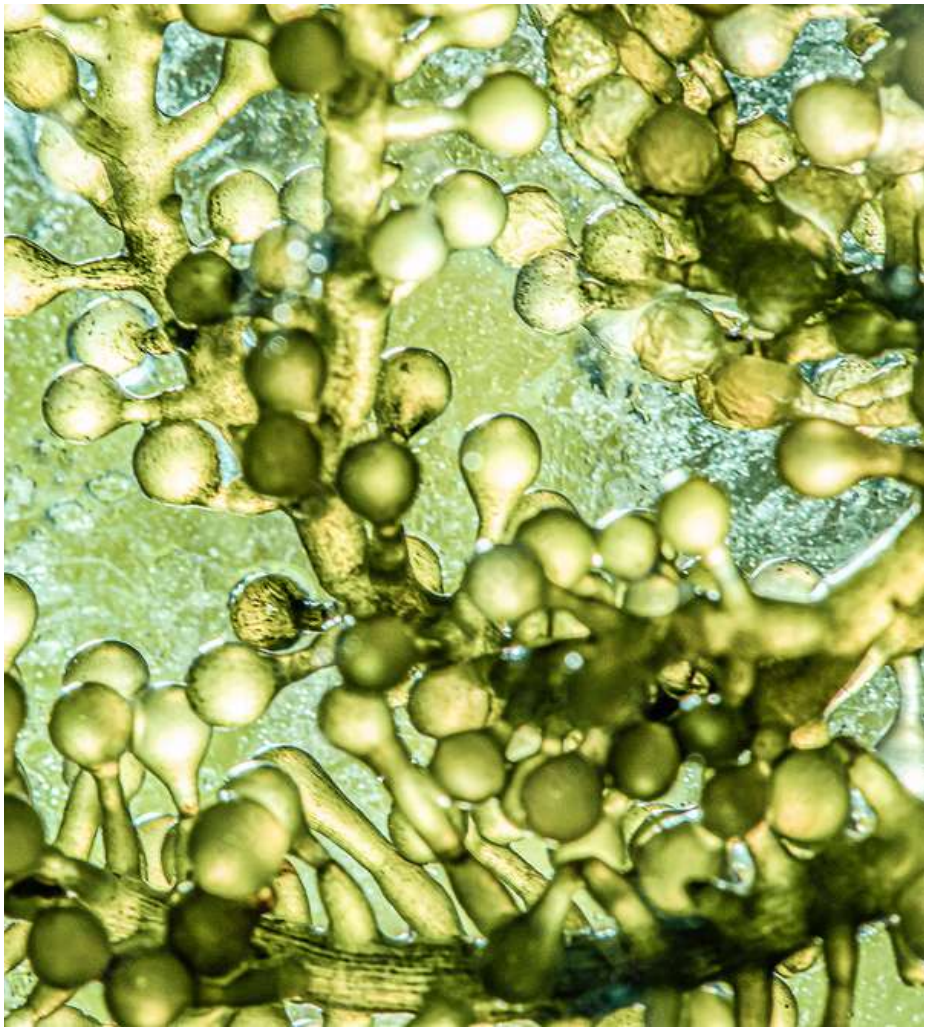
Suitable for **medium-to-large-scale WWTPs with sludge treatment systems** interested in adopting thermochemical or resource recovery technologies. Particularly relevant for regions seeking to **reduce nutrient discharges** to receiving waters and **promote circular bioeconomy** initiatives in their territory.

Advanced Bio-stimulants (ABs)

SEACURE is implementing **advanced bio-stimulants (ABs) derived from microalgae** to enhance crop productivity and soil health while reducing nutrient losses from agriculture. Previous experiments under the BlueBioChain project demonstrated the potential of microalgae-derived amino acids to improve soil organic matter and water-retention capacity in crops such as maize and wheat.

Microalgae can thrive in a wide range of habitats, including non-arable land, requiring only light and a carbon source to sustain growth throughout the year. Microalgal biostimulants (MBS) have emerged as promising tools for **enhancing the sustainability of crop production**. Biostimulants, which are derived from organic materials, can stimulate crop growth and development even when applied in small amounts, **functioning effectively under both optimal and stressful conditions**.

In Axios River Delta (DEMO 3), SEACURE will validate and demonstrate the application of microalgae-based bio-stimulants in real farming conditions to assess formulation performance on crop yield, soil quality, and nutrient-use efficiency.



Benefits

- Enhanced **crop productivity** and **resilience**
- Improved **soil organic matter** and **water-retention capacity**
- **Reduced reliance** on mineral fertilisers and synthetic inputs
- Lower **nutrient losses** and improved **soil health**

Replicaiton potential

Applicable in agricultural regions aiming to **enhance soil fertility** and **crop performance** through sustainable fertilisation strategies. Particularly suitable for areas with **access to microalgae cultivation facilities or wastewater treatment plants** capable of producing algal biomass for biostimulant development.

