



Policy guidance 2

Assessing the upscaling potential of innovative approaches to coastal ecosystem restoration

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From local pilots to large-scale deployment: key challenges for assessing nature-based solutions

Nature-based solutions for coastal restoration are still largely in a development and testing phase, mainly implemented through pilot and demonstration projects. At the same time, European policy frameworks, including the Nature Restoration Regulation, set ambitious targets to restore ecosystems and strengthen climate adaptation across the EU. Achieving these objectives requires scaling up innovative solutions across regions and countries, supported by effective planning and investment.

This creates a need to translate local experience into evidence that can support decision-making at regional and national levels. While many coastal restoration solutions demonstrate positive results in specific contexts, their performance and impact at larger scales are less well understood. Scaling up nature-based solutions therefore requires addressing several key challenges, including:

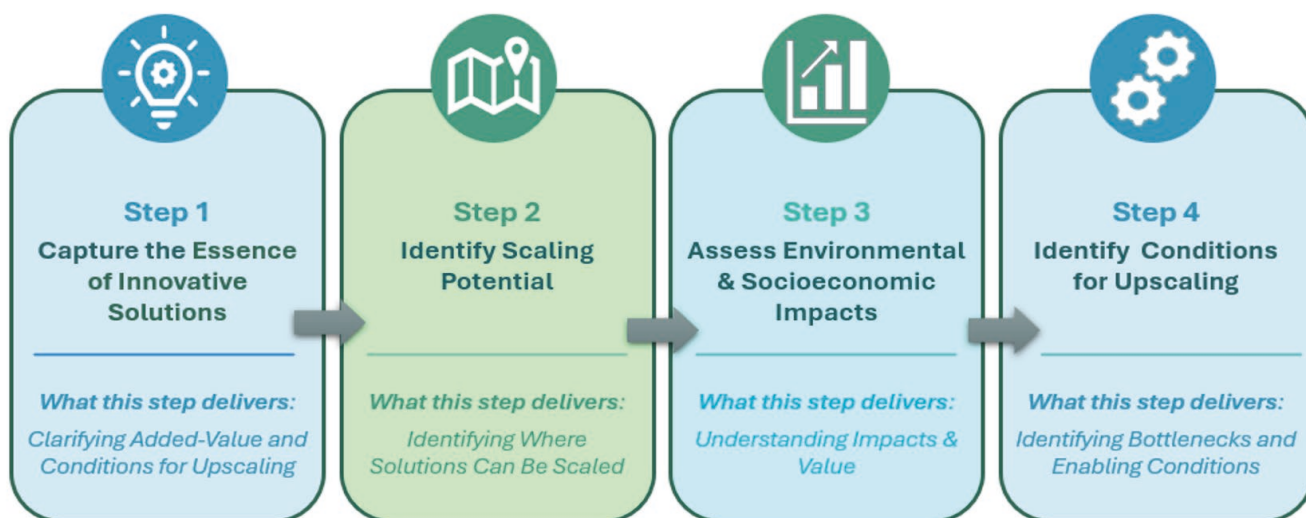
- ➔ Identifying where solutions can be effectively deployed.
- ➔ Understanding how they perform under different environmental and socio-economic conditions.
- ➔ Capturing the full range of economic values, including non-market benefits.
- ➔ Assessing how impacts, costs, and benefits evolve in different contexts and when implemented across multiple sites, capturing cumulative effects at regional and national scales.

Addressing these challenges is essential to support informed planning, prioritisation, and investment decisions, and to enable the effective large-scale deployment of nature-based solutions.

This policy guidance proposes consistent assessment framework to identify scaling potential and environmental and socio-economic impacts to support the effective deployment of innovative approaches to coastal restoration at larger scales.

A structured approach to assess upscaling potential and impacts

A structured assessment approach is essential to translate local evidence into actionable insights and support the effective large-scale deployment of nature-based solutions. A step-wise framework (see Figure below) was developed to assess both the upscaling potential of nature-based solutions and their environmental and socio-economic impacts. The framework combines insights from pilot projects with spatial, environmental, and socio-economic information to better understand where solutions can be applied, how they perform, and what impacts they can deliver.



A stepwise framework to assess the upscaling potential and impacts of nature-based solutions



Step 1 – Capture the essence of innovative solutions

Purpose

This first step aims to translate innovative solutions to coastal restoration into a structured description of activities, creating a shared understanding of what the solution does, what value it generates, and under which conditions it can be successfully implemented. By clarifying the solution's added value and its key enabling conditions, this step provides the foundation for assessing its scaling potential and impacts in subsequent steps.

