

Climagine Guide for Practitioners

GEF MedProgramme, Child Project 2.1.

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Table of contents

Director of publication	2
Author	2
Reviewer	2
Disclaimer	2
Legal notice	2
Table of contents	3
Table of Illustrations	4
Glossary	5
1. Introduction	6
2. Theoretical Foundation	7
3. Context and Scope of the Methodology	8
4. Basic Principles of the Climagine Methodology	10
5. Applying Climagine in the frame of the GEF MedProgramme	11
6. Context-Specific SWOT Analysis and Lessons Learned	12
6.1 Municipal Level: Overcoming Inter-Municipal Fragmentation - Boka Kotorska Bay, Montenegro	12
6.2 Regional Level: Managing Vast Territorial Disparities - Tangier-Tetouan-Al Hoceima Region, Morocco	15
6.3 National Level: National ICZM Strategy and Law, Lebanon	17
6.4 Basin Level: Integrating ICZM and IWRM - IMP Damour, Lebanon	19
6.5 Compiled SWOT Analysis for the MedProgramme	22
7. Integrating Lessons Learned: A Step-by-Step Guide for Future Climagine Implementation	23
7.1 Preliminary step: Prepare & Align	24
7.2 Step 1: Reflect and Understand	25
7.3 Step 2: Connect and Investigate	28
7.4 Step 3: Model and Explore	30
7.5 Step 4: Do and Suggest	32
7.6 Step 5: Act and Reach Out	35
8. Proposed Updates of the Climagine Methodology	41
8.1 Adapting the Climagine methodology to different contexts	41
8.2 Simplifying the Amoeba Diagram: The "Doughnut" Model	42
8.3 Consensus-building and Conflict Resolution	42
8.4 Continuity of the Climagine Process	43
8.5 Indicator Database	43
8.6 Advancing the Understanding and Visualisation of the Methodology	43
8.7 Implementation and Funding	43
9. Conclusion	44
10. Bibliography	45
11. Annexes	46
Annex 1: Lessons learned from MedPartnership (Croatia and Tunisia)	46
Annex 2: Simplified Templates	49

Table of Illustrations

BOXES

Box 1. Example of results from one group (Montenegro) for Workshop 1	27
Box 2. Example of results from one group (Montenegro) for Workshop 2	29
Box 3. The Band of Equilibrium (BoE) & Amoeba Diagram	30
Box 4. Lessons learned from Climagine in Croatia (MedPartnership)	46
Box 5. Lessons learned from Climagine in Tunisia (MedPartnership)	47

FIGURES

Figure 1. Overview of Climagine workshops in Boka Kotorska Bay	13
Figure 2. Compiled amoeba containing the current state (blue), 2030 Business as Usual scenario (red), 2030 alternative scenario (purple) and Band of Equilibrium (green) for Boka Kotorska Bay	13
Figure 3. Amoeba diagrams presenting the sustainability indicators selected for the Coastal Plan (Schéma régional du littoral) in the region Tanger Tétouan-Al Hoceima, containing the current state 2023 (red), the business-as-usual scenario 2045 (blue), and the alternative scenario 2045 (green)	15
Figure 4. Amoeba diagrams presenting the sustainability indicators selected for the Lebanese coast, containing the current state (blue), the business-as-usual scenario 2045 (red), and the alternative scenario 2045 (green).	18
Figure 5. Amoeba diagrams presenting the sustainability indicators selected for the IMP Damour, containing the current state (blue), the business-as-usual scenario 2045 (red), and the alternative scenario 2045 (green).	20
Figure 6. The Climagine workshop cycle	23
Figure 7. Compiled amoeba diagram overlaying all scenarios to clearly show decision-makers the magnitude of change required. The current state (blue), the business-as-usual scenario 2030 (red), and the alternative scenario 2030 (green) are visualized.	36
Figure 8. Coastal Risk Index and Climagine results from Tangier-Tetouan-Al Hoceima region (Morocco), represented in Plan Bleu's observatory	37
Figure 9. Amoeba diagrams Boka Kotorska Bay: current state, 2030 BAU (unsustainable), 2030 alternative (sustainable) with data visualisation proposal.	38
Figure 10. Scenarios for the selected priority sectors in Boka Kotorska Bay and recommendations for data visualisation	40
Figure 11. General proposed improvement of the Climagine methodology. Technical Climagine Workshop (18-19 February 2026)	41
Figure 12. Climagine adapted to focus on NbS implementation in a marine national park context. Technical Climagine Workshop (18-19 February 2026)	42

TABLES

Table 1. SWOT Analysis for Boka Kotorska Bay	13
Table 2. SWOT Analysis for Tangier-Tetouan-Al Hoceima Region	16
Table 3. SWOT Analysis for the national coast of Lebanon	18
Table 4. SWOT analysis for the Damour area	21
Table 5. Compiled SWOT analysis for the Climagine implementation in the frame of the GEF MedProgramme	22
Table 6. Proposed Structure for the Group Activity in Workshop 1	25
Table 7. Proposed Structure for the Group Activity in Workshop 2	28
Table 8. Proposed Structure for the Group Activity in Workshop 3	31
Table 9. Example of results from one group (Montenegro) for Workshop 3	32
Table 10. Proposed Structure for the Group Activity in Workshop 4	33
Table 11. Example of results from one group of the Climagine workshop in the Damour, Lebanon	33

Glossary

Amoeba Diagram: A visual radar chart used to map the current and future states of indicators against their defined Band of Equilibrium.

Band of Equilibrium (BoE): The "safe operating space" established by setting minimum and maximum sustainability thresholds for a given indicator.

Child Project 2.1 (CP 2.1): A GEF MedProgramme project aimed at supporting ICZM implementation, climate resilience, and water security in Mediterranean coastal zones.

Climagine: A systemic, participatory foresight methodology developed by Plan Bleu that engages local stakeholders to assess and plan the sustainable future of their coastal socio-ecological systems.

Coastal Zone: The geomorphologic area on either side of the seashore defined by the complex interactions between marine and land environments and human activities.

DPSIR Framework: An analytical model (Drivers, Pressures, State, Impact, Response) used to structure indicator selection and map socio-ecological relationships.

GEF MedProgramme: A major regional programme focused on reducing transboundary environmental stresses and improving climate resilience across the Mediterranean.

Integrated Coastal Zone Management (ICZM): A dynamic, continuous process designed to sustainably manage coastal zones by balancing ecological fragility with diverse human activities.

Nature-based Solutions (NbS) & Ecosystem-based Adaptation (EbA): Approaches that utilize ecosystem conservation and restoration to help coastal communities adapt to climate change.

PAP/RAC & Plan Bleu/RAC: Regional Activity Centres of the UNEP Mediterranean Action Plan (MAP) responsible for advancing sustainable coastal governance and executing the Climagine methodology.

Priority Sectors: Key thematic areas—such as tourism, water, or waste—identified by stakeholders for targeted intervention in a Coastal Management Plan.

RACER Criteria: A practical filter to ensure selected indicators are Relevant, Accepted, Credible, Easy to monitor, and Robust.

SMART Criteria: A framework to verify that proposed indicators are Specific, Measurable, Achievable, Relevant, and Time-bound.

Soft Systems Methodology (SSM): A method of inquiry grounded in soft systems theory, addresses complex, real-world situations characterised by ambiguity, subjectivity, and diverse stakeholder perspectives.

Sustainability Dimensions (SD): Broad thematic challenges (e.g., governance, transportation) defined by stakeholders during initial workshops.

Sustainability Indicators (SIs): Measurable variables used to assess the current state of a coastal area and project future scenarios.

1. Introduction

Plan Bleu is a Regional Activity Centre of the Mediterranean Action Plan (MAP) under the United Nations Environment Programme (UNEP). Operating within the framework of the Barcelona Convention and the Mediterranean Strategy for Sustainable Development (MSSD), Plan Bleu/RAC is instrumental in advancing sustainable coastal governance.

At the heart of this initiative is the **MedProgramme**, a major regional programme funded by the Global Environment Facility (GEF), with a budget of \$43 million and coordinated by UNEP/MAP. Especially the **Child Project 2.1.**, which focuses on “*Mediterranean Coastal Zones: Water Security, Climate Resilience and Habitat Protection*”, is of major importance. This project is fundamentally designed to support Mediterranean countries in the implementation of the Protocol on Integrated Coastal Zone Management (ICZM Protocol). One of its main goals is to reduce major transboundary environmental stresses affecting the Mediterranean Sea and its coastal areas, specifically taking into account climate change by building climate resilience and water security, and ultimately improving health and livelihoods of coastal populations. With PAP/RAC, Plan Bleu/RAC, GWP-Med and UNESCO-IHP serving as Child Project 2.1. executing partners, the project notably foresees the elaboration of two Coastal Management Plans led by PAP/RAC in Boka Kotorska Bay, Montenegro and the Tanger-Tetouan-Al Hoceima Region (TTA), Morocco.

Moreover, the **GEF MedProgramme Special Climate Change Fund (SCCF) Project** is feeding into Climagine through its focus on climate change adaptation in coastal zones. This synergistic integration includes the production of gender-sensitive climate risk assessments for both coastal hotspots (2022), alongside a Climagine workshop to identify coastal adaptation solutions and submit them to economic and multi-criteria analyses. The SCCF Project also aims to build capacity on using climate risk assessments and ecosystem-based adaptation in coastal zones, and simultaneously works to stimulate the engagement of private and financial sector stakeholders to support coastal zone adaptation in TTA and in Kotor Bay.

To effectively anchor these interventions in local realities, Plan Bleu/RAC is supporting this effort using the participatory Climagine methodology to support ICZM. By empowering local actors to act as experts at their own level, the Climagine process can inform the development of local and national Coastal Management Plans in a highly effective bottom-up manner. This inclusive foresight approach ensures that strategic planning answers the direct needs of the territories while providing regional lessons for ICZM and coastal climate change adaptation in the Mediterranean.

The Climagine Guide for Practitioners is based on a review of over 20 workshop reports on the application of the Climagine methodology, a survey which was sent to participants and implementers of the methodology and a two days workshop designed to co-design the Guide which was held on 18-19 February 2026 in Marseille. This workshop served to capitalize on over ten years of implementation experience, identify common pitfalls, and ensure the Guide supports replication across the Mediterranean.

2. Theoretical Foundation

The Climagine methodology was developed to assess complex socio-ecological systems (SES) where nature and human activities are heavily interlinked. Based on principles of system thinking, the Climagine developers and implementers assume that local resources could only be managed sustainably, when interactions with society, economy and the environment are understood. This fosters cross-sectoral collaboration, system thinking and looking at decision making from an holistic perspective.

The theoretical roots of Climagine draw from four primary domains:

- The Systems Approach,
- Prospective and Scenario Making,
- Sustainability Indicators, and
- Participatory Methods.

Building upon the systems dynamics concepts pioneered by Donella Meadows, Climagine helps stakeholders understand complex interactions in coastal zones. Furthermore, inspired by Elinor Ostrom's principles of governance architecture for common-pool resources, the methodology emphasizes decentralization, polycentric governance, and the empowerment of local actors, actively treating them as experts at their own level.

By integrating Soft Systems Methodology (SSM) and prospective scenario planning, Climagine goes beyond linear forecasting. It enables stakeholders to explore the future—answering "What do we do if...?" questions—and design adaptive, resilient strategies to navigate climate uncertainty. This structured exploration bridges qualitative stakeholder insights with formal indicator logic, therefore enhancing a system thinking component that drives concrete, sustainable action.

3. Context and Scope of the Methodology

“Imagine, is a systemic and prospective sustainability analysis, offering a set of tools and methods (a methodological corpus) for describing, evaluating, and exploring the level of sustainability of an socio-ecological system in the past, present, and future, using indicators and a participatory approach that considers local actors as experts at their level.”

From Imagine to Climagine

In the 2000s, Plan Bleu developed the Imagine approach in collaboration with the Bayswater Institute (United Kingdom) to promote sustainable management practices in Mediterranean coastal zones.

In 2012 the integration of climate change in sustainable management practices gained more and more attention. This new component required revision of the initial participatory approach (Imagine), to develop Climagine. As part of the MedPartnership sister project “Integration of Climate Variability and Change into National Strategies for the

Implementation of the ICZM Protocol in the Mediterranean,” (Climvar & ICZM project) the Imagine approach was adapted into “Climagine”. This adaptation specifically addresses the specific challenges of **climate change** and **variability in coastal zones** with a focus on the **ICZM process**.

Finally, incorporating the outcomes of Climagine into a coastal plan gives them a regulatory scope as this document will need to be taken into consideration when drawing up future legally-binding documents. It is therefore a win-win partnership for developing planning documents to help Mediterranean coastlines achieve greater sustainability and strengthen resilience.

MedPartnership

Under the GEF MedPartnership, implemented by UNEP/MAP, Climagine was first piloted at two sites:

- Šibenik-Knin County, Croatia: Utilizing the DIVA model (developed by the Potsdam Institute, Germany), coordinated by PAP/RAC, Croatia.
- Kerkennah Archipelago, Tunisia: Using the RiVAMP model developed by UNEP-GRID, Geneva.

The results and lessons learned from these two pilot cases laid the groundwork for the use of “Climagine” in the framework of the GEF MedProgramme. Cross-cutting themes such as Gender and Climate Change received more attention in the GEF MedProgramme. Many of the lessons learned from the MedPartnership have been addressed through the deliverables and parallel activities of the SCCF project.

The GEF MedProgramme (2020-2026) and New Applications

Building on the lessons learned from these early pilots, the Climagine methodology was updated and expanded under the GEF MedProgramme Child Project 2.1. During this phase, Climagine was applied to inform the development of Coastal Plans through a bottom-up, participatory foresight approach, in diverse contexts: at the municipal level in the Bay of Kotor (Montenegro), at the regional level in the Tangier-Tetouan-Al Hoceima region (Morocco), and at both basin and national level in Lebanon.

In Lebanon, Climagine was scaled up for the first time to the national level to support the revision of the National ICZM Strategy and Law. In parallel, it was applied at a localized, “source-to-sea” scale for the Damour River Basin Integrated Management Plan (IMP), effectively linking ICZM with Integrated Water Resources Management (IWRM). These dual applications in Lebanon demonstrated that Climagine is not a rigid, scale-neutral template, but rather an adaptive framework that works best when national strategic coherence and decentralized territorial realities are allowed to inform one another.

Climagine outputs were mobilized to support the development of integrated coastal strategies and plans in several Mediterranean countries:

- Municipal level (Montenegro): Bay of Kotor, where Climagine contributed to the development of a Coastal Plan coordinated by PAP/RAC.
- Regional level (Morocco): Tangier-Tetouan-Al Hoceima region, with a similar process for the coastal plan.