S3 SMART FARMING

S3. Smart Farming

SEACURE is advancing the development and implementation of smart farming tools designed to improve agricultural management and prevent nutrient losses, while maintaining or increasing crop yields *This category includes:*

Precision Agriculture (PA)

Online Fertigation (OF)

Precision Agriculture (PA)

In the Axios River Delta (DEMO 3), the project is implementing a combination of two **precision agriculture modules (PreFer & ProFit)**, previously developed and continuously tested in the field during the last eight years (2018-2025), to **optimise fertilisation plans** by accounting for both soil conditions and crop needs, maintaining optimal yields while reducing overall fertiliser inputs.

PreFer integrates geographic information systems (GIS) with data from soil sampling, meteorological records, and yield monitors. Using **advanced machine learning algorithms**, it generates **precise, site-specific fertilisation prescriptions**. The **ProFit** module assesses the economic **profitability of precision farming practices** on a 5-meter scale. Both modules function within ifarma, a pre-existing farm management information system (FMIS), previously tested on a variety of farms in the Axios River plain and elsewhere.

SEACURE combines the PreFer and ProFit modules within the ifarma system to deliver a holistic **precision agriculture approach that links agronomic and economic performance**. This integrated tool enables farmers and practitioners to evaluate the economic impact of precision agriculture techniques and make informed decisions that optimise fertiliser use, prevent nutrient losses, and maximise profitability.

Benefits

- **Optimised fertilisation** based on **real-time** soil and crop **data**
- Up to 20 % **reduction in fertiliser use**, according to farmers' evidence
- Up to 15 % **increase in crop yield**, according to yield maps derived from harvesters in the last 5 years (2020-2024)
- On average 8.4% **higher yields than conventional farming**, according to yield maps derived from harvesters in the last 5 years (2020-2024)
- **Reduced nutrient losses** from agricultural soils and runoff
- Potential improvement in **farm profitability**

Replicaiton potential

Applicable in **farming systems aiming to optimise fertiliser use** and improve nutrient management through **data-driven decision tools**. It is particularly relevant for regions with **access to digital infrastructure** and **soil and crop monitoring data**, where smart technologies can enhance nutrient efficiency, reduce losses, and improve farm profitability.

Online Fertigation (OF)

In the Axios River Delta (DEMO 3), SEACURE is implementing an **online fertigation (OF) system** in a real operational setting within a collective irrigation network to **optimise the reuse of drainage water for irrigation** and improve resource-use efficiency. The **IT Module** design automatically regulates the **blending of drainage and freshwater** based on real-time data on soil moisture, crop water needs, and water quality.

Developed from methodologies of the H2020 ATLAS project and drawing on international experience such as WaterTap (USA), the demonstration is testing the online-controlled fertigation system's effectiveness in improving irrigation management, reducing nutrient losses from agriculture, and preventing freshwater salinisation.

Benefits

- **Optimised irrigation** and **fertilisation** (conditional on drainage-water nutrient content)
- **Decreased fertiliser inputs** and **nutrient loads**
- Reduction in **freshwater use** and **groundwater abstraction**
- Prevention of **freshwater salinisation**

Replicaiton potential

The online fertigation system is relevant for **irrigated regions facing water scarcity, salinisation, or nutrient losses** from intensive irrigation, particularly for Mediterranean and semi-arid climates with variable rainfall and high irrigation demand. The solution is applicable to **irrigation and drainage networks** interested in adopting **data-driven monitoring and control tools** to optimise water and fertiliser use.

REDUCTION

Solutions for preventing and reducing nutrients' entry into river catchments

S4. NATURE-BASED SOLUTIONS

SEACURE is implementing nature-based solutions (NBS) to reduce nutrient inputs into rivers from both point and diffuse sources, targeting emissions from urban wastewater and stormwater runoff. Through optimisation, testing, and validation under real-life demonstrative conditions, SEACURE enhances the performance of these systems for nutrient removal, water quality improvement, and ecosystem restoration. *This category includes:*

- *Combined system of Constructed Wetlands and High-Rate Algal Pond (CW&HRAP)*
- *Bioswale (BS)*
- *Constructed Wetlands & Biochar (CW&BC)*

Combined system of Constructed Wetlands & High-Rate Algal Pond (CW&HRAP)

In Thessaly Plain, Greece (DEMO 4), the project is implementing a **combined nature-based system** integrating an **unsaturated constructed wetland (UNSAT-CW),** a **high-rate algal pond (HRAP),** and a **saturated constructed wetland (SAT-CW**). This hybrid system aims to produce class A reclaimed water suitable for reuse and fertigation.

In the first stage **pre-treated wastewater** from a septic tank is directed into the **UNSAT-CW**, where aerobic microorganisms oxidise organic matter to CO_2 and nitrify ammonia to nitrate. **Recycled glass** will be **tested as an innovative substrate** alongside conventional media to enhance treatment performance.