Key activities

- ➔ Define the problem addressed and its policy relevance.
- ➔ Describe the solution and its main components.
- ➔ Identify key stakeholders, resources, and implementation processes.
- ➔ Clarify the value provided compared to existing approaches.
- ➔ Identify key enabling conditions.

Recommendations

A structured and clear description of the solution is essential to support its assessment and potential replication. Using a consistent framework, such as a business model logic, can help capture both the technical components of the solution and the organisational arrangements that support its implementation. As the assessment progresses, this description can be updated and refined to reflect new insights.



Step 2 – Identify scaling potential

Purpose

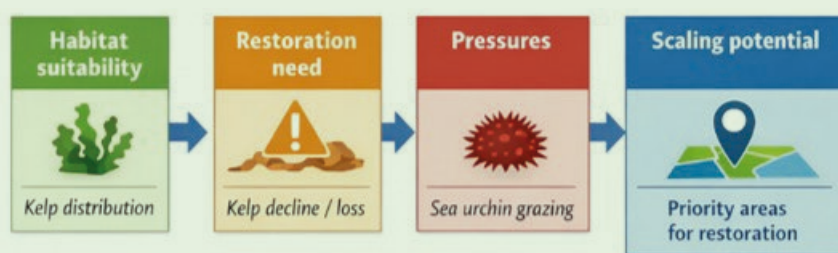
Based on the characterisation of the coastal restoration solution, this step aims to determine where else it can be effectively applied considering environmental conditions and to estimate its potential scale of deployment. This step should be seen as a screening exercise to identify priority areas, to be further refined through more detailed analysis and consideration of enabling conditions. The results provide the basis for assessing environmental and socio-economic impacts in Step 3.

Activities

- ➔ Map the distribution of relevant ecosystems or habitats (e.g. sandy coastlines, seagrass meadows, kelp forests).
- ➔ Map areas where the environmental problem is present (e.g. erosion hotspots, degraded habitats).
- ➔ Map other key biophysical conditions required for the solution to function effectively.
- ➔ Combine spatial datasets to identify potential areas for deployment, innovation objectives and restoration goals. Cultural factors, including risk aversion and a narrow understanding of innovation as purely technological, further limit experimentation and adoption.

Illustration: Assessing the scaling potential of kelp restoration through sea urchin removal

Experience from A-AAgora shows that a simplified GIS-based approach can provide an operational basis for assessing scaling potential. In the case of kelp restoration through sea urchin removal, scaling potential is identified by overlaying data on kelp distribution, areas of decline, and sea urchin grazing. This allows the identification of priority areas where intervention is both needed and feasible.



This type of analysis provides a first estimate of the 'theoretical scaling potential', i.e. the maximum area where the solution could be applied based on environmental suitability. Results should be interpreted as indicative and refined through further analysis of local conditions and enabling factors. The approach is transparent, replicable, and relatively easy to apply, making it suitable for large-scale screening.



Recommendations

A pragmatic and transparent approach should be adopted to assess scaling potential, building on available data and knowledge. Initial analyses can rely on simplified spatial methods to identify areas where the solution could be applied, combining information on the presence of the problem, ecosystem distribution, and key biophysical conditions. Where relevant, future developments such as climate change or evolving socio-economic conditions should be considered to ensure a forward-looking perspective. Results should be interpreted as indicative estimates of 'theoretical potential' rather than precise predictions and clearly communicated as such. It is important to acknowledge data limitations and uncertainties, and to complement quantitative analysis with expert judgement where needed.



Step 3 – Assess environmental and socio-economic impacts

Purpose

Building on the identification of scaling potential, this step aims to assess what the innovative coastal restoration solution delivers when deployed at scale, in terms of environmental outcomes and socio-economic benefits. It supports decision-making by clarifying the overall value of scaling up and its contribution to policy objectives.