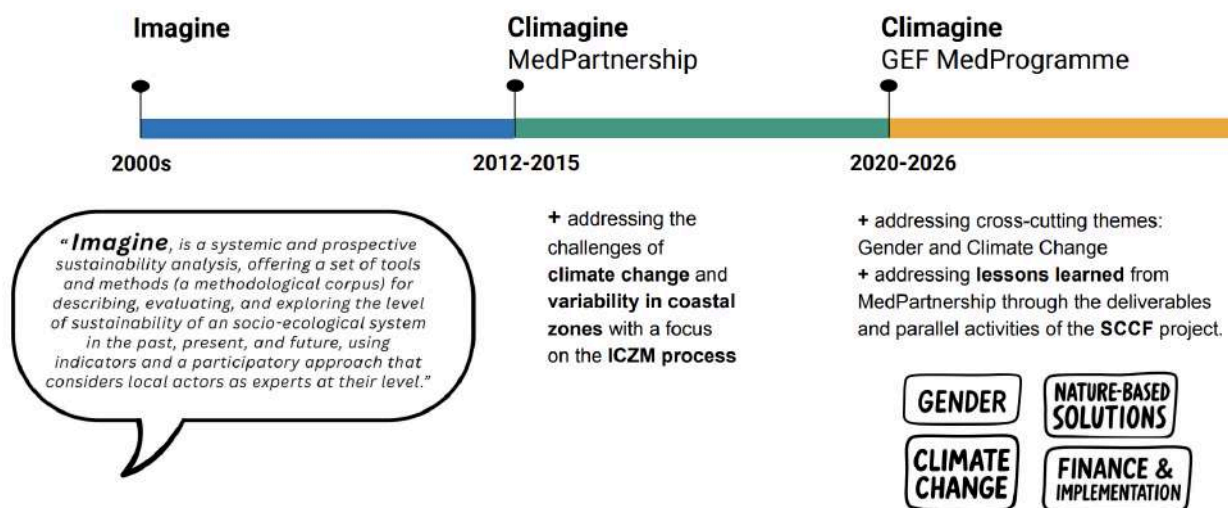
- Basin and national levels (Lebanon): Planned application for the new National ICZM Strategy and the Integrated Management Plan for the Damour area

Integration with the SCCF Project

To adapt to evolving challenges, the Climagine methodology has been methodically enriched by the GEF MedProgramme Special Climate Change Fund (SCCF) Project. This integration introduces critical cross-cutting themes into the participatory process, including:

- Gender-sensitive climate risk assessments ensuring that social equity and demographic representation are mainstreamed;
- Capacity building on Nature-based Solutions (NbS) and Ecosystem-based Adaptation (EbA);
- The mobilization of coastal adaptation finance, stimulating the engagement of private and financial sector stakeholders early in the planning process.

By integrating these dimensions, Climagine ensures that the resulting Coastal Management Plans and ICZM strategies are not only ecologically sound and socially inclusive but also financially viable and climate-resilient.



4. Basic Principles of the Climagine Methodology

The Climagine approach is based on a series of structured participatory workshops, typically organized in four stages:

- Identifying sustainability dimensions, key challenges, and priority sectors.
- Defining sustainability indicators.
- Developing a “band of equilibrium” (safe operating space) for each indicator.
- Formulating strategic recommendations for coastal plans.

These stages empower local stakeholders by treating them as “experts at their own level,” effectively combining empirical local knowledge with robust scientific analysis. However, to prevent the dilution of expertise and mitigate the influence of dominant voices, it is crucial to establish a clear operational distinction between the roles of technical experts and local stakeholders. Technical experts are responsible for providing scientific baselines, verifying data robustness, and translating qualitative community inputs into complex analytical frameworks (such as the Band of Equilibrium or DPSIR) behind the scenes. Local stakeholders, meanwhile, are tasked with establishing the territorial vision, providing qualitative assessments of challenges, and prioritizing interventions based on contextual realities and local needs.

The methodology relies on systemic and prospective analysis, often utilizing tools such as the DPSIR (Drivers, Pressures, State, Impact, Response) framework to map complex socio-ecological relationships. A core feature of the process is the use of the Amoeba (or Radar) diagram, which visually represents the current and future states of indicators against their defined Band of Equilibrium. By comparing unsustainable “Business-as-Usual” trajectories with alternative, sustainable scenarios, stakeholders can collaboratively prioritize strategic coastal adaptation measures.

A major innovation of the recent Climagine applications is the systematic integration of cross-cutting themes from day one, notably through the Special Climate Change Fund (SCCF) project. This ensures that Gender-sensitive Climate Risk Assessments, Nature-based Solutions (NbS), Ecosystem-based Adaptation (EbA), and the mobilization of coastal adaptation finance are embedded into the foresight process.

Each pilot site (Morocco and Montenegro) held four workshops, with reports and outcomes published by Plan Bleu. For Lebanon, three participatory workshops have been implemented for the national ICZM strategy and three local workshops for the Damour Integrated Management Plan, with corresponding reports and sustainability indicators to support monitoring.

5. Applying Climagine in the frame of the GEF MedProgramme

In the frame of the GEF MedProgramme CP2.1 the Climagine methodology was applied in the Tangier-Tetouan-Al Hoceima region (Morocco) and the Bay of Kotor (Montenegro) for the Coastal Plans coordinated by PAP/RAC, and in Lebanon for the new National ICZM Strategy and the Integrated Management Plan for the Damour area.

Through these implementations, Climagine directly informed the elaboration of formal, statutory planning documents such as the "Schéma régional du littoral" in Morocco and the Coastal Management Plan in Montenegro. A major innovation of this MedProgramme phase was the systematic integration of parallel activities from the Special Climate Change Fund (SCCF) project. This integration enriched the Climagine workshops with crucial cross-cutting elements, including gender-sensitive climate risk assessments, capacity-building trainings on Nature-based Solutions (NbS) and Ecosystem-based Adaptation (EbA), and dedicated sessions on mobilizing coastal adaptation finance and engaging the private sector.

Furthermore, the application in Lebanon demonstrated the methodology's flexibility and complementarity across different scales. It was tested at the national level to establish strategic policy coherence for the ICZM Strategy and Law, and concurrently at the sub-national, territorial level for the Damour River Basin. This local application effectively addressed the "source-to-sea" continuum, successfully bridging Integrated Coastal Zone Management (ICZM) with Integrated Water Resources Management (IWRM).

Key insights from the workshop series are synthesized in the following section and a SWOT analysis has been conducted for each pilot site.

6. Context-Specific SWOT Analysis and Lessons Learned

The Climagine process is not “scale-neutral”. It must be adapted to the specific geographic and institutional realities of the territory. Thus, this chapter synthesizes the experiences from the GEF MedProgramme and their lessons learned.

6.1 MUNICIPAL LEVEL: OVERCOMING INTER-MUNICIPAL FRAGMENTATION - BOKA KOTORSKA BAY, MONTENEGRO

Climagine’s implementation in Kotor Bay applied participatory foresight and stakeholder engagement approaches in an effort to inform the development of the area’s Coastal Management Plan, led by PAP/RAC. Throughout the process, Climagine allowed local and national stakeholders from the national government, municipalities, academia and civil society to directly participate in the elaboration of this legal tool, illustrating Montenegro’s will to further its ICZM and sustainability efforts in line with its national sustainability, spatial planning and climate change adaptation objectives, and in line with the aims of the Barcelona Convention. This pilot focused on a specific micro-scale coastal zone and region governed by three municipalities (Kotor, Tivat, Herceg Novi), highlighting the unique challenges of inter-municipal coordination, which differs significantly from a national-scale approach like the one applied in Lebanon.

To effectively address this inter-municipal fragmentation and bridge the implementation gap, the strategic foresight process has been paired with concrete institutional recommendations. Specifically, practitioners should advocate for the establishment of formal inter-municipal coordination mechanisms and shared monitoring arrangements that operate across municipal borders. Furthermore, it is critical to define clearer, legally binding links between the Climagine participatory outputs and the statutory planning procedures of the coastal state to ensure the final Coastal Management Plan is fully operational.

Location: Boka Kotorska Bay, Montenegro; 3 municipalities (616 km²).

Context: Highly dense, small geographic area (less than 70.000 inhabitants), governed by multiple neighboring municipalities (Kotor, Tivat, Herceg Novi). The area is heavily regulated (UNESCO heritage) and faces extreme development and tourism pressure.

Partners:

Ministry of Ecology, Sustainable Development and Northern Region Development

UNEP/MAP Regional Activity Centres – the Priority Actions Programme (PAP/RAC)

UNEP/MAP Regional Activity Centres - Plan Bleu (PB/RAC)

Output: Coastal Management Plan with integrated Climagine results

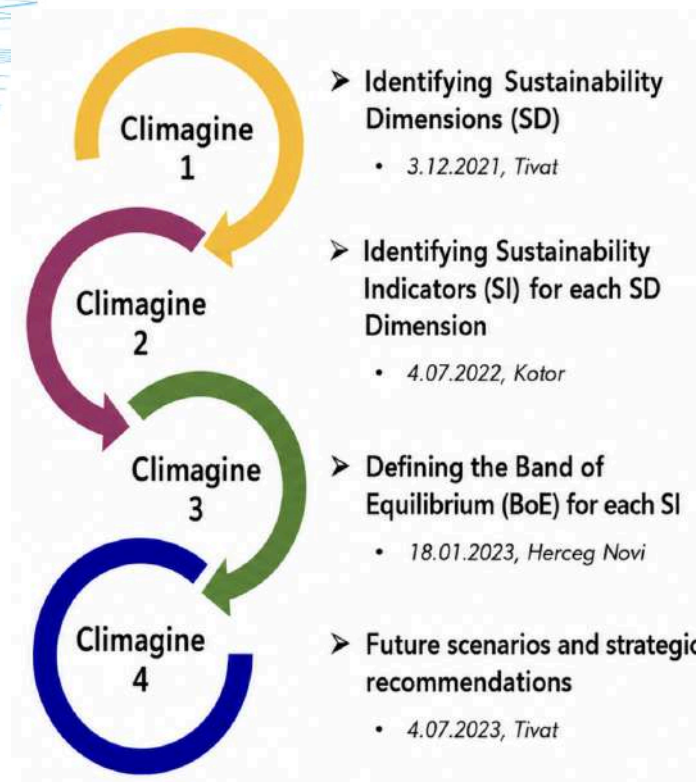


Figure 1. Overview of Climagine workshops in Boka Kotorska Bay.

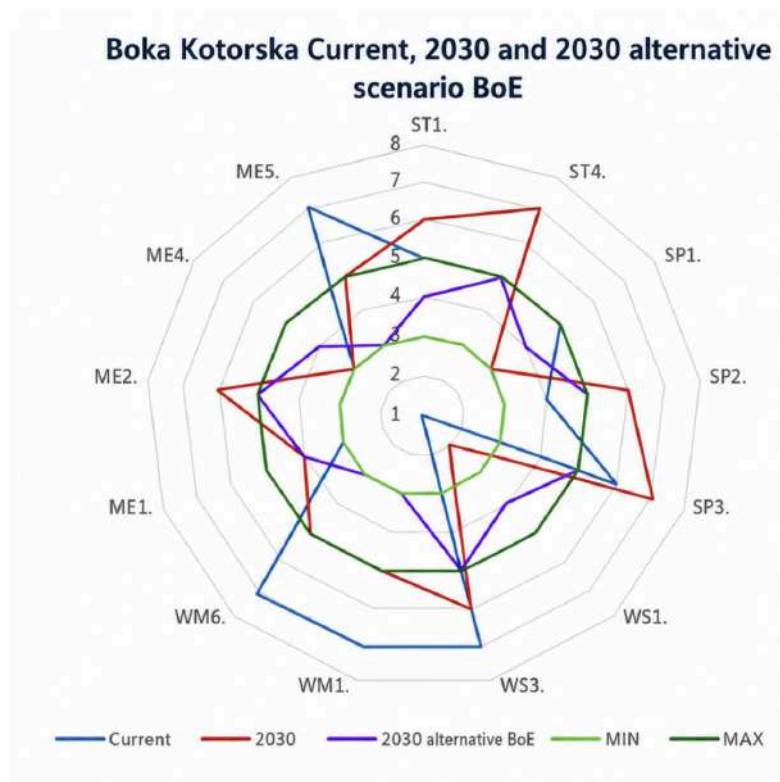


Figure 2. Compiled amoeba containing the current state (blue), 2030 Business as Usual scenario (red), 2030 alternative scenario (purple) and Band of Equilibrium (green) for Boka Kotorska Bay.

6.1.1 SWOT Analysis: Boka Kotorska Bay

Table 1. SWOT Analysis for Boka Kotorska Bay

	Strengths	Weaknesses	Opportunities	Threats
Stakeholder Engagement & Participation	- Impartiality and inclusivity (workshops in each municipality within Kotor Bay) → participation from every community with their local perspectives. - Contextualised and nuanced comprehension of the area's key challenges and potential solutions. - Civil society's inputs acknowledged and demonstrated a commitment to inclusivity and grassroots participation. - Faster consensus was achieved because participants were mostly mid-management/technical staff, fostering less formal and highly practical exchanges.	- Limited coordination between municipalities and shortcomings in consensus-building - Limited participation from the private sector and general local communities, leading to a predominantly institutional perspective.	- Integrate steps on individual approaches to each community's unique challenges. - Consensus-building at regional level among local and national government stakeholders. - Methodologies that balance diverse stakeholder interests, deepen coordination between municipalities and encourage meaningful collaboration among them. - More structured approach for civil society organisation's contribution to decision-making processes (formalising mechanisms for input (advisory boards/ regular forums).	- Civil society fatigue if contributions do not lead to visible results - Power imbalances within small communities can result in some perspectives being more prominent, while others remain underrepresented.
Methodology & Process	- Open dialogue: exchange ideas, collaboration, sense of inclusivity among stakeholders, equal opportunities to contribute to discussions - Common goals and challenges across diverse perspectives (e.g. local and national)	- Fragmented data availability and differing local capacities complicated the creation of the indicators - Some institutions were	- Increase representation of stakeholders directly involved in defined sustainability sectors throughout the entire Climagine process. - Additional training or support for local facilitators on conflict resolution and workshop	- Risk of disengagement if discussions are perceived as symbolic rather than impactful

	institutions) identified - Local facilitators, key for guidance and facilitating dialogue in Montenegrin, to link national and local perspectives, ensuring structured discussions, understanding of the expected results and the process. - Forced stakeholders to look beyond their municipal borders and treat the bay as a single shared space	hesitant to engage deeply without formal decision-making status	facilitation to navigate complex discussions. - Framework for common understanding through initial workshops/seminar on understanding the positions of national and local institutions.	
Governance & Implementation	- Acknowledgment of limitations of local municipal budgets and recognition of need for additional funding sources enables stakeholders to explore alternative funding sources	- Lack of legally binding integration into existing spatial planning laws - Need for stability in decision-making processes and importance of fostering a culture of sustained engagement	- Explore alternative funding sources (grants, partnerships, crowdfunding); streamline municipal budget allocation and transparency increase might attract external funding (enabling implementation of more robust sustainability initiatives) - The process laid the groundwork for formalizing inter-municipal co-management systems (e.g., shared water/waste infrastructure). Linking measures to EU funding gives strong political incentives - Establishment of resilient governance structures that withstand political transitions to maintain momentum in sustainability initiatives (long-term partnerships and commitments that transcend political changes) - Engage political stakeholders in sustainability discussions and decision-making processes to build consensus and support for sustainability initiatives across political transitions - Implement shared monitoring arrangements and concrete inter-municipal coordination mechanisms to forge clearer links between Climagine outputs and formal statutory planning procedures	- Political transitions and instability threaten the continuity of long-term sustainability initiatives - The implementation gap: stakeholders seek greater clarity on where executive responsibility for enforcing the plan effectively lies.