In the second stage, **the effluent from the UNSAT-CW is further treated in an HRAP**, where photosynthetic microalgae assimilate inorganic nitrogen and convert it into protein-rich biomass. **Recirculation** of the oxygen-rich **HRAP effluent back to the UNSAT-CW** will be examined to demonstrate if it can pose a **cost-effective** photosynthesis-driven aeration method aiming to **reduce energy demand.**

In the final stage, the **SAT-CW** supports anoxic microbial denitrification, **converting remaining nitrate into nitrogen gas. Biochar**, combined with conventional filter media, is used to **enhance the removal of residual micropollutants**. After treatment, the final effluent will undergo UV disinfection and will be stored for **reuse in irrigation**.

Through long-term, full-scale evaluation, SEACURE will validate the system's performance and functionality via **continuous monitoring and analysis**, addressing gaps in existing research, which is largely limited to laboratory or short-duration studies. The demonstration will generate the evidence needed to refine design and operational parameters for integrated CW–HRAP systems and to support their broader replication and **integration with other wastewater treatment technologies**.

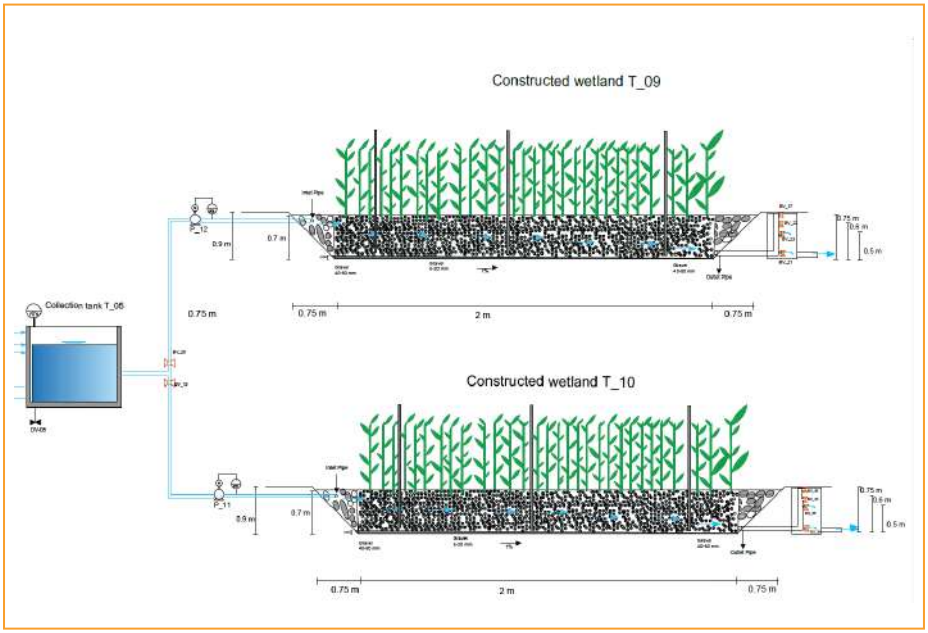
Benefits

- High **efficiency in nitrogen removal** from wastewater
- **Lower energy demand** enabled by photosynthetic aeration
- **Cost-effective** and **low-maintenance** treatment compared to conventional systems
- **Reduced land area** requirements relative to horizontal flow constructed wetlands

Replicaiton potential

This combined system is suitable for **rural and peri-urban areas with municipal or decentralised wastewater treatment needs**, especially where low-energy, nature-based and nutrient-focused solutions are required. It is particularly relevant in regions with elevated agricultural nutrient pressures or **designated Nitrate Vulnerable Zones.**

The nitrogen-rich algal biomass produced also offers opportunities for regions pursuing circular reuse. The system provides **opportunities for biomass valorisation** (e.g., protein recovery), to be used for high-value **commercial** & **industrial applications**.

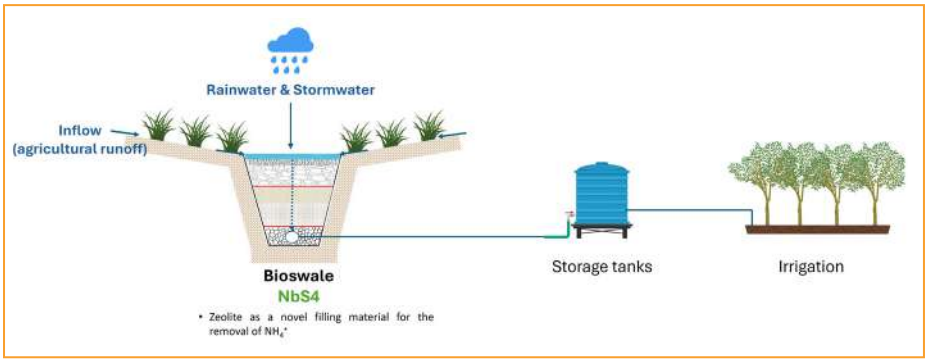


Bioswale (BS)

A **bioswale system (BS)** is being implemented in the agricultural area of the Thessaly Plain, Greece (DEMO 4) to manage stormwater runoff, reduce nutrient loads, and mitigate flood risk. Bioswales are gently sloped, vegetated channels that collect, filter, and convey stormwater, allowing water to **infiltrate into the soil** or be **directed to storage tanks for future use**, such as irrigation.

