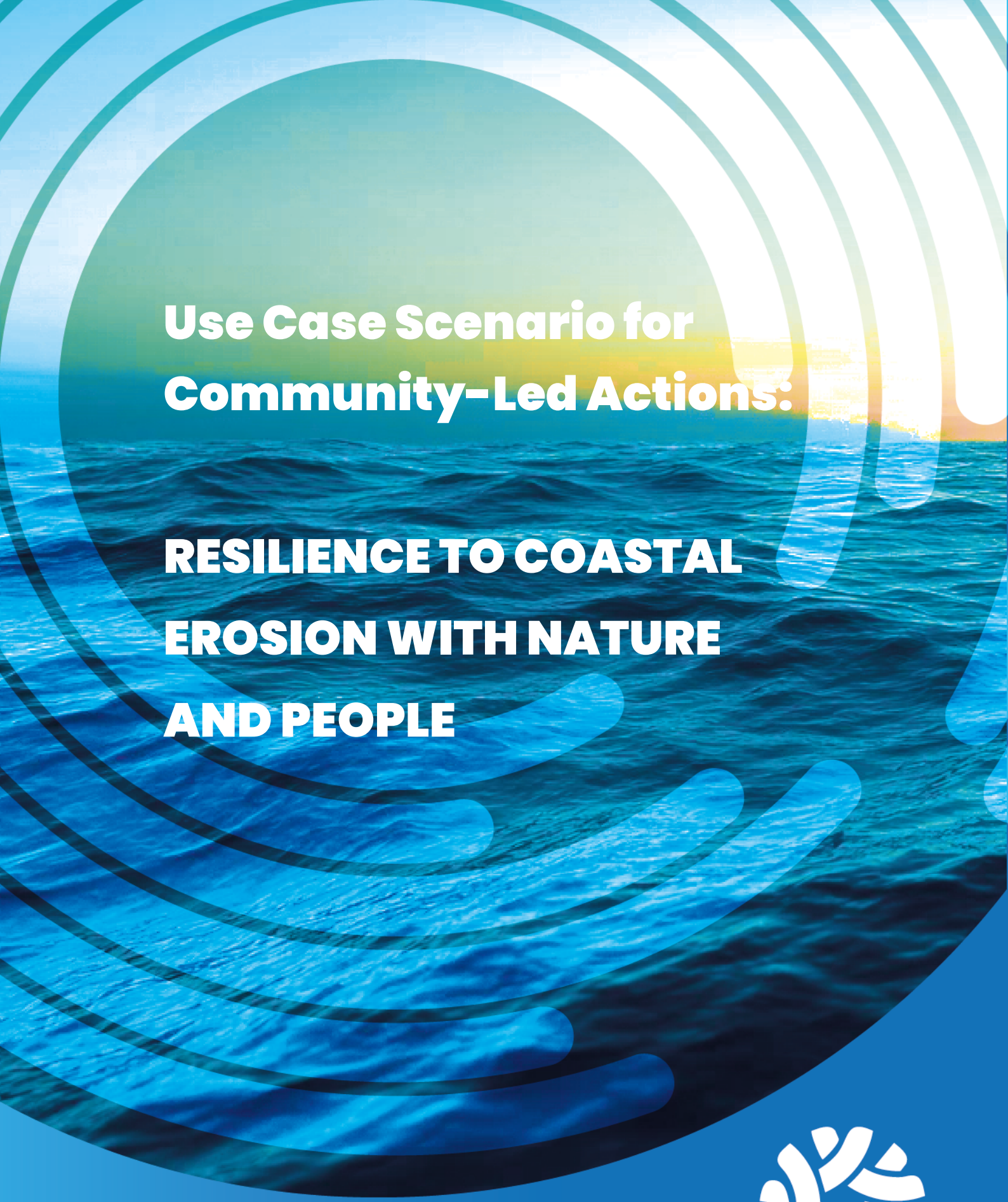
Use Case Scenario for Community-Led Actions:

RESILIENCE TO COASTAL EROSION WITH NATURE AND PEOPLE



EMPOWERING COMMUNITY- LED ACTION IN THE ATLANTIC & ARCTIC

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PLOCAN Plataforma Oceánica de Canarias

NIVA Norwegian Institute for Water Research

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Use case Overview

Use case title

Resilience to Coastal Erosion with nature and people.