Key Lessons:

- The Challenge:** The main hurdle is not a lack of national strategy, but horizontal fragmentation. Different municipalities share the same bay but operate in silos, leading to uncoordinated infrastructure (waste, traffic, sewage). Additionally, maintaining continuity of the participatory process between Climagine workshops proves difficult as momentum tends to fade without structured communication and follow-up. Finally, achieving consensus among diverse local actors is complicated by differing municipal priorities, power dynamics, and institutional disagreements.
- The Pitfall:** If the methodology relies too much on national actors, local ownership and engagement decrease. Furthermore, dominant voices can overshadow minority perspectives within small communities. Similarly, funding activities are often launched too late, which disconnects the Climagine process from tangible investment opportunities. Also, indicator discussions become challenging when monitoring systems and datasets are uneven across the area. Without well-facilitated communication between sessions, institutional inertia and local tensions can slow or derail collaboration.
- The Solution:** Climagine must act as a unifying platform. Stakeholders recognized that managing shared resources requires formal inter-municipal cooperation (e.g., joint management of water supply and shared emergency response centers). The methodology successfully engaged stakeholders to look beyond their municipal borders and treat the bay as a single socio-ecological system. The process should be explicitly linked to a statutory planning process from the start to avoid institutional distancing and ownership issues. Additionally, to sustain engagement, organizers should maintain smoother communication and continual monitoring between sessions - using short briefing notes, pre-workshop questionnaires, online platforms, and formal post-workshop follow-up. Furthermore, financing activities and the integration of Nature-based Solutions (NbS) must start earlier and be conducted in parallel with the Climagine process. Engaging the private sector, such as real estate developers and insurance companies, from the beginning ensures that the proposed coastal adaptation measures are financially viable and directly linked to concrete investments.

Publications:

- Workshop 1 (FR/EN/AR)
- Workshop 2 (EN)
- Workshop 3 (EN)
- Workshop 4 (EN)
- Final Report (EN)
- Gender-sensitive climate risk assessment of Kotor Bay, Montenegro (EN version – FR version)
- Application of the Multiscale Coastal Risk Index-Local Scale to Kotor Bay, Montenegro (EN version)
- Baseline study to appraise coastal adaptation interventions in Mediterranean coastal hotspots – Stage I (EN version)
- Catalyzing coastal adaptation finance in Montenegro – Rapid Capacity Assessment (EN version – FR version)

6.2 REGIONAL LEVEL: MANAGING VAST TERRITORIAL DISPARITIES - TANGIER-TETOUAN-AL HOCEIMA REGION, MOROCCO

This pilot highlights the challenges of applying ICZM to a vast administrative region (17,262 km²) spanning two different maritime facades (Mediterranean and Atlantic) and including six diverse provinces with significant socio-economic disparities.

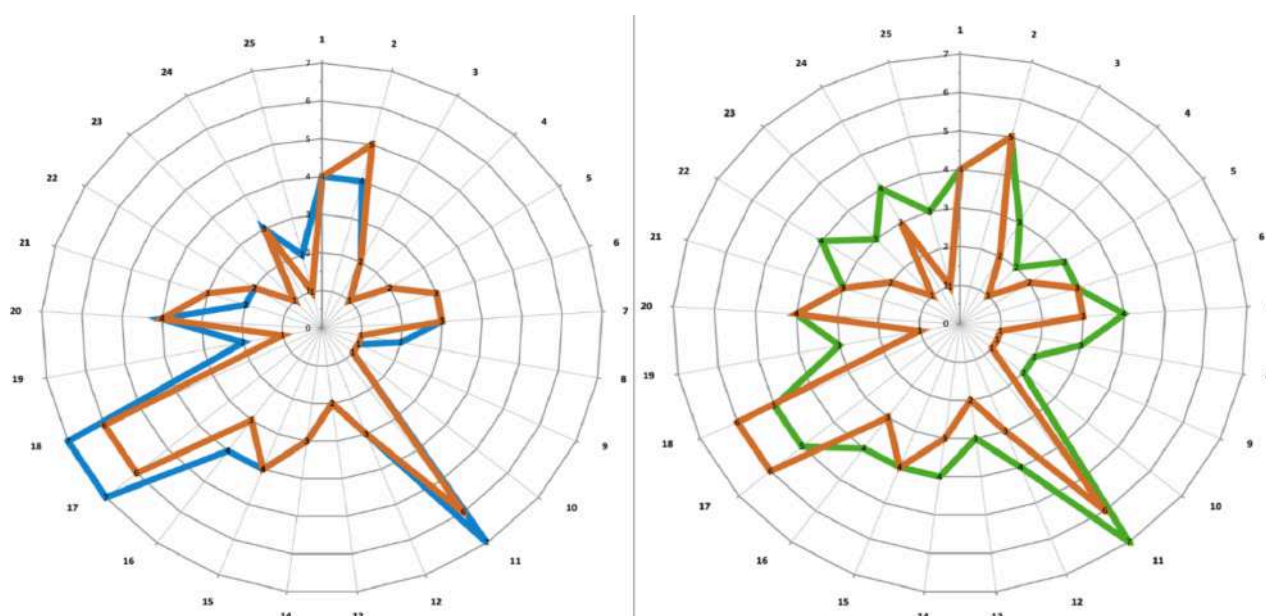


Figure 3. Amoebe diagrams presenting the sustainability indicators selected for the Coastal Plan (Schéma régional du littoral) in the region Tanger Tétouan-Al Hoceima, containing the current state 2023 (red), the business-as-usual scenario 2045 (blue), and the alternative scenario 2045 (green).

Location: Tanger-Tetouan-Al Hoceima Region, Morocco (17,262 km²)

Partners: Direction Régionale de l'Environnement TTA, PAP/RAC, and Plan Bleu

Context: A massive administrative region covering 17,262 km², with 3.5 million inhabitants. It spans two different maritime facades (Mediterranean and Atlantic) and includes 6 diverse provinces.

Output: SRL still pending

6.2.1 SWOT Analysis: Tangier-Tetouan-Al Hoceima Region, Morocco

Table 2. SWOT Analysis for Tangier-Tetouan-Al Hoceima Region

	Strengths	Weaknesses	Opportunities	Threats
Stakeholder Engagement & Participation	- Good collaboration between the DRE TTA, PAP/RAC and Plan Bleu. - Large number of diverse stakeholders. - Collaborative decision-making, intersectoral collaboration, common understanding of problems.	- Limits of participative governance, real inclusiveness and representation in decision making. - Potential underrepresentation or exclusion comprises the legitimacy and effectiveness of taken decisions. - Limited workshop time compared to the immense territorial complexity of the region	- Strengthen local capacities. Capacity building for local stakeholders to enhance active and informed participation (additional training, resources, technical support). - Additional efforts are needed to integrate marginalised and/or underrepresented communities. - Introduce more structured tracking tools, such as operational roadmaps and monitoring indicators	- Hard-to-reach stakeholder groups - Dominant actors may disproportionately influence decision-making - Institutional continuity remains a severe challenge
Methodology & Scope	- Integration of local knowledge, preferences and solutions in planning, participative discussions and a shared vision for the region's coast. - Solutions adapted to local context. - Supported dialogue, expert exchange, knowledge sharing between stakeholders. - Amoeba diagrams supported scenario clarity and helped anticipate climate risks - Systemic understanding of the land-sea continuum	- Complexity; effective integration of local knowledge into planning requires significant time and resources, close collaboration across all stakeholders at different levels. - The region covers a vast area with diverse provincial contexts (difficult to take local realities and provincial needs into account). - Severe data gaps at the sub-regional and provincial level	- More granular and adaptive approach to planning and implementing solutions - Additional regional or local sessions to better understand specific challenges of each area and develop tailored action plans.	- Risk of overlooking provincial disparities and local priorities - Uneven distribution of resources may create tensions between regions - Potential loss of stakeholder engagement if local realities are not properly reflected
Governance & Implementation	- Objectives ensured socio-economic viability. Hierarchy of priority actions for identified issues and structural frame allowed to develop recommendations and monitoring of realised progress of the SRL TTA - Climagine was essential to develop the specific sustainability indicators for the SRL TTA.	- Criticism regarding the need for better coordination between the different actors across the phases of Climagine and smoother communication between workshops. - Time constraints during the workshops. Insufficient time to evaluate exhaustively the complex challenges and potential solutions in the region and deepen discussions. - Transforming recommendations into concrete actions could be constrained by financial resources, conflict of interest, and political hurdles. - Difficulty translating high-level indicators into operational measures	- Implementation of a continuous monitoring and retrospective mechanism between the sessions, to allow for iterative adaptation to changing circumstances. - Creation of an online platform to exchange information and resources between the stakeholders. - More time per session to allow for better exploration of challenges and solutions, and more active participation.	- Risk of recommendations remaining at theoretical level if not backed by resources and political support - Inconsistent follow-up may undermine progress and stakeholder trust

Key lessons learned:

- **The Challenge:** Applying a participatory process across such a vast area risks creating generalized goals that ignore severe local disparities (e.g., pronounced wealth and resource gradients between the West and East, or urban vs. rural areas).
- **The Pitfall:** Overlooking provincial realities can lead to a loss of stakeholder engagement, as local communities might feel the regional plan does not reflect their specific daily struggles. Insufficient time during workshops to exhaustively evaluate the complex challenges of the entire region. Translating recommendations into concrete actions is often constrained by financial resources and political hurdles.
- **The Solution:** The methodology must combine strong "Top-Down" legal frameworks (like the Moroccan Coastal Law) with "Bottom-Up" local consultations. To handle the scale, it is crucial to establish overarching governance bodies to consolidate the diverse provincial inputs into a single, unified regional vision. Enhance the spatial and thematic specificity of the exercises so that scenarios correspond closer to local ecological and socio-economic

realities. Establish formal post-workshop follow-up mechanisms to ensure a dynamic transition from static foresight to active coastal governance. In territories with strong environmental and socio-economic disparities, this requires designing specific mechanisms for the aggregation, prioritization, and alignment of indicators to ensure coherence across the different provinces.

Publications:

- Workshop 1 ([FB/EN/AR](#))
- Workshop 2 ([FR](#))
- Workshop 3 ([FR](#))
- Workshop 4 ([FR](#))
- Final Report ([FR](#))
- Gender-sensitive climate risk assessment of the Tangier-Tetouan-Al Hoceima region 2022 ([EN version](#) – [FR version](#))
- Catalyzing coastal adaptation finance in Morocco – Rapid Capacity Assessment ([EN version](#))
- Nature-based solutions and ecosystem-based adaptation in the Mediterranean ([EN version](#))
- Mobilizing Finance for Coastal Adaptation in the Mediterranean. Webinar and Regional Roundtable Report. ([EN version](#))

6.3 NATIONAL LEVEL: NATIONAL ICZM STRATEGY AND LAW, LEBANON

The application of the Climagine methodology for Lebanon's National ICZM Strategy and Law marks the first time the approach was scaled up to a national level. The process was implemented in a highly challenging context characterized by ongoing political and institutional instability, a severe financial crisis, fragmented governance, and highly uneven data availability. However, this national application benefited from a strong expert baseline, a clear policy anchor tied to the revision of the legal framework, and a relatively advanced indicator architecture compared to local-level planning.

A central comparative finding from the Lebanese experience is that Climagine should not be framed as a choice between national and local applications; rather, the methodology is strongest when these scales are understood as complementary and allowed to mutually inform one another. National applications offer strategic coherence, broader policy relevance, and stronger alignment with formal frameworks, while territorial applications offer realism, ownership, grounded diagnosis, and clearer exposure of institutional fragmentation.

Location: Lebanon (National scale, extending along approximately 220 km of coastline)

Partners: Ministry of Environment (MoE), UNEP/MAP, PAP/RAC, Plan Bleu/RAC, GWP-Med, and national technical partners (Difaf, MORES, UOB)

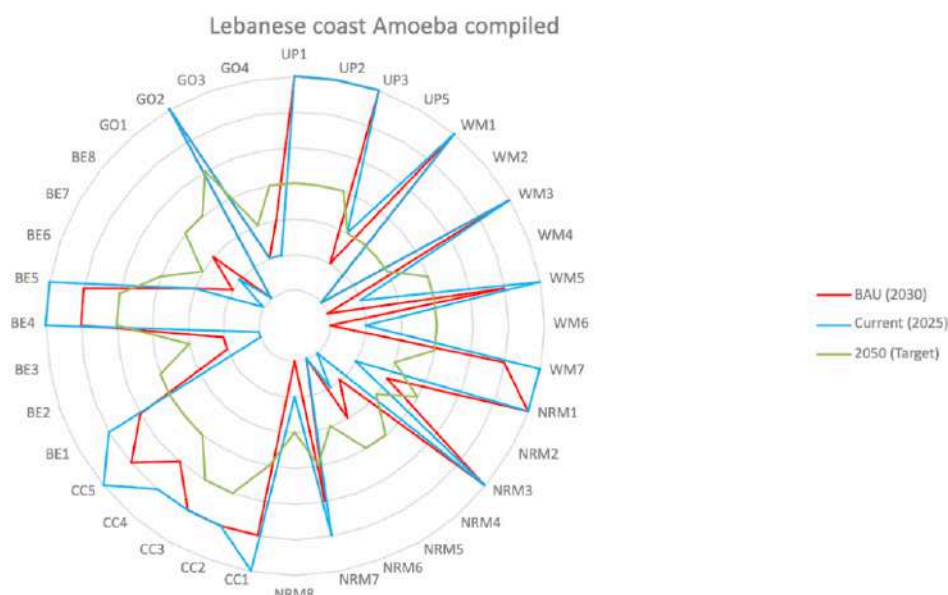
Context: A national-scale application covering the entire Lebanese coastal zone, serving a population of approximately 5 million people. The process is taking place in a highly challenging context characterized by ongoing political and institutional instability, a severe national financial crisis, and highly uneven data availability. The coastal zone itself faces intense pressures from unregulated urban sprawl, habitat loss, pollution, and a highly fragmented governance system with overlapping institutional mandates

Output: *Still pending*

The Climagine process for the National ICZM Strategy was structured around three main participatory workshops:

- Workshop 1: Focused on scoping, rapid stakeholder analysis, identifying key challenges, and prioritizing sectors using the RACER (Relevant, Accepted, Credible, Easy, Robust) criteria to evaluate candidate sustainability indicators.
- Workshop 2: Designed as an expert-driven technical exchange rather than a simple validation meeting. It aimed to deepen technical understanding, enrich the conceptual basis of the selected sustainability indicators, and identify critical data gaps.
- Workshop 3: Focused on elaborating Amoeba diagrams, defining the "Band of Equilibrium" (BoE) to establish safe operating limits, and translating broad sustainability diagnoses into decision-relevant policy pathways

Figure 4. Amoeba diagrams presenting the sustainability indicators selected for the Lebanese coast, containing the current state (blue), the business-as-usual scenario 2045 (red), and the alternative scenario 2045 (green).