At DEMO 4, the bioswale is constructed within an existing roadside ditch, reaching a depth of approximately 1.5 metres after minor in situ modifications to optimise hydraulic performance. The design integrates **two stratified filter zones**, one with sand, and one with a sand + zeolite mixture, each underlain by gravel layers. This configuration allows **direct comparison of zeolite's capacity** for ammonium, nutrient, and metal removal under real field conditions.

The system applies passive hydrological principles, relying on natural slope, infiltration, and vegetative uptake to retain and treat stormwater **without external energy or mechanical pumping**, while vegetation enhances pollutant filtration, stabilises the soil, and supports biological uptake. The demonstration will provide field-scale evidence to support wider adoption of bioswales as effective, resilient, and **nature-based systems for managing stormwater** and **reducing diffuse agricultural pollution,** strengthening water resilience in landscapes with intensive farming activity.



Benefits

- **Reduction of nutrient loads,** particularly ammonium
- **Flood risk reduction** via enhanced retention, conveyance, and infiltration
- Improved **stormwater quality** suitable **for reuse** (e.g., irrigation).
- Removal of **suspended solids, nutrients**, and potentially **heavy metals**
- **Low-maintenance, cost-effective nature-based solution** requiring no mechanical equipment or energy input.
- Downstream **flow attenuation, reducing peak discharge**, and contributing to flood mitigation.
- Enhanced **landscape integration** through vegetated cover and soil–water interaction.

Replicaiton potential

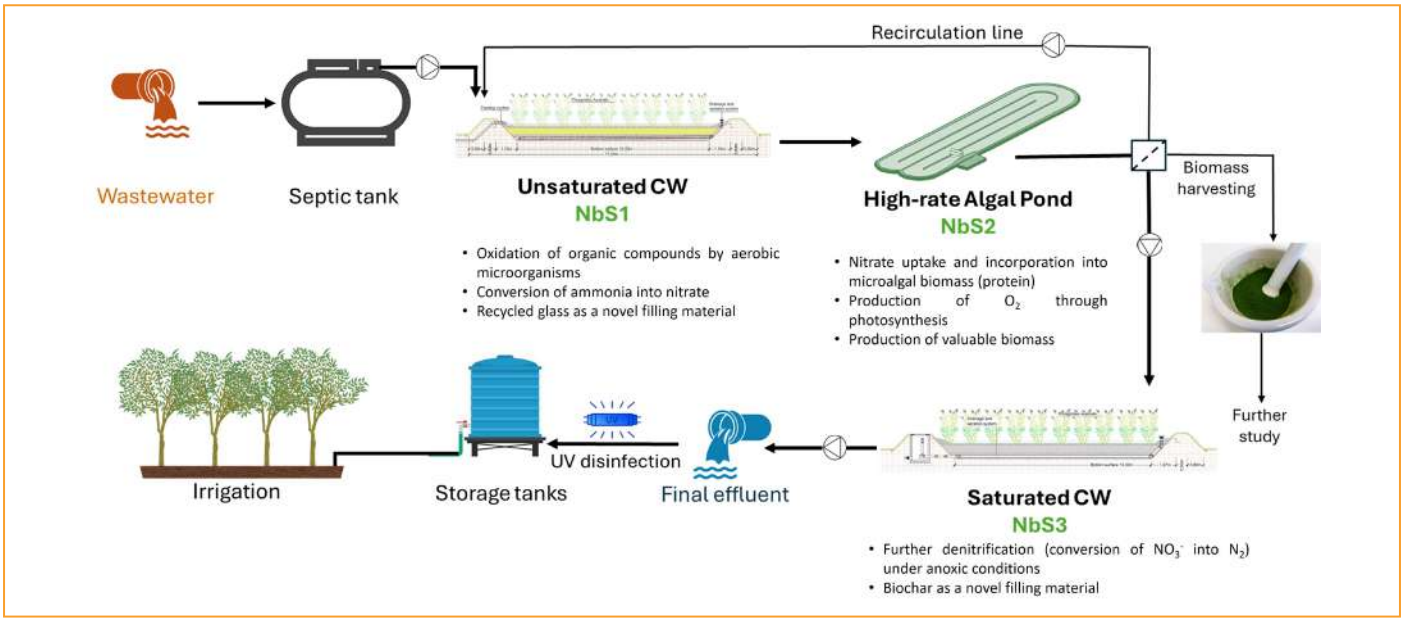
This bioswale system is suited to **rural or peri-urban areas** with **intensive farming activity facing diffuse nutrient pollution from agriculture**, seasonal heavy rainfall, **storm water management challenges** and heightened flood risk, or insufficient conventional drainage infrastructure. Particularly, the zeolite's high cation-exchange capacity makes this system especially valuable in **areas with elevated ammonium or metal concentrations**.