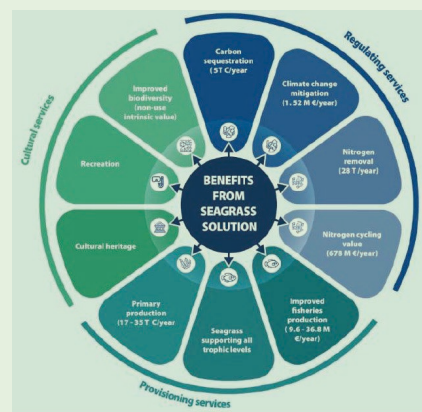
Activities

- ➔ Identify key environmental changes (e.g. ecosystem condition, biodiversity, ecosystem functioning).
- ➔ Link these changes to benefits for society (e.g. ecosystem services such as coastal protection, carbon sequestration, water quality).
- ➔ Assess socio-economic impacts, including costs and benefits.
- ➔ Where possible, quantify impacts using indicators, models, or valuation methods.

Illustration: Assessing impacts of climate change mitigation through seagrass restoration

The assessment of seagrass restoration in the A-Agora project illustrates how environmental and socio-economic impacts can be assessed as part of upscaling analysis adopting an ecosystem services perspective. The analysis identified areas suitable for restoration based on habitat distribution, degradation, and constraints. Environmental impacts include improved ecosystem condition, biodiversity, and socio-economic benefits include improved ecosystem services such as carbon sequestration and nutrient regulation.

The results of the assessment were combined and presented in one figure, bringing together qualitative, quantitative, and monetised information. This visual representation provides a comprehensive overview of the range of benefits generated by seagrass restoration, highlighting both measurable and non-market impacts. By synthesising different types of evidence in a single format, the figure supports a clearer understanding of the diversity of impacts and facilitates communication.



Recommendations

An integrated approach should be adopted to assess environmental and socio-economic impacts, ensuring that ecological changes are clearly linked to benefits for society. Applying an ecosystem services perspective can support this by translating improvements in ecosystem condition into tangible outcomes such as climate regulation, water quality, or coastal protection.

The assessment should combine qualitative, quantitative, and, where relevant, monetised information to capture the full range of impacts. Attention should be given to non-market benefits, which are often significant but not captured in assessments due to methodological challenges.

Methods should remain proportionate to available data and resources, using indicators, models, or valuation approaches as appropriate. It is essential to clearly communicate assumptions, uncertainties, and limitations, and to ensure consistency with the identified scaling potential.



Step 4 – Identify enabling conditions for upscaling

Purpose

Building on the assessment of impacts, this step aims to identify the key conditions required to enable the large-scale deployment (beyond the environmental conditions assessed in step 2) of nature-based solutions and to determine what is needed to move from potential to real implementation. This step helps bridge the gap between technical potential and real-world feasibility, supporting effective and sustained deployment of nature-based solutions.

Activities

- ➔ Identify costs, financing needs and potential funding sources.
- ➔ Assess regulatory frameworks that can either limit or support the solution.
- ➔ Identify the infrastructure and equipment that are required to ensure technical feasibility.
- ➔ Analyse the governance system and the human resources needed, as well as existing initiatives and networks relevant to implementation.

Recommendations

A comprehensive assessment of bottlenecks and enabling conditions should be carried out to understand the practical requirements for large-scale implementation. This includes analysing governance frameworks, financing mechanisms, technical capacity, and stakeholder engagement.

The focus should be on actionable aspects that can support implementation, such as improving coordination across sectors and governance levels, adapting funding mechanisms, or strengthening institutional capacity.

Concluding remarks

The transition from local pilot initiatives to large-scale deployment of nature-based solutions remains a central challenge for coastal ecosystem restoration. While many innovative approaches demonstrate clear environmental and socio-economic benefits at small scale, translating these results into consistent, large-scale action requires structured methods to assess where solutions can be applied, what impacts they can deliver, and under which conditions they can be implemented.

The assessment framework proposed in this policy guidance provides a practical approach contributing to the broader objective of advancing the implementation of European restoration policies, including the Nature Restoration Regulation, and supports the transition towards large-scale, sustainable restoration of coastal ecosystems.

The stepwise assessment framework combines the identification of scaling potential, the assessment of environmental and socio-economic impacts, and the analysis of enabling conditions, thereby supporting a more comprehensive understanding of both opportunities and constraints associated with upscaling. The integration of qualitative, quantitative, and monetised information further strengthens the evidence base, helping to capture the full range of benefits generated by nature-based solutions, including those that are not directly reflected in market values.

This policy guidance is a product of the A-AAgora project.

Suggested citation style:

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References

Van Duinen, R., Wang, J., Jarry, C., Tapia Grimaldo, J. (2026). Potential impacts and wide application of demonstrated innovations. A-AAgora project Deliverable 1.2.