Key Innovations: To overcome data scarcity and institutional fragmentation, the process heavily utilized the DPSIR (Drivers, Pressures, State, Impact, Response) framework. Experts deliberately prioritized Pressure, State, and Impact indicators over Driving Forces (which are often too broad to control locally) to ensure that the strategy remained actionable. Furthermore, a Three Tiers of Data Evaluation system was introduced to categorize indicators based on data readiness: Tier 1 (validated and available data), Tier 2 (usable estimates), and Tier 3 (absent data requiring active gathering, which inherently became a strategic response action)

6.3.1 SWOT Analysis: National ICZM Strategy and Law, Lebanon

Table 3. SWOT Analysis for the national coast of Lebanon

	Strengths	Weaknesses	Opportunities	Threats
Data & Expert Engagement	- The process benefited from a mature analytical foundation and expert involvement. - Climagine successfully structured dialogue across disciplines, moving participants from divergence to convergence.	- Expert silos (e.g., scientific vs. legal experts) and uneven data quality across the country undermine the robustness of indicators, while the lack of a standardized national data governance framework - covering data ownership, sharing protocols, and update frequency- further limits their consistency and comparability.	- Using the three-tier data evaluation system allows planners to systematically identify data gaps and formalize data gathering as a strategic intervention.	- Data scarcity and fragmentation heavily limit the degree of formalization that can be achieved. - Persistent data gaps and lack of monitoring infrastructure may prevent effective tracking of indicators over time.
Methodology & Application	- Policy Anchor: The process was directly linked to the revision of the National ICZM Strategy and Law, providing high strategic coherence and legitimacy. - The use of the DPSIR framework enhanced causal understanding, linking environmental pressures to policy responses.	- Analytical tools like the Amoeba diagram and Band of Equilibrium (BoE) can become too complex and abstract for non-experts without careful translation. Furthermore, justifying these indicator thresholds frequently relies on expert judgment due to data scarcity, introducing uncertainty that risks distancing the strategic vision from practical implementation realities.	- Using the DPSIR framework to translate problems directly into solutions helps ground indicator prioritization and makes interventions highly actionable.	- The complexity of indicator logic can exceed the actual governance capacity of a system constrained by a weak legal framework.

Governance & Context	- The methodology created a shared language among heterogeneous actors (public institutions, private actors, NGOs).	- The mixed audience required intense facilitation to bridge gaps between technical experts and general policymakers.	- Opportunities to establish formal inter-ministerial coordination platforms and unified digital data platforms for coastal governance.	- Ongoing political and financial crises constrain institutional capacity, funding availability, and continuity of implementation. Fragmented governance and overlapping institutional mandates may hinder coordinated execution of ICZM actions.
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Key lessons learned:

- **The Challenge:** Scaling up the methodology to a national level in a highly challenging context characterized by fragmented governance, severe data scarcity, and a strong "silo phenomenon" between experts (e.g., scientific experts using complex jargon vs. legal experts needing generic indicators)
- **The Pitfall:** The complexity of the indicator logic can easily exceed the actual governance capacity of a system constrained by a weak legal framework. Furthermore, national-level indicators and tools (like Amoeba diagrams) risk becoming too abstract for varied audiences and disconnected from implementation realities if not carefully translated
- **The Solution:** In data-poor contexts, implement a "Three Tiers of Data Evaluation" system to actively identify data gaps and formalize data gathering as a strategic intervention, rather than treating missing data as a roadblock. Limit priority indicators to no more than five per thematic area to preserve usability, and use the DPSIR framework to translate qualitative problems into actionable solutions. Finally, embrace scale complementarity: national work provides strategic coherence, while local work (like Damour) provides territorial realism.

Publications:

- Climagine Sustainability Indicators - Inception Report ([EN](#))
- Workshop 1 ICZM Law & Strategy ([EN](#))
- Workshop 2 ICZM Law & Strategy ([EN](#))
- Workshop 3 ICZM Law & Strategy ([EN](#))
- Final Report - Applying Climagine at the National Level ([EN](#))

6.4 BASIN LEVEL: INTEGRATING ICZM AND IWRM - IMP DAMOUR, LEBANON

In parallel with the national strategy, Climagine was applied at a sub-national, territorial scale to develop the Integrated Management Plan (IMP) for the Damour area. This pilot adopted a "Source-to-Sea" approach, effectively integrating Integrated Coastal Zone Management (ICZM) with Integrated Water Resources Management (IWRM). The planning area was defined by natural hydrological boundaries (the river basin, its underlying coastal aquifers, and the adjacent coastal zones) rather than administrative borders. This sub-regional application demonstrated that a basin cannot be treated as a completely homogeneous unit; it benefited significantly from further internal spatial stratification. Distinct portions of the territory—the Upper, Middle, and Lower valley geo-zones—face distinct ecological conditions, unequal infrastructure coverage, and different types of pressures, which fundamentally shape which indicators are meaningful and which forms of response appear realistic. The territorial grounding of the methodology fostered remarkable local ownership, allowing stakeholders to openly address and resolve sensitive local resource disputes (such as upstream versus downstream water rights), even while relying heavily on proxy indicators and qualitative assessments due to severe data scarcity. This territorial context was also characterized by severe data scarcity, fragmented local governance, overlapping mandates, and intense competition over water resources, compounded by Lebanon's ongoing financial crisis.

The Damour IMP process was highly dependent on preparatory groundwork. It was preceded by a Rapid Stakeholder Assessment (RSA), which was critical for mapping actors, differentiating sub-regional challenges across the Upper, Middle, and Lower basin, and grounding the foresight exercise in actual social and governance realities before the workshops even began. During the workshops, the area was conceptually divided into distinct "geo-zones" (Upper, Middle, and Lower valley) to isolate specific issues (e.g., agriculture, nature conservation, tourism) and identify the key actors responsible for each segment.

Location: Damour area, Lebanon (approximately 333 km²)

Partners: Ministry of Environment (MoE), UNEP/MAP, PAP/RAC, Plan Bleu/RAC, GWP-Med, UNESCO IHP, and national technical partners (Difaf, MORES, UOB)

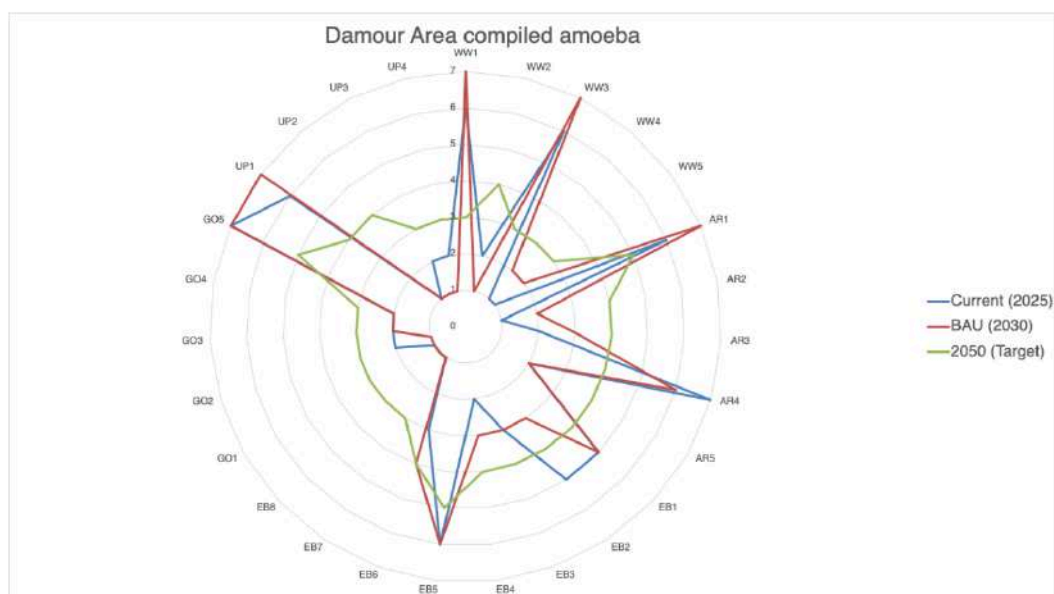
Context: A sub-national, territorial "source-to-sea" basin spanning roughly 333 km² from the high elevations of the Shouf and Barouk Mountains down to a 5-km wide coastal estuary. It encompasses over 30 municipalities with an estimated population of 200,000 to 400,000 inhabitants. The context is characterized by acute data scarcity, fragmented local governance, intense competition over water resources, and severe environmental pressures such as groundwater over-extraction and subsequent seawater intrusion into coastal aquifers.

Output: IMP still pending

To accommodate the complex regional context, the Climagine process for the Damour IMP was structured around three highly contextualized workshops:

- **Workshop 1: Sharing 2050 Visions, Key Challenges, and Priority Sectors:** This initial session focused on building a shared vision for the basin from source to sea. Participants were divided into four thematic groups (Water Supply/Wastewater, Agriculture, Environment/Biodiversity, and Urban Planning/Governance) to assess the current baseline and identify systemic challenges. The workshop conceptually divided the basin into distinct "geo-zones" (Upper, Middle, and Lower valley) to isolate specific issues and highlight how problems generated at one scale (e.g., upstream agricultural runoff) directly impact others (e.g., coastal water quality).
- **Workshop 2: Defining Sustainability Indicators and the Band of Equilibrium:** The second workshop moved from problem identification to solutions, focusing on reviewing and ranking preliminary indicators using the RACER criteria tailored to Damour's data-scarce context. A major highlight of this session was its use as a neutral platform to discuss sensitive, real-world governance conflicts—such as the uncoordinated construction of the Silfaya check-dam, which caused downstream drying and ecological harm. These grounded discussions were used to illustrate the urgent need for a formalized "River Basin Charter" and the strict enforcement of environmental flow standards.
- **Workshop 3: Elaborating Amoeba Diagrams and Defining Priority Measures:** The final expert convergence step translated the refined indicators into practical decision-making tools. Participants established the exact "Band of Equilibrium" (BoE) by defining minimum acceptable levels (critical red lines) and desired targets for 2030–2050. Amoeba diagrams were then generated to visualize the system's performance. This exercise uniquely revealed that Damour suffers from a dual dynamic of unsustainability: structural deficits (e.g., absent wastewater treatment and missing monitoring data) occurring simultaneously with resource excesses (e.g., severe groundwater over-extraction causing seawater intrusion).

Figure 5. Amoeba diagrams presenting the sustainability indicators selected for the IMP Damour, containing the current state (blue), the business-as-usual scenario 2045 (red), and the alternative scenario 2045 (green).



Key Innovations: A major success of the Damour application was the emphasis on natural boundaries and the "water box" concept. By visualizing the river basin and aquifers as a concrete physical system with distinct inputs and outputs, stakeholders could easily relate to the water balance, conceptualize environmental flow requirements, and understand rights versus needs. The process heavily utilized indicator tiering and proxy data to overcome the severe lack of quantitative baseline data. Ultimately, the territorial grounding of the methodology fostered remarkable local ownership, with stakeholders organically beginning to behave like a de facto river-basin agency to openly resolve long-standing upstream-downstream resource disputes.

6.4.1 SWOT Analysis: National ICZM Strategy and Law, Lebanon

Table 4. SWOT analysis for the Damour area

	Strengths	Weaknesses	Opportunities	Threats
Stakeholder Engagement & Grounding	- High Territorial Realism: Working within natural hydrological boundaries (source-to-sea) resonated strongly with local communities, generating greater engagement and ownership than national-scale approaches. - The preliminary Rapid Stakeholder Assessment successfully structured representation and clarified decentralized governance tensions.	- The highly heterogeneous mix of local stakeholders required intense facilitation, contextual translation, and simplified guidance to manage group dynamics.	- Conflict Resolution: The participatory format provides a unique platform to openly address and resolve sensitive local resource disputes (e.g., upstream vs. downstream water rights).	- Stakeholder fatigue and apathy could set in if participatory contributions do not translate into visible, funded results.
Methodology & Planning	- System Visualization: Using the "water box" and geo-zone concepts made complex hydrogeological dynamics understandable, making trade-offs visible.	- The process relied heavily on proxy indicators and qualitative judgments due to a severe lack of baseline data, especially regarding inland/upstream river flows and aquifers.	- Expanding the scope to include aquifers allows for a truly holistic understanding of the water balance, linking surface water to groundwater recharge.	- Risk of overlooking highly localized disparities if the sub-regional basin is treated as a completely homogeneous unit.
Governance & Implementation	- Bottom-Up Alignment: Stakeholders organically began behaving like a de facto river-basin agency, demonstrating the potential for decentralized governance.	- Weak Legal Foundation: The complexity of the required ecosystem management exceeds the current capacity of a system where laws (like the new water code) lack enforced governing structures.	- Local Community Committees: Creating formal local committees with diverse expertise can significantly enhance accountability, oversight, and long-term stewardship.	- Uncoordinated interventions (e.g., individual municipalities executing isolated check-dams) and external demands (e.g., pumping Damour water to Beirut) severely disrupt downstream ecology

Key Lessons Learned from IMP Damour:

- **The Challenge:** Implementing an integrated plan across natural hydrological boundaries (source-to-sea) rather than administrative ones. The process faced acute data scarcity regarding inland/upstream river flows and coastal aquifers, fragmented local governance, and sensitive local resource conflicts (e.g., upstream vs. downstream water rights).
- **The Pitfall:** The "Missing Bridge" or "exercise without integration" risk. Participatory workshops can produce useful foresight and shared visions, but these outputs do not automatically become binding planning tools. There is a high risk of stakeholder fatigue and apathy if participation does not translate into visible, funded governance reform.
- **The Solution:** Preparation is methodology—conducting a Rapid Stakeholder Assessment (RSA) is critical before workshops begin to map power dynamics, sub-regional challenges, and governance tensions. During workshops, use simple system visualization (like the "water box" and geo-zones) to make complex hydrogeological trade-offs visible. Most importantly, design explicit pathways for integration into statutory planning from the outset, such as drafting a formal "River Basin Charter" to translate foresight into actual decentralized governance.

Publications:

- Rapid Stakeholder Assessment of the Damour Area ([EN](#))
- Workshop 1 IMP Damour ([EN](#))
- Workshop 2 IMP Damour ([EN](#))
- Workshop 3 IMP Damour ([EN](#))

6.5 COMPILED SWOT ANALYSIS FOR THE MEDPROGRAMME

Summarizing the lessons learned from MedProgramme

Across the **four pilot sites** in Montenegro, Morocco, and Lebanon, several overarching themes emerged regarding the application of the Climagine methodology in the MedProgramme. Based on continuous feedback and surveys of practitioners and stakeholders, the following summary highlights the collective realities of implementing participatory coastal foresight:

Preparation is paramount: Pre-workshop engagement and baseline assessments (like the RSA) are essential to understand priorities, constraints, and data gaps before gathering stakeholders

Adaptability in **Data-Scarce Contexts:** Climagine is not scale-neutral. Indicators must be contextualized iteratively. When data is absent, the methodology must explicitly rely on indicator tiering and the DPSIR framework to translate qualitative problems into measurable proxy states

Bridge the Implementation Gap: The most significant challenge is ensuring that workshop outputs do not remain static. Future applications must design **formal follow-up mechanisms**, secure financing early, and explicitly align the process with statutory planning milestones to transform foresight into legally binding coastal governance.