Short Description

This use case addresses coastal erosion through an integrated approach combining scientific monitoring, community engagement, and awareness-building. By establishing baseline data on coastal dynamics and deploying automated monitoring systems such as video-based shoreline detection, the initiative enables real-time understanding of coastal changes. The solution combines technological tools with citizen science and nature literacy campaigns, empowering communities and decision-makers to better understand erosion as a natural process and respond more effectively to risks. It promotes data-driven decision-making and supports the transition from hard engineering solutions toward adaptive and ecosystem-based approaches. Tested in coastal regions in Portugal and Ireland, the use case enhances resilience by improving early warning capabilities, strengthening community awareness, and enabling more sustainable coastal management practices.

Country and Region

Portugal and Ireland/Atlantic.

Domain/Sector

Environmental Protection; Coastal Management.

Current status

Pilot.

Geographical scope

Coastal/EEZ.

Organization's categorization

Regional or local (public) authority; SMEs; Research organisations and academia.

Promoter's information

- Organization's name: University College Cork; Cork City Council.
- Place: Ireland & Portugal
- EU Mission Restore Our Oceans and Seas related project: AAGORA

Use case duration

- From Year 2023 to Year 2026.
- Number of Months: 42.

Keywords

Coastal Erosion/Monitoring/Community Awareness

Website link

https://a-aagora.konnektable.com/cork-county/resilience-to-coastal-erosion-for-people-and-nature?fullscreen=true
https://a-aagora.konnektable.com/centro-region/resilience-to-coastal-erosion-for-people-and-nature?fullscreen=true

Use case picture

Section 2. Design

Briefly describe how the use case is aligned/contributes to the objectives of the EU Mission Restore Our Oceans and Waters 2030.

This project contributes to the EU Mission "Restore Our Ocean and Waters" by improving the understanding and management of coastal erosion processes. It supports ecosystem protection and climate adaptation through data-driven monitoring, early warning systems, and increased public awareness. The approach promotes sustainable and adaptive coastal management aligned with ecosystem-based solutions.

Challenge's definition and Primary Objective

Coastal erosion is a natural process, but its impacts are increasingly intensified by human activities and climate change. Many coastal areas face growing risks to infrastructure, ecosystems, and livelihoods, while traditional responses, such as hard engineering solutions, are often costly, inflexible, and may exacerbate erosion elsewhere. At the same time, there is a lack of accessible, continuous data on coastal dynamics and limited public understanding of erosion processes. This creates challenges for decision-makers and reduces the effectiveness and acceptance of management strategies. This project addresses these challenges by combining scientific monitoring, community engagement, and awareness-building. The main objective is to improve understanding of coastal erosion dynamics, establish reliable data baselines, and support more adaptive and evidence-based decision-making. By empowering both communities and authorities with knowledge and tools, the use case promotes more sustainable and socially accepted coastal management approaches.

End users

Local communities, coastal managers, policy makers, researchers, port authorities.

Gender equality and diversity

The use case promotes inclusive participation by engaging diverse community groups in monitoring and awareness activities. Citizen science initiatives provide accessible entry points for different age groups, genders, and backgrounds, ensuring broad participation in understanding and managing coastal risks.

Section 3. Implementation

Implementers

Regional or local (public) authority; community-based organisations; SMEs; Research organisations and academia.

Concrete Solutions and Actions taken

The project implements an integrated system combining coastal monitoring, awareness campaigns, and stakeholder engagement. Key actions include the development of beach profiling campaigns using GPS surveys to establish baseline coastal conditions. Automated monitoring systems, such as video cameras, are deployed to capture high-frequency coastal data. These systems are combined with advanced analysis techniques, including deep learning, to enable shoreline detection and support real-time coastal warning systems. Citizen science initiatives are integrated to involve local communities in data collection and increase awareness of coastal processes. Public participatory tools are used to gather local knowledge and perceptions. Awareness campaigns and educational materials are developed alongside scientific activities to improve understanding of coastal erosion and promote more adaptive approaches to management. Engagement with local authorities and decision-makers ensures that collected data supports planning, risk assessment, and response strategies.

Community Engagement Needs

The use case addresses the need for improved public understanding of coastal erosion and stronger collaboration between communities and decision-makers. It responds to the gap between scientific knowledge and public perception.

Community Engagement Measures

Citizen science programs, participatory data collection tools, awareness campaigns, workshops, and collaboration with local stakeholders ensure engagement.

Community Engagement benefits

Improved awareness and understanding of coastal processes, increased capacity to respond to risks, stronger trust between communities and authorities, and more informed participation in decision-making.

Monitoring and Evaluation

Technical Risks

One key technical risk relates to the reliability and maintenance of monitoring systems, such as video cameras and data processing tools. Harsh coastal conditions (e.g., salt exposure, storms, sand) may affect equipment performance and data continuity. Additionally, the accuracy of automated shoreline detection using deep learning depends on the quality and consistency of input data, which may vary due to environmental conditions (lighting, tides, weather). Ensuring robust calibration and validation of monitoring systems is essential.