The solution is well-suited to regions requiring low-energy, low-impact, and easily maintainable stormwater treatment solutions. Its modular structure allows **replication in roadside ditches, field-edge channels, drainage lines, and mixed rural catchments**. The dual-media design (sand vs. sand + zeolite) allows comparison of cost, pollutant removal performance, and suitability for different runoff compositions, supporting informed media selection for future installations.

Constructed Wetlands & Biochar (CW&BC)

SEACURE is implementing and conducting long-term tests on the performance of a **horizontal flow constructed wetland (CW) amended with biochar (BC) substrates** to enhance nutrient and micropollutant removal from wastewater. The CW treats the **secondary effluent of a WWTP** in Esino River Basin, Italy (DEMO 5), including the effluent from the EBPR/microalgae pilot (see S5). The **biochar is produced locally** through non-oxidative thermochemical conversion of an optimal mix of biomass collected at the demonstration site, including microalgae, harvested plants from CWs, agrowastes, phosphorus-rich sewage sludge, and wood residues, also using appropriate modification/activation procedures.

The project will assess the effectiveness and long-term performance of biochar substrates to define optimal operating parameters and carbonisation conditions for **improved adsorption of nutrients and micropollutants.** The demonstration will provide essential data on the scalability and durability of biochar as a filler material in constructed wetlands, addressing current knowledge gaps and supporting the design of future full-scale CWs at the WWTP.



Benefits

- Improved **removal efficiency of nutrients** and **micropollutants**
- Enhanced **adsorption capacity**, improving long-term treatment performance
- Greater **operational stability** & **reduced clogging risks** during continuous use
- **Valorisation** of locally **sources biomass and waste** following a circular approach

Replicaiton potential

Applicable to **wastewater treatment plants** aiming to **enhance nutrient and micropollutant removal through nature-based solutions**. Particularly relevant for regions seeking to adopt more sustainable wastewater treatment methodologies through circular approaches that valorise locally available biomass resources and improve effluent quality.

S5. TECHNOLOGICAL SOLUTIONS

SEACURE develops and demonstrates innovative technologies to reduce nutrient inputs into rivers from both urban and agricultural wastewaters. While advanced processes are widely applied in conventional wastewater treatment, fewer solutions target nutrient losses from agricultural runoff. Through optimisation and validation under real-life conditions, SEACURE enhances the performance of these systems to improve nutrient removal, water quality, and sustainable water management. This category includes:

Denitrification biofiltration technology (BIOBOX)

Hybrid System of Constructed Wetlands and Raceway Solar Reactor

Automated Enhanced Biological P removal and Microalgae Reactor (EBPR&MR)

Denitrification patented technology (BIOBOX)

The patented **BIOBOX biological denitrification technology** is being optimised in Mar Menor Lagoon (DEMO 1) to **remove nitrates from agricultural runoff** before they reach coastal waters. This compact and modular treatment unit mimics natural denitrification processes by using specific microorganisms and bacteria to convert nitrates (NO_3^-) into atmospheric nitrogen gas, requiring only an organic carbon source.

The technology has already demonstrated high removal performance in drinking water and osmosis rejection streams. Under SEACURE, it is being adapted and optimised to operate under real environmental conditions, treating runoff intercepted from dry riverbeds during heavy rain and flash flood events. The demonstration aims to validate previous pilot-scale results and assess the system's operational efficiency and capacity for **treating large volumes of agricultural wastewater**, generating data to guide its future application in areas severely affected by diffuse nutrient pollution.

Benefits

- *High nitrate removal efficiency*
- *Compact and modular design adaptable to variable flow and load conditions*
- *Prevention of nutrient discharge into sensitive ecosystems*

Replicaiton potential

Applicable in **regions affected by diffuse nitrate pollution from agricultural runoff or drainage waters**. Particularly suitable for Mediterranean and semi-arid areas where episodic **heavy rainfall and flash floods** increase nutrient transfer to surface and coastal waters. The **modular design allows adaptation to different scales and site conditions**, supporting replication in agricultural catchments and vulnerable water bodies across regions seeking **effective nitrate reduction** from diffuse pollution sources.

Hybrid System of Constructed Wetlands and Raceway Solar Reactor (CW&RSR)

The **Hybrid System of Constructed Wetlands and Raceway Solar Reactor (CW&RSR)** is an innovative combination of nature-based and solar-driven technologies applied as a **tertiary treatment** stage in a **municipal wastewater facility** in the Axios River Delta (DEMO 3). The constructed wetlands remove nutrients through plant uptake and microbial activity, while the raceway solar reactor improves purification through photo-oxidation and algal nutrient assimilation. The system is designed to reduce nutrient loads discharged from urban wastewater and **achieve water quality suitable for agricultural reuse**, in line with EU Regulation 2020/741.