Table 5. Compiled SWOT analysis for the Climagine implementation in the frame of the GEF MedProgramme

	Strengths	Weaknesses	Opportunities	Threats
Methodology & Process	Highly inclusive, participatory approach that builds trust and a shared vision among diverse actors. The step-by-step framework effectively structures strategic priorities and moves participants from divergence to convergence.	Complexity of facilitation requirements. Maintaining the continuity of the Climagine process between workshops is difficult, often leading to a loss of momentum.	Providing detailed step-by-step explanations, checklists, and practical templates within the Practitioner's Guide can standardize and simplify future applications.	Translating the shared vision into legal regulatory action and operational policy remains a major hurdle (the "implementation gap").
Data & Resources	Amoeba diagrams and the Band of Equilibrium (BoE) successfully translate complex data into visual, action-oriented scenarios.	Chronic data availability issues and scarcity across all pilot sites. Severe budget and resource constraints for proper implementation.	Developing specific pathways for data-scarce contexts, including the use of tiered indicators and proxy data, can make the methodology more adaptable.	Without formal post-workshop follow-up mechanisms and dedicated funding, the strategic recommendations risk remaining purely theoretical.
Stakeholder Dynamics	Gives voice to local knowledge, treating every participant as an "expert at their level".	Difficulty in ensuring a balanced representation of different stakeholder groups, particularly marginalizing civil society or the private sector in favor of institutional actors.	Mandating a Rapid Stakeholder Assessment (RSA) prior to workshops ensures power dynamics and marginalized groups are identified early.	Dominant institutional voices can overshadow community perspectives, and political instability can erode long-term commitment.

7. Integrating Lessons Learned: A Step-by-Step Guide for Future Climagine Implementation

In the following chapter the Climagine methodology is explained step-by-step. Please note that this is done based on the experience from the GEF MedPartnership and the GEF MedProgramme which was implemented in the frame of the ICZM and Coastal Plan development. However, the methodology can be used in diverse contexts, which is specified in Chapter 8.

Figure 6. The Climagine workshop cycle



Designed by Plan Bleu, using NotebookLM, 2026.

Also the provided structure is a proposition for the Climagine process. A vital part of the transfer and adoption of the methodology is to adapt certain parts to the local context of application, ensuring that the methodology is not treated as a rigid, scale-neutral template, but rather a flexible framework that responds to local realities, available data, and governance capacities.

To support the adaptation of the Climagine methodology across these diverse settings, it is highly useful for practitioners to distinguish between key types of implementation contexts before beginning the workshops:

1. Data-rich vs. Data-poor contexts
 - a. Data-rich: Allows for quantitative indicators, advanced modeling, and the full use of complex analytical tools such as Amoeba diagrams and Cost-Benefit Analysis (CBA).
 - b. Data-poor: Requires simplified indicators, proxy data, qualitative stakeholder assessments (such as multiple-choice scoring), and a stronger reliance on expert judgment to estimate thresholds.
2. Centralized vs. Decentralized governance systems
 - a. Centralized systems: National authorities play a dominant role. In these contexts, early institutional alignment with ministries is critical to ensure the outputs are integrated into statutory policies.
 - b. Decentralized systems: Municipalities and local actors have greater autonomy. Here, grassroots stakeholder engagement, inter-municipal coordination, and building local ownership become the most important factors for success.
3. Small/Homogeneous vs. Large/Heterogeneous territories
 - a. Small/Homogeneous: Allows for generalized plenary sessions and a single, unified set of indicators for the entire planning area.

- b. Large/Heterogeneous: In vast regions with strong disparities between coastal segments, provinces, and socio-economic conditions (such as regional coastal schemes), practitioners must avoid diluting local specificities into generalized regional visions. This requires applying sub-regional clustering, differentiated thematic sessions, or phased territorial approaches to ensure local realities are accurately captured and effectively integrated into the broader strategic framework.

Adapting the Climagine process based on these specific contextual factors from Phase 0 ensures that the methodology remains realistic, efficient, and scalable.

7.1 PRELIMINARY STEP: PREPARE & ALIGN

One of the most important feedback retrieved from the Technical Workshop on the Climagine Guide held on 18-19 February is a more extensive preparation phase. In this first phase, it is important to assess the drivers. It was mentioned that Plan Bleu should develop a Climagine set or **library of generic indicators**¹ (covering approximately 75% of standard needs) to prevent starting from scratch every time. This should help to facilitate the process of selecting appropriate indicators and align with national, regional or international standards (e.g., MSSD, SDGs). This shows a potential next step for the replication of this methodology for Plan Bleu, to develop this database within a follow-up project.

[A Rapid Stakeholder Assessment \(RSA\)](#) was identified as a valuable tool, with emphasis on incorporating a comprehensive power analysis to assess disparities in influence and decision-making. Particular attention should be given to inclusive engagement, ensuring the meaningful integration of women and representation across all demographic groups, from youth to the elderly. Similarly, **gender-sensitive climate risk assessments** should be conducted before the first Climagine workshop. These assessments support the mainstreaming of gender aspects into the process from the start. Increasing the awareness of differences in vulnerability and adaptive capacities between women and men, facilitates the evidence-based development of tailored adaptation measures and strategies at a later stage of the Climagine process.

Another important factor to keep in mind in this phase are the **facilitator** selection criteria. To effectively manage unequal power dynamics and ensure all voices are heard, practitioner teams should focus on the following components on facilitation. Lead facilitators should be objective, external experts trained in the Climagine process, possessing strong empathy and no vested interests in the territory's planning outcomes. Additionally, a neutral external facilitator (who manages the process and group dynamics) could be paired with local experts (who strictly provide technical clarifications and contextual knowledge) for facilitation.

To allow for a good fit and uptake of the Climagine outputs, it was recommended to conduct a **legal and institutional framework analysis** in advance to the Climagine process. Specifically, practitioners must map out local legal mandates before prioritizing indicators and actions. This ensures that all proposed interventions fall strictly within the jurisdiction of the competent authorities responsible for the implementation. If this demographic balance is not secured and the legal framework is not well understood from the beginning of the process, there is a high risk that the workshops could be on the wrong track and institutional dominance could skew final results. Besides the legal framework, financial capacities are key for the implementation of proposed actions at the end of the Climagine process. In order to be able to address this component effectively, **rapid financial capacity assessments**, as they have been conducted in 2024 for [Montenegro](#) and in 2025 for [Morocco](#), should be developed in advance to have a good understanding of the financial landscape.

To further facilitate the Climagine process a **3-Tier data classification** should be undertaken, pre-classifying available data into: 1. reliable data, 2. usable estimates, and 3. absent data.

Furthermore, a survey could be conducted in advance to the first workshop to already have a better understanding of the participants' needs and the local context.

Preliminary step - checklist:

- ☐ Rapid stakeholder assessment, including analysis of power dynamics
- ☐ Ensure demographic balance (gender and age groups) for all invitations
- ☐ Gender-sensitive climate risk assessment
- ☐ Mapping of legal and institutional frameworks, including local legal mandates
- ☐ Survey prior to the workshop (e.g., using pre-workshop questionnaires to map local needs and allow participants to come prepared with relevant data)
- ☐ 3-Tier data classification to identify data gaps early (Tier 1: reliable, Tier 2: estimates, Tier 3: absent)

¹ This library of generic indicators is not yet developed, but could be the object of future activities and projects from Plan Bleu, where this Climagine Library of Generic Indicators could be developed.

■ Map existing funding mechanisms, through rapid financial capacity assessment and engage the private sector (e.g., real estate developers, insurance companies) and financial institutions early to align actions with concrete investment portfolios

■ Create a "common library" of generic indicators (aiming for 75% coverage) aligned with international standards like IMAP and the Mediterranean Strategy for Sustainable Development (MSSD) to prevent starting from scratch

List of common pitfalls:

- Failing to verify data availability before starting, leading to reliance on fragmented or non-existent data for the indicators
- Allowing dominant institutional actors to overshadow minority or local community perspectives, especially if demographic representation is not secured
- Proceeding without identifying existing legal boundaries and overlapping institutional mandates, leading to future implementation roadblocks

7.2 STEP 1: REFLECT AND UNDERSTAND

WORKSHOP 1: Understanding the context - gaining insights into locally defined concerns.

"The Coastal Management Plan is an integrative and strategic document complementary to other plans, that comprises a sustainability vision and climate change adaptation actions."

– Ivan Sekovski (PAP/RAC)

For the first workshop it is important to explain the setting and set the frame. It is recommended to start by a coastal management plan scoping session, where expectations are managed, and explained what a Coastal Plan is and what it is not. In the next step, the Climagine methodology and its objectives can be introduced. It is important to point out that local knowledge and experience are unique and a significant factor in developing a sense of ownership and collective purpose throughout the process. After having a common understanding of the regulatory framework (e.g. Coastal Management Plan) and the participatory methodology Climagine, the first Climagine workshop can be initiated. At the beginning of the first workshop, the project team should present scientific baseline diagnostics. This allows stakeholders to debate problems based on recent scientific evaluations. To ensure a targeted consultation methodology, it is highly recommended

that this diagnostic work be carried out in small working groups, organized by homogeneous spaces or ecosystems sharing the same challenges, rather than in overly large plenary sessions. To ensure a targeted consultation methodology, it is highly recommended that this diagnostic work be carried out in small working groups, organized by homogeneous spaces or ecosystems sharing the same challenges, rather than in overly large plenary sessions. The following structure, illustrated in Table 6, is proposed for the first group activity in the frame of Climagine workshop series.

Table 6. Proposed Structure for the Group Activity in Workshop 1

Time	Actions
1:00 h	Plenary: Presentation of Scientific Diagnostics , including the gender-sensitive climate risk assessment. This must be done before the brainstorming sessions to ground the debate in robust evidence and avoid intensifying discussions on environmental challenges without a factual baseline. Information should be translated into non-technical language using visual aids to accommodate diverse audiences.
2:00 h	Group: Create the Vision & Identify Challenges ● Define the sustainability visions for the area (e.g., through the collaborative creation of "Rich Pictures" or emotional storytelling to break the ice, sweep in all concerns, conflicts, and ideas). ● Identify the key challenges and issues relevant to coastal development and climate change adaptation while explicitly defining the system boundaries (e.g., administrative borders vs. natural source-to-sea basin limits) to ensure consistent discussions.
0:30 h	Plenary: Present Visions, Challenges. The facilitator's role here is crucial: they must weave these individual narratives into a single, cohesive group vision (e.g., <i>"Boka Kotorska as an example of culture and nature living in harmony"</i>).
2:00 h	Group: Sustainability Dimensions, Actions & Data Check ● Prioritise and classify the raw key challenges and issues identified under broader general themes (biodiversity, transportation, i.e., Sustainability Dimensions). ● Discuss the key challenges and select main actions to address them.

	• Systematic NbS & Gender Integration: Ensure Nature-based Solutions (NbS) criteria and gender considerations are systematically filtered into the actions from Day 1. Do not treat them as standalone topics; instead, force the linkage (e.g., <i>Challenge -> Proposed Action -> NbS Criterion -> Gender Impact</i>). • Note the availability of data for selected actions/solutions using a 3-Tier classification system (Tier 1: reliable, Tier 2: estimates, Tier 3: absent) to explicitly target data gaps early.
0:45 h	Plenary: Synthesis Present sustainability dimensions and main actions to address challenges. Sum up the overarching sustainability dimensions.

What we would propose: Organise a training on Nature-based Solutions (NbS) and Ecosystem-based Adaptation (EbA) back-to-back to the first Climagine approach. In this way you can make sure that concepts of ecosystem-based adaptation are understood and potential NbS indicators could be integrated from the beginning. Two regional trainings on NbS and EbA have been conducted in Montenegro and Morocco. You can find more information on these trainings in Plan Bleu's report [here](#).

STEP I - checklist:

- ☐ Set the stage using tailored communication strategies for different stakeholders (from experts to farmers and local municipalities)
- ☐ Establish and understand the local and regional context by acknowledging existing overlapping mandates and fragmented governance
- ☐ Present scientific diagnostics to inform the participants before any group work begins to prevent discussions from drifting into purely theoretical or uninformed complaints
- ☐ Map stakeholders' vision of the area using creative and inclusive tools like "Rich Pictures"
- ☐ Agree on the key issues and priorities
- ☐ Identify sustainability dimensions and begin framing them within the DPSIR methodology
- ☐ Select actions to address key challenges while explicitly integrating NbS and climate risk criteria into the proposed solutions
- ☐ Begin forming a local group of experts to later help translate these ambitions into measurable indicators
- ☐ Map missing stakeholders (e.g., private sector, heritage protection, finance/investment sector) and define strategies to engage them in Workshop 2 (e.g., [Workshop report 1 for Damour](#))
- ☐ Provide gender and demographic statistics (participants, speakers) to ensure continuous representativeness and inclusive decision-making

Box 1. Example of results from one group (Montenegro) for Workshop 1

GROUP 1

Sustainability Vision: "Boka Kotorska as an example of culture and nature living in harmony."

Key challenges

- **Construction:** devastation of space due to inadequate construction practices
- **Depopulation** in villages and rural areas
- **Education:** promoting environmental education of the general public and at all levels
- **Extreme weather events**
- **Tourism:** putting constraints on cruising tourism
- **Transport:** developing more sustainable transport infrastructure
- **Waste:** Inadequate waste management

Priority actions

- **Education:** implementation of adequate education in schools and raising awareness
- **Emergencies:** establishing a Regional Centre for Emergencies (weather, extreme events, maritime incidents)
- **Enforcing regulations:** undertaking stronger inspection controls (spatial planning/urbanisation, grey economy, tourism...)
- **Infrastructure:** modernisation and expansion of communal infrastructure and infrastructure in the coastal hinterland, providing support for the adaptation of existing development projects (buildings, homes, etc.)
- **Supporting local food systems:** valorisation and promotion of agricultural products
- **Sustainable growth:** balancing nature conservation and economic development
- **Tourism:** extension of the touristic season, harmonising touristic offer with accommodation capacities, balancing the cruising industry (constraints on the number and size of vessels)
- **Transport:** efficient use of Tivat airport (low-cost companies as a means to decrease the impact of single point tourism, e.g. from cruising), regulating internal maritime traffic, implementing public maritime transport and other sustainable means of transport such as cable cars, rental bicycles and scooters and building road bypasses

Sustainability Dimensions: governance, education, protection of nature, sustainable tourism, transportation

PROJECT TEAM

(to do before the next workshop:)

- ☐ Experts rework overarching dimensions and send results to participants for validation/ or let them validate this during the second workshop.
- ☐ Translate these aspects of sustainability into a list of quantitative and qualitative indicators
- ☐ Linking sustainability dimension to priority sectors of the Coastal Plan
- ☐ Provide tailored communication materials and present the scientific diagnostic baseline to stakeholders to avoid intensifying discussions on environmental challenges without robust evidence.
- ☐ Ensure Nature-based Solutions (NbS) and gender criteria are systematically filtered into the priority sectors from day one, rather than treating them as standalone focuses
- ☐ Begin framing issues using the DPSIR (Drivers, Pressures, State, Impact, Response) framework, embedding Climagine indicators within a systemic methodology

List of common pitfalls:

- Non-representative stakeholder group
- Failing to explicitly define geographical and governance boundaries (e.g., river basin "source-to-sea" vs. administrative borders), leading to fragmented and inconsistent discussions.
- Overcomplicating methodological details for local communities; using overly technical language instead of simplified tools.

Ignoring the need for visual aids, like pictures or "emotional storytelling," to help people concretely understand how indicators apply to their environment.

7.3 STEP 2: CONNECT AND INVESTIGATE

WORKSHOP 2: Agreeing on Sustainability Indicators (SIs) to assess their meanings, and agreeing with stakeholders on their acceptable, sustainable values.