Operational constraints

Coastal environments present operational challenges, including difficult access to monitoring sites, exposure to extreme weather, and seasonal variability. Installing and maintaining equipment in remote or dynamic coastal zones may require additional logistical planning and resources. Furthermore, coordinating field activities such as beach profiling and community engagement campaigns may be constrained by weather conditions, availability of participants, and local operational capacity.

Legal/Regulatory Constraints

The installation of monitoring equipment and implementation of coastal interventions may require permits from local and national authorities. Activities in sensitive coastal zones must comply with environmental regulations, coastal management policies, and data protection rules. Differences in regulatory frameworks across regions may create administrative complexity and require coordination between multiple stakeholders.

Ethical and Social Considerations

The use case ensures that community engagement is conducted in an inclusive and transparent manner, respecting local knowledge and perspectives. Citizen participation in data collection and awareness activities should be voluntary and accessible to diverse groups. Data collected through monitoring systems and participatory tools must be handled responsibly, ensuring privacy and appropriate use. Additionally, communication around coastal erosion must be carefully managed to avoid unnecessary alarm while still promoting awareness and preparedness.

Ensuring fair representation and avoiding unequal distribution of benefits or influence among stakeholders is also important.

Results & Impacts

Outputs

The use case delivers a combination of technological, scientific, and social outputs to improve coastal erosion management. These include coastal monitoring systems based on video imaging and data processing tools, enabling high-frequency shoreline observation and analysis. Baseline datasets are generated through beach profiling campaigns, providing essential information on coastal dynamics. Citizen science tools and participatory platforms are also developed to support data collection and community involvement. In addition, awareness materials and nature literacy campaigns are created to improve public understanding of coastal processes. The use case also contributes to new governance approaches by strengthening collaboration between scientists, communities, and decision-makers, and supporting evidence-based coastal management practices.

Outcomes

- Environmental impacts: Improved understanding of coastal dynamics supports more informed and adaptive management of erosion processes. The use case may contribute to the protection of coastal ecosystems by encouraging nature-based management approaches. Enhanced monitoring allows earlier identification of extreme events and potential risks.

- Economic impacts: Better-informed decision-making may help optimise resource allocation and reduce costs associated with ineffective or poorly targeted coastal interventions. The availability of reliable data can support more efficient planning and prioritisation of investments in coastal protection and adaptation measures.

- Social impacts: Increased awareness and understanding of coastal erosion among local communities, leading to more informed and constructive engagement with decision-making processes. Strengthened collaboration between citizens, scientists, and authorities may improve trust and support more socially accepted management strategies.

Operational benefits

The implementation of monitoring systems and early warning tools may improve the ability of authorities to respond proactively to coastal risks, enhancing safety and preparedness. Continuous data collection supports more efficient planning and reduces reliance on reactive interventions. The integration of citizen science and participatory approaches may also reduce monitoring costs while increasing data coverage and community involvement.

Lessons learned and take aways for the future

Key lessons include the importance of combining scientific monitoring with community engagement to improve both data quality and social acceptance of management decisions. The use case highlights the need for accessible communication of scientific information, as well as the value of integrating local knowledge into monitoring and decision-making processes. Flexibility and adaptation are essential, given the dynamic nature of coastal systems and the uncertainties associated with climate change.

Scalability

Local -> Regional; Regional -> Global.

Replicability

The use case is replicable in coastal regions experiencing erosion, particularly in areas with limited monitoring data and increasing climate-related risks. The modular nature of the solution, combining monitoring, awareness, and engagement, allows adaptation to different coastal contexts and governance structures.

Transferability

The approach may be transferred to other environmental monitoring contexts, such as flood risk management, coastal flooding, and ecosystem monitoring. The integration of technology, citizen science, and awareness campaigns is also applicable to broader climate adaptation and environmental management challenges.

Post project sustainability

The sustainability of the project could be supported through continued use of monitoring systems, integration into local and regional coastal

management strategies, and ongoing stakeholder collaboration. The data generated may contribute to long-term planning and adaptive management, while continued engagement with communities could help maintain awareness and participation over time. Partnerships with public authorities, research organisations, and private actors may support the continuation and expansion of activities. Additionally, the use of scalable tools and methodologies, such as video monitoring, participatory data collection, and awareness campaigns, could enable the approach to evolve and be maintained beyond the initial project duration. Continuous monitoring and feedback mechanisms may support adaptive management and long-term relevance.

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