SEACURE is implementing a **sub-surface horizontal flow Constructed Wetland (CW)**, widely used as an aerobic post-treatment for domestic wastewater, as an effective ecological treatment for removing organic matter and supporting nitrate reduction. The system is complemented by a **Raceway pond reactor (RPRs)**, which consists of open-channel photoreactors in which water circulates continuously, driven by a paddle wheel. The reactor **relies on sunlight to activate oxidative processes that enable the degradation of contaminants**, and its liquid depth can be easily adjusted, making it an important operational parameter.

While less efficient than parabolic-collector photoreactors, these systems are **more cost-effective for municipal wastewater treatment, where only mild oxidative conditions are needed** to remove pathogens and micropollutants. Under these conditions, shorter treatment times (minutes) and lower energy doses are sufficient.

Building upon the results of the AQUACYCLE project, SEACURE is optimising the system's design and operational parameters under real-life conditions to evaluate treatment performance, operational efficiency, and environmental benefits, generating evidence to support replication and scaling across urban wastewater treatment facilities aiming to reduce nutrient emissions.

Benefits

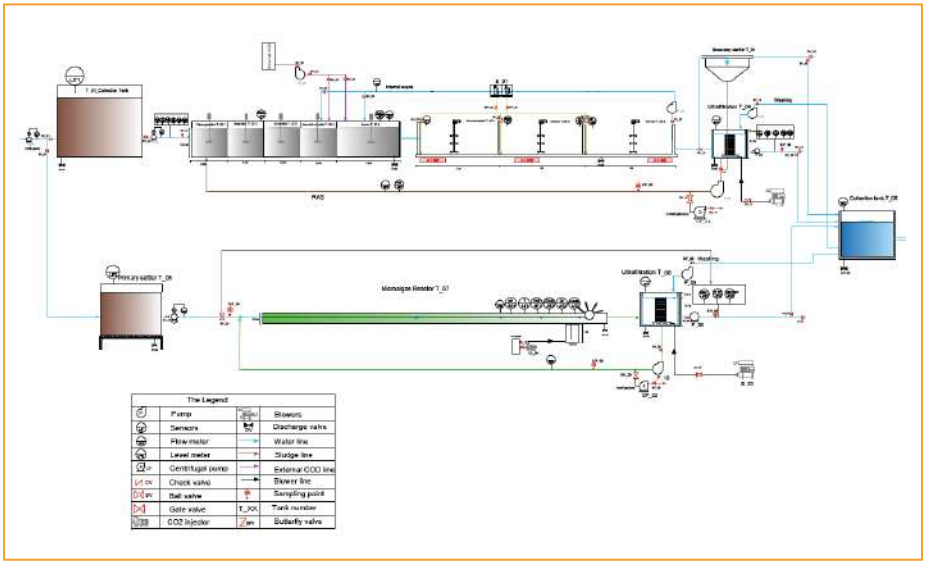
- Reduction of **nitrogen (N)** and **phosphorus (P)** loads from **urban wastewater discharges**
- Promotes **circular water reuse** suitable for agricultural irrigation
- **Cost-effective** and **sustainable** tertiary treatment alternative
- Sub-surface Horizontal CW capacity to **treat higher hydraulic loads** than Surface Flow CW

Replicaiton potential

The hybrid system is suitable for **small and medium-sized wastewater treatment plants interested in sustainable tertiary treatment options** to reduce nutrient discharges and enable safe water reuse. It is well-suited for semi-arid and warm regions, where **high solar irradiation supports the operation of solar-based treatment processes** and contributes to addressing water scarcity through safe water reuse.

Automated Enhanced Biological P removal and Micro-algae Reactor (EBPR&MR)

In the Esino River Basin (Italy, DEMO 5), SEACURE is implementing an innovative prototype at the Jesi (Ancona) wastewater treatment plant (WWTP). This intervention integrates three distinct, automated pilot lines: **Enhanced Biological Phosphorus Removal (EBPR), a Microalgae Reactor (MAR)**, and Horizontal Flow Constructed Wetlands (CW) for final polishing (see S4). The aim is to test and validate these technologies for the **advanced nutrient (N/P) removal from urban wastewater, transforming the WWTP into a smart bio-refinery** platform for environmental improvement and circular economy. This approach minimises nutrient discharge into the Esino River while maximising the recovery of valuable biomass (P-rich sludge, microalgae, and macrophyte plants). The demonstration is equipped with real-time sensors and will automatically monitor and regulate key parameters to maintain optimal operational conditions for both processes.This strategy enhances nutrient removal, while promoting nutrient-rich biomass production, which can be valorised through non-oxidative thermochemical processes (pyrolysis) for subsequent bio-based fertiliser production (see S2). The demonstration will validate the system's efficiency in reducing nutrient discharges, energy use, and GHG emissions while improving process stability, providing a model for integrated, **data-driven wastewater treatment solutions that promotes both nutrient removal and resource recovery.**