As the last workshop, Climagine 1, ended with identifying overarching sustainability dimensions. These sustainability dimensions are presented at the beginning of Climagine 2 for a final validation by the Climagine attendees. The idea is to link the priority sectors for the plan with the sustainability dimensions identified in Climagine 1.

The main goal of Climagine 2 is to identify Sustainability Indicators (SIs) and its sustainability ranges for each Sustainability Dimension and priority sectors of the Coastal Management Plan. For the evaluation of these indicators the SMART (Specific, Measurable, Achievable, Relevant and Time-bound) or the RACER (Relevant, Accepted, Credible, Easy to monitor, Robust) criteria are used. In data-scarce environments, the RACER criteria have proven especially practical. Experts should also evaluate data using the FAIR (Findability, Accessibility, Interoperability, and Reuse) principles. It was advised instead of asking the participants to come up with complex indicators from scratch, to introduce the “Climagine Indicator Library”² which covers approximately 75% of standard needs and aligns with broader Mediterranean frameworks like IMAP and the MSSD. For this current Guide, we advise practitioners to refer to the [IMAP](#) and [MSSD](#) indicators, as well as the indicators available in the [Plan Bleu Observatory](#) as an immediate starting point. The complete development of this Climagine Indicator Library will be proposed as a specific activity in a follow-up project. While the use of a pre-defined “Climagine Indicator Library” improves efficiency, there is a risk that the process becomes overly expert-driven, potentially reducing stakeholder ownership. To mitigate this, a two-step co-creation approach is recommended:

- Step 1 (Stakeholder Shortlisting): Stakeholders identify priority themes and shortlist preferred indicators (or indicator types) based on relevance to their local context.
- Step 2 (Expert Refinement): Technical experts refine the shortlisted indicators by aligning them with scientific standards, ensuring measurability, and validating data availability. Because indicator selection is the backbone of the process, practitioners should use a successive filter grid (combining the RACER criteria with a 3-Tier data classification) as a clear checklist to narrow down the library to the most viable metrics.

This approach ensures that indicators remain both locally meaningful and technically robust, strengthening ownership while maintaining methodological rigor. Furthermore, when utilizing the DPSIR framework to structure these indicators, the tool must transcend theoretical analysis and guide concrete policy choices. Practitioners must explicitly link identified ‘Pressures’ (e.g., coastal pollution or overexploitation of resources) to specific, actionable regulatory or investment ‘Responses’. Finally, before validating the selected indicators, experts could apply three final filters to ensure they are actionable and comprehensive: a legal filter (Does the indicator fall under a local mandate for intervention?), a climate filter (Does the indicator reflect the impact of climate change?), and a gender filter (Does the indicator measure the impact on gender equity?).



Building on this systemic approach, practitioners could explore the concept of an “indicator nexus”, particularly for complex interventions in coastal socio-ecological systems. Many key interventions—such as Nature-based Solutions (NbS)—simultaneously impact multiple dimensions, including biodiversity, water quality, climate resilience, and socio-economic benefits. However, these interconnections are often missed when indicators are evaluated independently. For example, an NbS intervention like wetland restoration or seagrass recovery should be assessed through a cluster of interconnected indicators reflecting ecological, social, and economic outcomes simultaneously. This nexus-based approach enhances both analytical depth and operational relevance.

Table 7. Proposed Structure for the Group Activity in Workshop 2

Time	Activity
0:20 h	Plenary: Recap & Linkage Present the overarching Sustainability Dimensions validated in Workshop 1 and explain how they link to the priority sectors of the Coastal Management Plan.
2:00 h	Group: Indicator Co-Creation & Filtering

² Please note, that this is a recommendation from the Technical Workshop conducted in February 2026. The Climagine Indicator Library does not exist as such today, but could be developed in the frame of future application of the methodology.

	• Select Indicators: Using the predefined "Climagine Indicator Library,"³ groups select 3 key indicators per sustainability dimension/sector. • Filter: Apply the RACER criteria and 3-Tier Data Classification to evaluate the feasibility of the chosen indicators (by experts). • Define Thresholds: Begin discussing preliminary acceptable values (thresholds of sustainability) for these indicators.
0:40 h	Plenary: Presentation & Debate Each group presents their 3 key indicators per sector. Facilitators cross-check for synergies and overlapping metrics between groups

STEP II - checklist:

- ☐ **Sustainability indicators** for each sustainability dimension proposed
- ☐ Defined sustainability thresholds (preliminary acceptable values) for these indicators
- ☐ Link sustainability dimensions with priority sectors of the Coastal Management Plan
- ☐ Evaluate selected indicators through the RACER (Relevant, Accepted, Credible, Easy, Robust) filter
- ☐ Categorize data availability using the 3-Tier system to systematically identify and target data gaps
- ☐ Experts structure the selected indicators logically using the DPSIR framework

Box 2. Example of results from one group (Montenegro) for Workshop 2

GROUP 1	
Sustainability Dimensions: SUSTAINABLE TOURISM AND AGRICULTURE	
Challenges/Indicators	
• Responsible planning in terms of developing the touristic offer – Suppression of poaching and illegal fishing – Linking the touristic offer with agricultural production (establishing cooperation agreements) – Greater representation of domestic products in the offer of hotels, restaurants, and retail chains and encouraging invisible exports – Developing and promoting products with added value (e.g., through protected name and origin certifications) • Strengthening cooperation between all touristic structures (horizontal-vertical connections) – Local tourism organizations (LTOs) – National tourism organization (NTOs) – Specialized agencies (special tourist offers) • Supporting the diversification of agriculture with emphasis on strengthening human capacities – Involving women (aim for 50% of formal workforce) and youth in the sector – Education (doorstep marketing)	
3 Key indicators	
• Use of local agricultural products in the tourism sector (as % of total uptake) • Number of clusters in the agricultural/tourism sectors (at least 10) • Number of women in the tourism/entrepreneurship sectors (at least 50% of woman)	
Linked Sustainability Dimensions: governance, education, sustainable tourism, agriculture, gender	



(to do before the next workshop:)

- ☐ Submit the finalized stakeholder-defined and -identified indicators to experts for review and feasibility assessment
- ☐ Assess indicators using the RACER criteria (Relevant, Accepted, Credible, Easy, Robust) to ensure they are manageable and practical, especially in data-scarce contexts.

³ Please note, that this is a recommendation from the Technical Workshop conducted in February 2026. The Climagine Indicator Library does not exist as such today, but could be developed in the frame of future application of the methodology.

Where applicable, separate expert tracks from general community tracks, using qualitative multiple-choice assessments for communities instead of complex analytical diagrams.

List of common pitfalls:

- Asking participants to build complex indicators from scratch instead of starting with a predefined "Indicator Library," which consumes excessive time and exhausts stakeholders.
- Assuming data is available without verifying it, leading to the selection of indicators that cannot be monitored. Failing to apply the 3-Tier data assessment.
- Focusing too heavily on "Driving Forces" (e.g., global population growth) which are often too broad to control locally, instead of focusing on actionable "Pressure," "State," and "Impact" indicators.
- Expert silos (e.g., scientific experts vs. legal experts) prevent the harmonization of indicators, leading to uneven data quality and incompatible metrics across different sectors.

7.4 STEP 3: MODEL AND EXPLORE

WORKSHOP 3: Developing the graphic Amoeba/Radar Diagram to represent the SIs. Making scenarios to reflect on their future evolution.

During the third workshop, begin by summarizing expert findings on progress toward the Coastal Management Plan's development and priority sector indicators derived from earlier analyses. Experts should then present the validated sustainability thresholds for each SI and explain how they relate to the priority sectors.

The session aims to validate and prioritize realistic Sustainability Indicators (SIs) along with their minimum and maximum thresholds, using the Band of Equilibrium (BoE) tool. This tool shows the past and current states of each SI and helps define the "safe operating space". A brief description of the Band of Equilibrium and Amoeba Diagrams can be found in Box 3.

Box 3. The Band of Equilibrium (BoE) & Amoeba Diagram

The Band of Equilibrium (BoE) explained:

In the Climagine BoE, categories 3-5 represent different levels of sustainability, with 4 constituting the "ideal situation" in terms of sustainability, and 3 and 5 representing the respective lower and upper sustainability thresholds for each SI value⁴, also known as "safe operating space".

Unsustainability can be described in two different manners:

- "Unsustainable by default" (1-2 in the BoE) refers to activities that are inherently unsustainable due to their design, nature or characteristics. Examples of such activities are the clearing natural areas for constructions, bottom trawling in fisheries, or investing in highly polluting activities, such as coal-fired power plants.
- "Unsustainable by excess" (6-7 in BoE scale) concerns practices that become unsustainable when their rate exceeds sustainability levels. For instance, excessive water consumption, deforestation rates that exceed the regenerative capacity of natural systems, or overfishing fall into this category.



Colour	Number	Ranking of the SI on the Band of Equilibrium
Dark Blue	1	Unsustainable by default
Blue	2	Low sustainability by default
Light Green	3	Lower sustainability threshold
Green	4	Sustainable
Dark Green	5	Upper sustainability threshold
Yellow	6	Unsustainable by excess
Red	7	Very unsustainable by excess

⁴ For numerous SIs, the numerical values were standardized into percentages to allow for the placement of the SIs in the amoeba diagrams.

However, experiences from pilot sites revealed that the Amoeba diagram and the Band of Equilibrium can become too complex, overloaded, or abstract for non-expert audiences, such as local community members, NGOs, and farmers. Participants often struggle to understand the difference between "unsustainable by default" and "unsustainable by excess" when both are combined on the same Amoeba scale.

To overcome this, the workflow should be divided into tailored tracks to accommodate diverse audiences:

- **Community Track:** Use highly simplified, community-based qualitative assessments instead of the Amoeba diagram. Provide participants with a multiple-choice sheet where they can qualitatively rate indicators (e.g., using a 1-to-5 scale or assessing them as high/low, acceptable/not acceptable) to extract their concerns without expert dominance. Their role is to provide on-the-ground realities that help to discuss and calibrate these indicator values, defining what is actually acceptable and realistic in both time and space.
- **Expert Track:** The Amoeba diagrams and complex analytical tools (like DPSIR) are restricted solely to technical expert groups and official documents. Technical experts take the qualitative multiple-choice answers from the community track and translate them back into quantitative percentages and formal "Bands of Equilibrium" in the background.

When discussing alternative scenarios, explicitly mainstream cross-cutting themes such as gender and climate change risks, ensuring they are systematically integrated rather than treated as standalone subjects.

Table 8. Proposed Structure for the Group Activity in Workshop 3

Time	Activity
0:30 h	Plenary: Recap & Concept Introduction Experts present the refined, validated list of Sustainability Indicators from Workshop 2. The facilitator introduces the concept of the "Band of Equilibrium" (BoE)/ safe operating space using simple, non-technical language and visual aids.
2:00 h	Group: Defining Thresholds (Dual-Track Approach) To avoid overwhelming participants, split the activity based on audience technical capacity: • Community Track (Qualitative): General stakeholders use, for example, simplified multiple-choice sheets to rate what they consider acceptable vs. unacceptable for each indicator, and to qualitatively assess the current state/value (e.g., "How severe is the current water scarcity, and is this level acceptable?") • Expert Track (Quantitative): Technical experts define the exact numerical minimum and maximum threshold values for each indicator to establish the BoE.
0:30 h	Plenary: Synthesis & Scenario Preparation Groups present their acceptable limits. The facilitator outlines the next step: translating these limits into visual "Business-as-Usual" (BAU) vs. "Sustainable" future scenarios.

STEP 3 - checklist:

- ☐ Determine the Plan's priority issues and strategic objectives
- ☐ Elaborate the Band of Equilibrium and Amoeba diagrams (for experts and technical documents)
- ☐ Deploy qualitative multiple-choice assessments or similar for community stakeholders
- ☐ Validate the indicators and identify missing indicators
- ☐ Identify climate change adaptation measures and Nature-based Solutions (NbS)
- ☐ Identify proxy indicators or rely on expert judgment where data remains absent (Tier 3 data) to allow the process to move forward.

Table 9. Example of results from one group (Montenegro) for Workshop 3

GROUP 1 Priority sector: SUSTAINABLE TOURISM		
Challenges/Indikator	Current value	2030
The relationship between the number of inhabitants and the number of tourists / Odnos broja stanovnika i broja turista Prosječna godišnja razina korištenja vodnih bogatstava (in ratio/ %)	10,45	12
The relationship between the number of beds in collective accommodation and the number of residents / Odnos broja ležajeva u kolektivnom smještaju i broja stanovnika (u %)	6,39	5,9
Share of overnight stays in the region in the total number of overnight stays / Udio noćenja regije u ukupnom broju noćenja (u %)	34,27	38
Number of beds in collective accommodation per km of coast / Broj ležajeva u kolektivnom smještaju po km obale	51,98	120

PROJECT TEAM

(to do before the next workshop:)

- ☐ The **values** for the *current state* and the *2030 business-as-usual scenario* of the *sustainability indicators* proposed by stakeholders will be forwarded to experts for evaluation (especially in terms of the values that are missing, newly added indicators and suggested sustainability values.)
- ☐ Translate Amoeba diagram results into simplified visual tools, such as a 1-to-7 scale, to make them easily understandable for decision-makers and the general public.
- ☐ Explore adopting logic from "Doughnut Economics" to better visualize the "Band of Equilibrium" (remaining above social foundations but below planetary boundaries)

List of common pitfalls:

- Participants struggling to understand the difference between "unsustainable by default" and "unsustainable by excess" within the Band of Equilibrium
- Relying solely on the traditional Amoeba diagram as the default visual. Because it can become too complex, overloaded, or abstract for NGOs, farmers, and non-expert audiences, failing to translate the data into the intuitive "Doughnut Model" (cf. Chapter 8) or other comprehensive formats could result in a loss of stakeholder engagement.
- Focusing too heavily on precise numbers rather than acceptable ranges (the Band of Equilibrium), which is often more realistic in data-poor environments
- Not adapting the methodology to the audience; forcing communities to use expert tools instead of simplified qualitative sheets.

7.5 STEP 4: DO AND SUGGEST
WORKSHOP 4: Finalising the Scenario Making, sharing this with major stakeholders.

During Climagine 3, the Sustainability Indicators (SIs) and their values for the current state and the 2030 business-as-usual (BAU) scenario were identified. Since then, experts have refined data, filled missing values and proposed sustainability thresholds. Climagine 4 focuses on validating these outputs, refining the scenarios, and ensuring their economic and institutional realism through broad stakeholder participation.

In groups the participants discuss the proposed values for the current state and the business-as-usual scenario (BAU Scenario). Based on the outcomes of the discussions, these results should be visually represented with "amoeba diagrams" for every sector (or simplified charts for non-expert community tracks). In a next step, participants should be encouraged to reflect on the area's future development and develop an **alternative scenario**, which is based on coordinated and far-reaching efforts to achieve sectoral and overall sustainability in the respective area.

To strengthen this scenario-based approach, practitioners must integrate longer-term perspectives (e.g. 2050) and uncertainty analysis. Incorporating these longer-term horizons helps stakeholders better anticipate severe structural transformations and guides highly resilient strategic planning.