Benefits

- Efficient **removal of nutrients** from wastewater
- Improved **process performance** and **stability** through automated, real-time monitoring
- Reduced **energy consumption** and **GHG emissions** compared to conventional systems
- **Minimise nutrient discharges** and pollution in receiving water bodies
- **Valorisation of produced biomass** (P-rich sludge, microalgae, plants) by converting them into nutrient-rich biomass for biofertiliser production

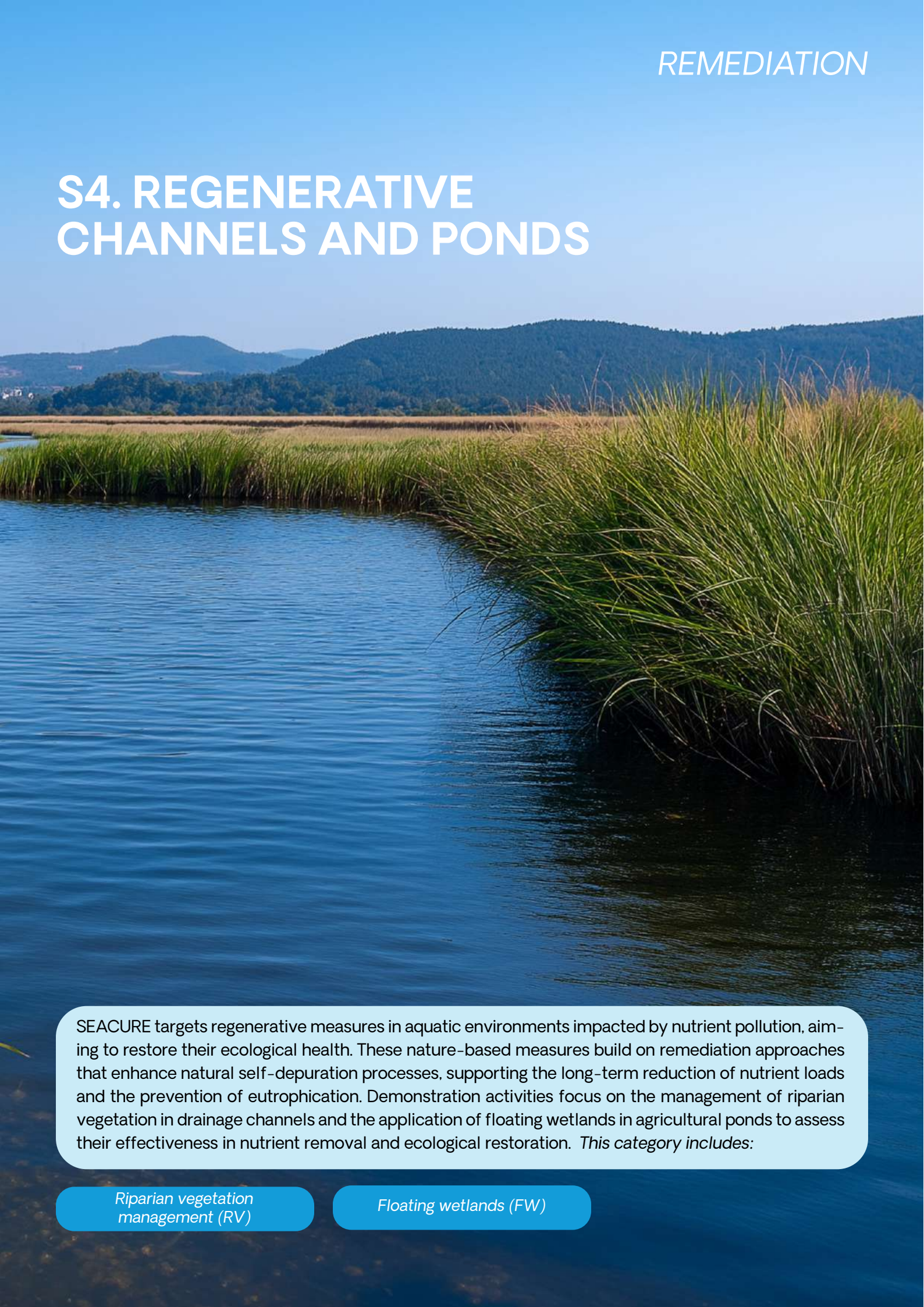
Replicaiton potential

Applicable to **urban wastewater treatment plants** aiming to improve nutrient removal and promote circular, resource-efficient operations transforming WWTP into bio-refineries. The solution is particularly relevant for **facilities looking to integrate automated, smart monitoring technologies and bio-based resource recovery into existing treatment lines**. Particularly suitable for regions with agricultural activity or agro-industrial by-products, **interested in closing nutrient loops** and advancing circular bioeconomy practices.

REMEDIATION

Solutions for eliminating nutrient excess in aquatic ecosystems

S4. REGENERATIVE CHANNELS AND PONDS



SEACURE targets regenerative measures in aquatic environments impacted by nutrient pollution, aiming to restore their ecological health. These nature-based measures build on remediation approaches that enhance natural self-depuration processes, supporting the long-term reduction of nutrient loads and the prevention of eutrophication. Demonstration activities focus on the management of riparian vegetation in drainage channels and the application of floating wetlands in agricultural ponds to assess their effectiveness in nutrient removal and ecological restoration. *This category includes:*

Riparian vegetation management (RV)

Floating wetlands (FW)

Riparian vegetation management (RV)

The project is validating the effectiveness of **riparian vegetation management (RV) practices in agricultural drainage canals** to enhance their nutrient mitigation capacity and limit the nutrient export to terminal water bodies. Implemented in a restored canal located in the Po River Delta, Italy (DEMO 2), this approach focuses on promoting the recolonisation of emergent macrophytes and adopting conservative management practices. Modifying the canal's morphology (i.e. widening the section and reducing the bank slope) favours the natural recovery of the native vegetation that was once dominant (i.e. Phragmites australis). Implementing conservative management practices of aquatic vegetation, which involves reducing the frequency of mowing operations and postponing cutting to the end of the growing season, **promotes the canal's ability to function as a natural buffer** mimicking a wetland environment, while **maintaining hydraulic efficiency.**

Extensive research has demonstrated the **high potential of canal networks to mitigate nutrient pollution when vegetation is properly managed**. The presence of aquatic macrophytes is considered a key factor in determining the potential for water depuration, particularly with regard to the removal of excess nitrogen, through their complex, synergistic interactions with bacterial communities. Shallow slow-flowing vegetated canals are hotspots of denitrification due to the development of multiple biologically active surfaces in both the water column and the rhizosphere. In SEACURE, the approach is being tested under real operational conditions to showcase **how reduced mowing operations can enhance self-depuration processes, improve nutrient control, and contribute to sustainable water management practices.**

Benefits

- **Decreased nutrient export to coastal waters**, particularly during periods of high risk of eutrophication
- **Ecosystem health** coupled with **hydraulic safety needs**
- **Enhanced ecological functioning** and biodiversity in canal networks

Replicaiton potential

The Riparian Vegetation Management approach can be **applied to agricultural drainage networks** aiming to reduce nutrient losses through nature-based maintenance practices. It is suited to **lowland, deltaic,** and **coastal agricultural regions**, where managing nutrient removal and hydraulic performance together is essential for sustainable water and land management.

Floating wetlands (FW)

Floating Wetlands (FW) are increasingly recognised as a practical and low-cost constructed wetland technology for areas with large water-level fluctuations and challenging environmental conditions. This solution involves the implementation of **vegetated floating platforms in agricultural water ponds** to enhance water quality through natural treatment processes. In the Axios River Delta, Greece (DEMO 3), SEACURE is demonstrating and optimising different vegetation management approaches for FWs under real operational conditions to **enhance the self-depuration capacity of water storage systems and increase their nitrogen (N) removal** potential, while maintaining hydraulic functionality.

Their effectiveness is largely driven by the plants and microbial biofilms that develop in the root zone, making **proper management of vegetation essential for successful pollutant removal**. Although most existing knowledge comes from controlled or small-scale applications, FWs have been used in various aquatic environments, including lakes, stormwater ponds, and rivers, and have shown promising results in reducing hydrocarbons in contaminated waters.

In coastal settings, FWs have been mainly applied for ecological enhancement (e.g., by creating habitats for birds and fish), aesthetic improvement, and sediment retention. However, their potential for treating hydrocarbons and other marine pollutants remains largely unexplored. The SEACURE demonstration will evaluate their performance and assess the feasibility of using floating wetlands as a multifunctional solution to improve water quality and enhance nutrient removal, thereby **preventing the degradation and eutrophication of surface water bodies**.

Benefits

- **Reduction of nutrient concentrations** in agricultural water ponds
- **Prevention of eutrophication** in surface water bodies
- **Improved self-depuration capacity** of water storage systems
- **Low-cost** and **low-energy solution** for pollution control
- Improved **ecological quality** and **biodiversity**

Replicaiton potential

Floating Wetlands can be **replicated in agricultural and irrigation ponds, drainage canals, and small reservoirs** requiring low-cost nutrient mitigation solutions. It is particularly relevant for **regions with large water-level fluctuations** and challenging environmental conditions, affected by nutrient pollution and water scarcity, where nature-based treatment systems can improve water quality and enhance ecological resilience within agricultural landscapes.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