Table 10. Proposed Structure for the Group Activity in Workshop 4

Time	Activity
0:30 h	Plenary: Presenting the Expert Findings Experts present the refined Sustainability Indicators (SIs), the proposed Band of Equilibrium (BoE), and crucially, the results of the Multi-Criteria Analysis (MCA) and Cost-Benefit Analysis (CBA) conducted behind the scenes.
1:30 h	Group: Validating BAU vs. Alternative Scenarios Groups review the proposed values for the current state and the "Business-as-Usual" (BAU) scenario. They then reflect on the area's future development to construct an Alternative Scenario based on coordinated sustainability efforts. These scenarios are visualized using Amoeba diagrams or the Doughnut model.
1:30 h	Group: Consensus-Building & Prioritizing Measures Based on the visual scenarios, stakeholders prioritize strategic recommendations and concrete adaptation measures, taking financial constraints into account.
0:30 h	Plenary: Final Synthesis Groups present their alternative scenarios and finalized strategic recommendations for integration into the Coastal Management Plan.

STEP 4 - checklist:

- ☐ Final validation of the indicators and their Band of Equilibrium
- ☐ Amoeba diagrams finalized (showing current state, 2030 BAU, and 2030 Alternative Scenario)
- ☐ Identify climate change adaptation measures and Nature-based Solutions (NbS)
- ☐ Strategic recommendations formulated for integration into the Coastal Management Plan

Table 11. Example of results from one group of the Climagine workshop in the Damour, Lebanon

Group Water Supply and Wastewater Management										
#	Indicator	Unit	Baseline	BAU Value	Alternative Value	Sustainable Minimum	Sustainable Maximum	Current (2025)	BAU (2030)	2050 (Target)
WW 1	Seawater intrusion index	Chlorides mg/L or Total dissolved solids (TDS) (mg/L)	Critical Chlorides >200 mg/L ≈ 435–1,163 mg/L (TDS)	> 1,500 mg/L (Increasing)	< 250 mg/L	0 mg/L	250 mg/L	6	7	3
WW 2	Groundwater Level Trend	m/year	Declining ≈ - 0.5 to 7.6m/year	< -7.6 m/year	0 to +0.5 m/year	0 m/year	+0.5 m/year	2	1	4
WW 3	Groundwater Abstraction	MCM/year	High Pressure ≈ 13,5 MCM/year	> 15 MCM/year	< 10 MCM/year (Safe Yield)	5 MCM/year	Safe Yield Limit	6	7	3
WW 4	Households connected to a functioning WWTP	% of households	< 10%	10%	80%	60%	100%	1	2	3
WW 5	Wastewater effectively treated	% = m ³ /day vs design capacity	Low Efficiency. ≈ 21%	15%	80%	60%	100%	1	2	3
Indicator			Current situation and BAU scenario in the Damour area				Recommendations - alternative scenario			
WW1. Seawater intrusion index			Currently, the Damour priority coastal aquifer experiences severe over-exploitation, driving significant seawater intrusion with TDS reaching up to 1,163 mg/L. The Business-As-Usual (BAU) scenario points to a continued, irreversible salinization of the coastal aquifer (BoE 7), rendering the freshwater lens unusable for domestic or agricultural purposes.				The alternative scenario requires immediately reducing coastal pumping and enforcing strict well licensing . Furthermore, implementing Managed Aquifer Recharge (MAR) systems should be prioritized to restore the freshwater-saltwater interface and			

		push salinity safely below the 250 mg/L maximum durable threshold.
WW2. Groundwater Level Trend	Groundwater levels are declining at an alarming rate (between -0.5 and -7.6 m/year) due to the proliferation of unregulated wells and climate variability reducing natural recharge. In a BAU scenario, aquifer depletion will accelerate, leading to the complete drying of wells and springs (BoE 1).	It is crucial to install continuous monitoring networks using piezometers with data loggers . The alternative scenario requires enforcing strict extraction caps and protecting major recharge zones to stabilize water levels, ensuring a sustainable zero or positive recharge trend
WW3. Groundwater Abstraction	Current abstraction exerts extreme pressure on the system (≈ 13.5 MCM/year), far exceeding natural safe yields. Unmetered and unregulated pumping dominates the area. The BAU scenario assumes continued uncontrolled abstraction (BoE 1), heavily degrading the water balance.	To reach the sustainable target, a comprehensive well inventory must be completed , coupled with mandatory metering for both public and major private wells . Groundwater abstraction must be strictly capped within sustainable safe yield limits, and illegal wells in critical zones must be closed.
WW4. Households connected to a functioning WWTP	Less than 10% of households are currently connected to a functioning wastewater treatment plant. Most rely on un-engineered, leaking septic tanks, and raw sewage is frequently discharged into the Damour River. BAU predicts only marginal improvements due to fragmented infrastructure (BoE 2).	Significant investments are required to complete collection networks, rehabilitate existing pumping stations, and effectively connect unserved rural and urban settlements to functional WWTPs, aiming for an alternative scenario target of at least an 80% effective connection rate.
WW5. Wastewater effectively treated	The actual treatment efficiency is critically low ($\approx 21\%$). Most constructed WWTPs and pumping stations are non-operational due to chronic power shortages and lack of maintenance. The BAU trend shows continued structural failure (BoE 2), leading to severe pollution of surface and groundwater.	The alternative scenario demands securing Operation & Maintenance (O&M) budgets , solarizing WWTPs to provide backup energy, and strictly enforcing pre-treatment for industrial and commercial discharges . This will allow the facilities to reach an 80% functional treatment capacity.



(to do before the next workshop:)

- ☐ After Climagine 4, the project team works together to finalise the final list of Climagine SIs and **alternative scenario values and Amoeba/Doughnut diagrams**, which will serve as inputs to the Coastal Management Plan.
- ☐ Multi-Criteria Analysis (MCA) and Cost-Benefit Analysis (CBA) based on the scenarios generated. This MCA-to-CBA refinement process ensures that the proposed alternative scenarios and coastal adaptation measures are realistic and financially viable.
- ☐ Feed Climagine results in an institutional strategy and specify which authorities will be responsible for continuous monitoring.
- ☐ Design formal follow-up mechanisms and align the process explicitly with statutory planning milestones (e.g., ICZM Law or Regional Coastal Scheme) to translate foresight into legally binding action.

List of common pitfalls:

- The "Implementation Gap": Strategic recommendations remain purely theoretical because they are not backed by dedicated financial resources, executive power, or concrete legal enforcement. Workshop outputs remain as an isolated "foresight exercise" because they are not explicitly linked to a concrete strategy, law, spatial plan, or national investment roadmap.
- Loss of momentum between workshops due to the lack of continuous monitoring and retrospective mechanisms.
- Methodological overconfidence: Treating indicators as fully operational when monitoring systems are actually weak or fragmented, leading to a false sense of precision.

- Failing to translate the complex Amoeba diagrams into clear, accessible narratives for policymakers and the general public, limiting the political impact of the results.

What we propose - The Expert Track: Filtering and Testing Priority Measures (MCA & CBA)

Once stakeholders have brainstormed potential climate adaptation measures during Workshop 4, technical experts conduct a rigorous, two-step evaluation process "behind the scenes" before Workshop 5. This ensures the proposed measures are both locally viable and economically sound.

1. Step One: [Multi-Criteria Analysis \(MCA\)](#) as a Filter

Experts first apply an MCA to systematically filter the list of community-proposed solutions against specific criteria. During the GEF MedProgramme SCCF Project, measures were specifically scored on their ability to enhance climate resilience, protect biodiversity, improve governance, and create employment. Two specific criteria must be systematically integrated into this evaluation:

- **Gender Equality:** Evaluating how well the proposed measure mainstreams social equity and addresses gender-specific vulnerabilities.
- **Data Availability for CBA:** Assessing whether there is sufficient economic or scientific data available to subsequently run a financial reality check.

2. Step Two: Cost-Benefit Analysis (CBA) as a Financial Reality Check

For the shortlisted measures that successfully pass the MCA filter, experts then conduct a Cost-Benefit Analysis (CBA). The CBA acts as a crucial "financial reality check," verifying the socio-economic viability of the selected actions. This process systematically compares the total investment and maintenance costs required for the proposed interventions against their expected returns—such as the estimated monetary value of avoided damages to coastal assets or the value of gained ecosystem services.

Conducting this sequenced MCA-to-CBA refinement process ensures that the proposed coastal adaptation measures are not only ecologically sound and socially accepted but also highly realistic and financially viable for future investment.

Case Study: Financial Reality Checks in the Mediterranean

During the GEF MedProgramme SCCF Project, PAP/RAC collaborated with technical experts (Metroeconomica) to apply this exact CBA methodology to prioritize coastal adaptation solutions in two pilot sites:

- [Boka Kotorska Bay, Montenegro](#): Experts evaluated the financial viability of two primary adaptation measures. The first evaluated the afforestation and reforestation of 9,500 hectares of mixed forests and 1,500 hectares of broad-leaved forests, measuring costs against the financial benefits of carbon storage and enhanced ecosystem services. The second measure evaluated the construction of two coastal dykes (485 m and 1,445 m in length) to protect highly vulnerable residential and natural areas from projected sea-level rise and flooding.
- [Tanger-Tétouan-Al Hoceima, Morocco](#): The analysis measured the investment and maintenance costs of massive nature-based adaptation efforts against their long-term economic returns in terms of climate resilience. Specifically, the CBA tested the viability of planting 17,348 hectares of temperate forests to replace 289 hectares of bare ground and 17,059 hectares of highly degraded range lands.

7.6 STEP 5: ACT AND REACH OUT

STEP 5: Approval of the Coastal Management Plan on ICZM in the Mediterranean's coastal zones.

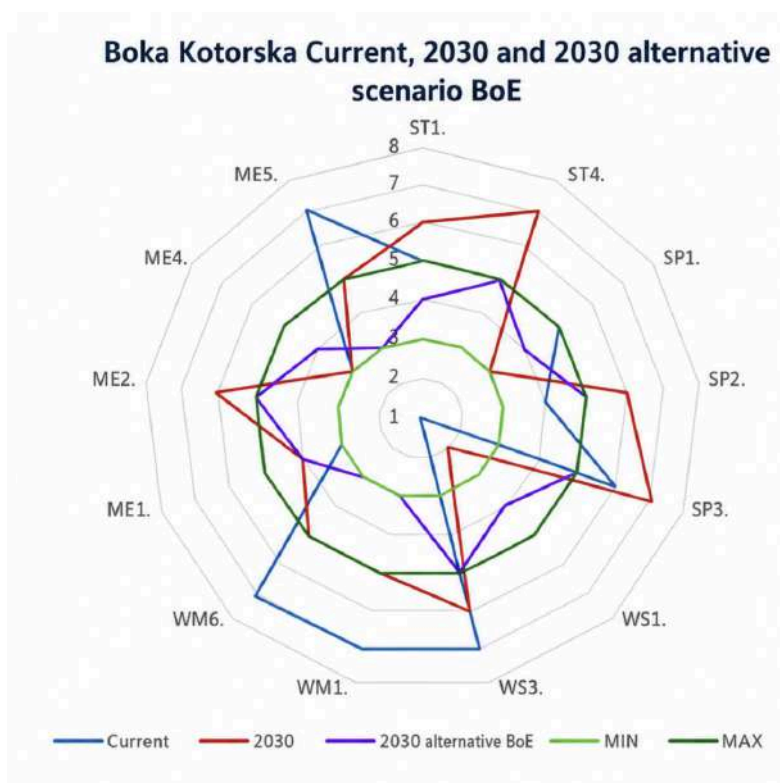
FINAL SESSION: Bridging the Gap - Regional Finance Roundtable and Plan Presentation.

While the formal participatory workshops conclude with Step 4, Step 5 is arguably the most critical phase of the entire methodology. To ensure the strategic recommendations do not remain theoretical and to effectively bridge the "Implementation Gap," Step 5 should culminate in a final high-level event bringing together local stakeholders, policymakers, and financial institutions. While not a traditional participatory workshop, this Regional Finance Roundtable serves as a key matchmaking platform. It transitions the process from planning to "observation for investment". By showcasing the economic viability of the proposed measures through the MCA and CBA results, practitioners can effectively pitch the co-created strategic recommendations to funding agencies, private investors, and development banks to secure the necessary adaptation finance.

Integrating CBA: The "Financial Reality Check"

A major threat to participatory planning is "blue sky thinking", where stakeholders propose idealized solutions that are financially impossible to execute. To ground the proposed measures in reality, the CBA analysis serves as a "financial reality check". Inviting representatives from financial institutions, the private sector, and economic ministries to this roundtable and presenting the expert-prepared Cost-Benefit Analysis (CBA), which proves the economic return on investment for measures like Nature-based Solutions (NbS), facilitators ensure that the proposed strategic recommendations are objectified, realistic, and matched with potentially obtainable financial means. Insights that have been collected from the [Webinar](#) and [Regional Roundtable](#) on Mobilizing Finance for Climate Change Adaptation and Private Sector Engagement in 2025 can be retrieved [here](#).

Figure 7. Compiled amoeba diagram overlaying all scenarios to clearly show decision-makers the magnitude of change required. The current state (blue), the business-as-usual scenario 2030 (red), and the alternative scenario 2030 (green) are visualized.



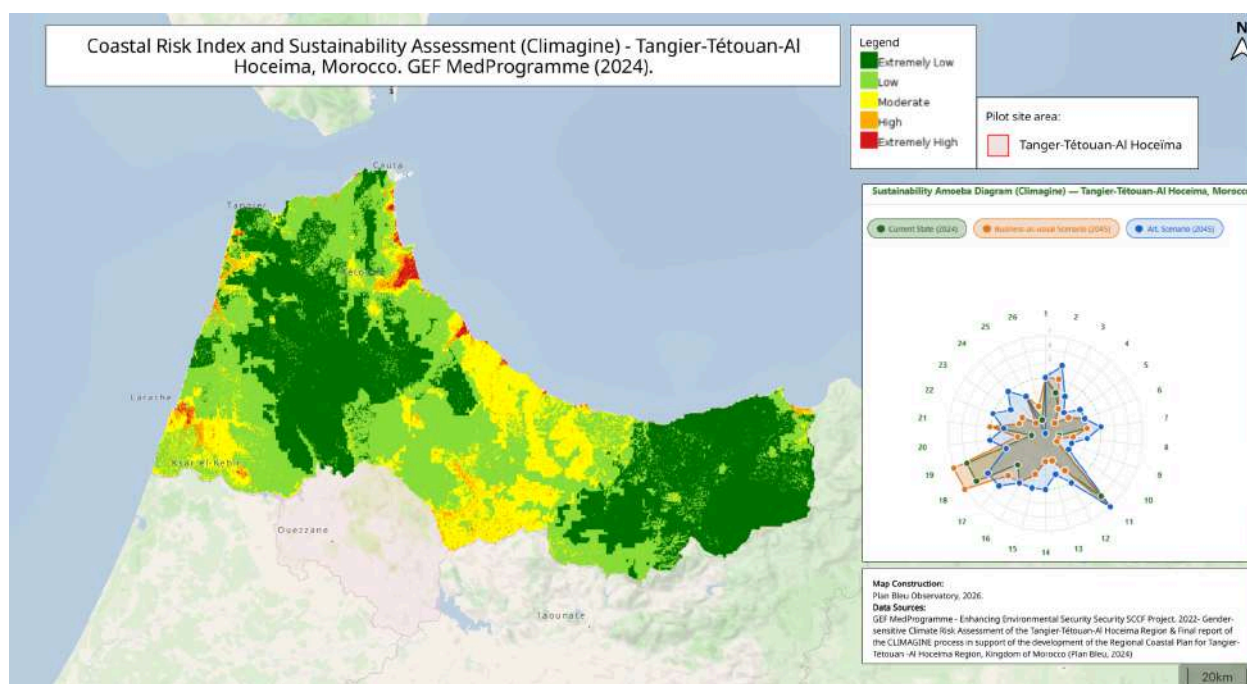
Implement mechanisms for continuous monitoring and knowledge exchange between stakeholders:

- Promote citizen science and establish local observatories to create ownership and establish a continuous, community-based monitoring network. This helps ensure that local communities remain meaningfully engaged and do not feel marginalised or merely symbolically involved once the official project has concluded.
- Maintain continuity in the post-workshop phase. One of the main challenges observed is a drop in stakeholder engagement if no clear follow-up mechanisms are established after Workshop 4. Practitioners must explicitly plan for how outputs will be consolidated and formally validated. This includes establishing structured processes such as technical committees, validation workshops, and clear administrative pathways for integrating the results into statutory planning documents.
- Establish formal inter-municipal and cross-sectoral coordination committees to enforce the plan and track the sustainability indicators dynamically. Given the complexity of coastal governance systems, overlapping mandates and fragmented responsibilities represent major challenges. Practitioners must prioritize establishing explicit coordination mechanisms specifically between environmental authorities, maritime institutions, and territorial planning bodies.
- Integrate outputs into digital geospatial platforms (such as Plan Bleu's observatory, MapX). To support long-term decision-making and continuous monitoring, practitioners should explore integrating Climagine outputs into dynamic digital platforms. Linking sustainability indicators to spatial layers, interactive dashboards, and scenario visualizations can significantly enhance stakeholder understanding. This allows decision-makers to visually track the interactions

between Nature-based Solutions (NbS) interventions, environmental pressures, and socio-economic dynamics across the territory. A first visualisation of the Amoeba diagram published in Plan Bleu's observatory can be seen in Figure 8.

- Develop an executive summary or a short 4-page flyer to communicate the methodology and outcomes visually to decision-makers and the broader public. This material must avoid overly complicated academic language and focus on clear, actionable insights.
- Establish a "Climagine & ICZM Hub" under UNEP/MAP for rapid replication, pairing new sites with "twin" sites that have already completed the full Climagine cycle.

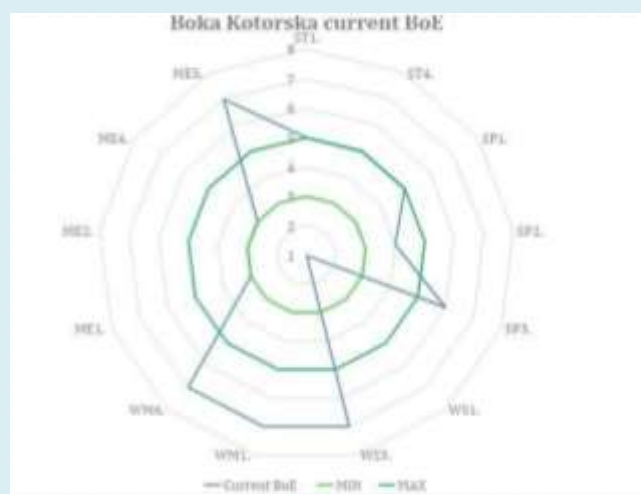
Figure 8. Coastal Risk Index and Climagine results from Tangier-Tétouan-Al Hoceima region (Morocco), represented in Plan Bleu's observatory



What we propose - Narrative stories by local authors and illustrations by local artists or AI

Translating abstract data and Amoeba diagrams into emotional storytelling and tangible visual renderings (using local artists or AI-generated imagery) is highly recommended. This "emotional storytelling" approach bridges the gap between technical experts and the general public, making the alternative scenarios feel achievable and real. In Figure 10 you can find a proposition for the Amoeba diagrams visualised in Figure 10 that have been created by using an IA. Please note that this has been done with IA due to budget and time constraints. In future applications, it is worthwhile to consider the integration of local artists and storytellers to integrate and strengthen the local perspective and ownership, whilst supporting cultural activities in the area.

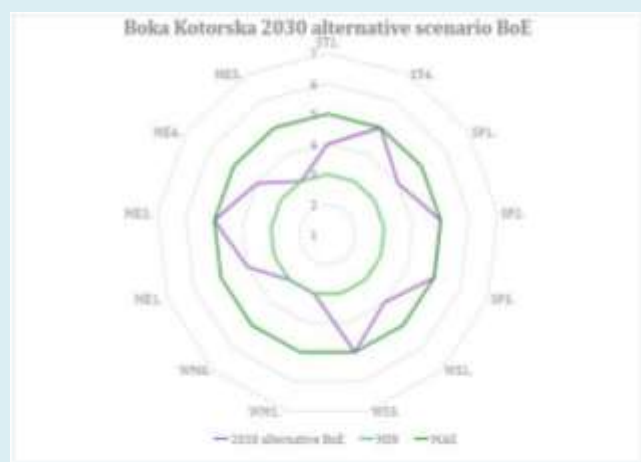
Figure 9. Amoeba diagrams Boka Kotorska Bay: current state, 2030 BAU (unsustainable), 2030 alternative (sustainable) with data visualisation proposal.



Green: BoE (The safe operating space),
Blue: **current state** (Showing current system imbalances and vulnerabilities)



Red: **2030 BAU / unsustainable** (Illustrating a trajectory of progressive degradation and eroded resilience if no action is taken)



Purple: **2030 alternative / sustainable** (Representing a rebalanced system where indicators are brought back within acceptable ranges)



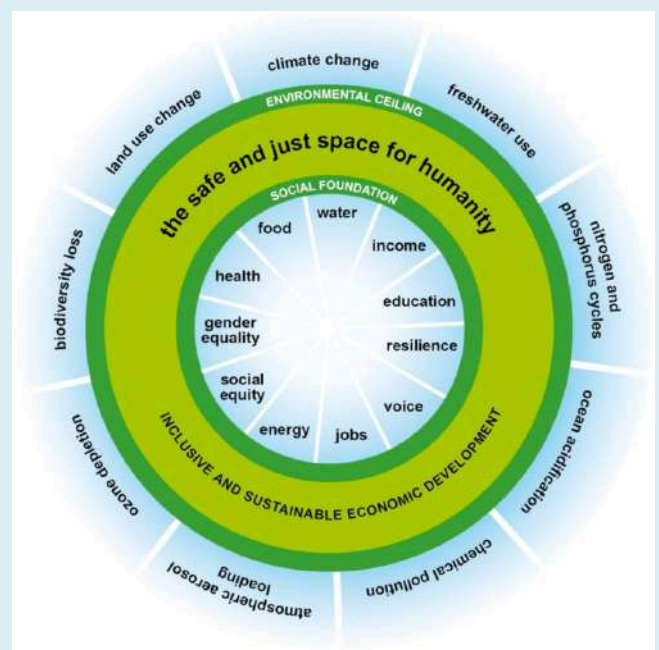
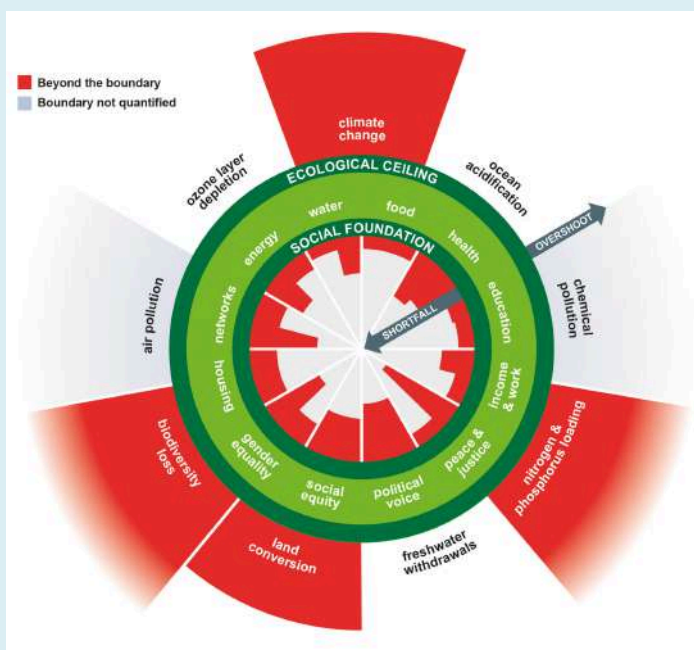
What we propose - The Amoeba diagram update inspired from Doughnut Economics

One of the key outputs of the Climagine methodology is the Amoeba diagram. However, during the technical Climagine workshop the complexity of these diagrams was stressed, as being a key area for the wider public and decision makers to buy-in to the methodologies output. This could be addressed by integrating visuals from the Doughnut Economy Concept.⁵

By incorporating the logic of "Doughnut Economics", the "Band of Equilibrium" (BoE) can help stakeholders visually understand the "safe operating space" by ensuring targets remain **above the lower limits of social foundations** while staying below the **upper limits of planetary boundaries and ecological ceilings**. To avoid confusing non-expert audiences, the Amoeba diagrams should be translated into simplified visual tools, such as a 1-to-7 color scale. Moreover, during workshops involving the general public, these complex diagrams should be replaced with simplified, qualitative multiple-choice assessments, reserving the quantitative Amoeba diagrams for technical experts who will translate the qualitative inputs back into percentages behind the scenes.

In this model the goal of the sustainable development of a region is to reach environmentally safe and socially just space for humanity and meet the needs of the people without disrupting bio-physical boundaries. This safe space for humanity is the doughnut. This doughnut is limited though two main boundaries:

- **The Social Foundation (Avoiding "Shortfall"):** This inner boundary represents the minimum standards required to meet basic human needs. If a society fails to provide these, it falls into a shortfall, meaning people are left falling short on life's essentials.
- **The Ecological Ceiling (Avoiding "Overshoot"):** This outer boundary represents the planet's biophysical limits. If human activity exceeds these limits, it results in an overshoot, which degrades ecosystems and destabilizes Earth's life-supporting systems. The ideal goal of sustainable development is to stay in the space between these two boundaries (the "Doughnut"), ensuring that human needs are met without disrupting the environment.



Raworth, Kate. *Doughnut economics: Seven ways to think like a 21st-century economist*. Random House Business Books, 2017.

Recommendations of stakeholders were synthesized into 2030 future alternative scenarios to push towards sustainability in the priority sectors identified during the Climagine process. To improve understanding and ownership of these scenarios, visualisations have been created with an artificial intelligence in Figure 10.

⁵ Raworth, K. (2018). *Doughnut economics: Seven ways to think like a 21st century economist*. Chelsea Green Publishing.

Figure 10. Scenarios for the selected priority sectors in Boka Kotorska Bay and recommendations for data visualisation



SUSTAINABLE **TOURISM**: GREEN DIGITAL TOURISM IN KOTOR BAY

The sustainable tourism plan seeks to ensure eco-friendly practices by developing a comprehensive strategy, promoting green accommodation, and introducing a green certification program for touristic businesses. Digital tourism promotion is emphasized (virtual reality, travel blogs) to diversify the touristic experience and reduce seasonality



ENVIRONMENT AND MARINE **ENVIRONMENT**: CONSERVE THE COASTLINE AND MARINE ZONE FOR A SUSTAINABLE KOTOR BAY

Coastal conservation measures include the establishment of new protected areas, strict policies for beach restoration, and collaborative governance to combat pollution and control non-indigenous species. It also strongly promotes sustainable fishing practices and the implementation of ecosystem-based adaptation



SPATIAL PLANNING AND **TRANSPORTATION**: THE GREEN FUTURE OF KOTOR BAY

This scenario emphasizes shifting main transport routes to the hinterland, introducing highly efficient public land and sea transportation, and placing much stricter constraints on coastal construction to preserve the natural and cultural landscape



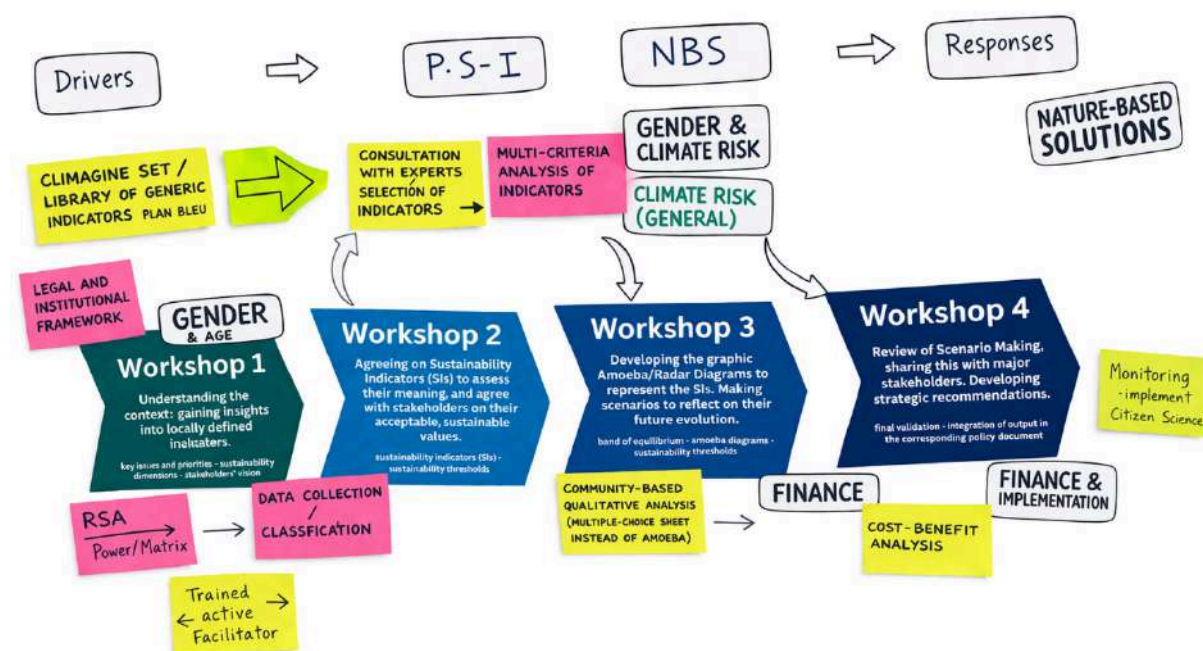
2030 BUSINESS-AS-USUAL

This scenario visualizes the consequences of inaction: unregulated urban expansion, extreme traffic congestion, overwhelmed communal infrastructure, and the steady deterioration of natural buffers, severely compromising the bay's resilience to climate change

8. Proposed Updates of the Climagine Methodology

The Climagine methodology fosters co-creation with local stakeholders on diverse issues and in multiple contexts and levels. Additionally, the iterative development of the methodology is part of a co-creation process itself. After each implementation of the Climagine methodology over the last years, lessons learned have been collected to iteratively update the methodology. These reports, meeting minutes and surveys have been integrated into this guide. In addition, the Technical Workshop on the Climagine Guide held on 18-19 February 2026 in Marseille, helped to revise the draft guide and collect additional feedback directly from Climagine Practitioners. An example of results and suggestions for an updated Climagine methodology can be seen in Figure 11. Several updates and suggestions have been already integrated in this guide and are again listed in this chapter.

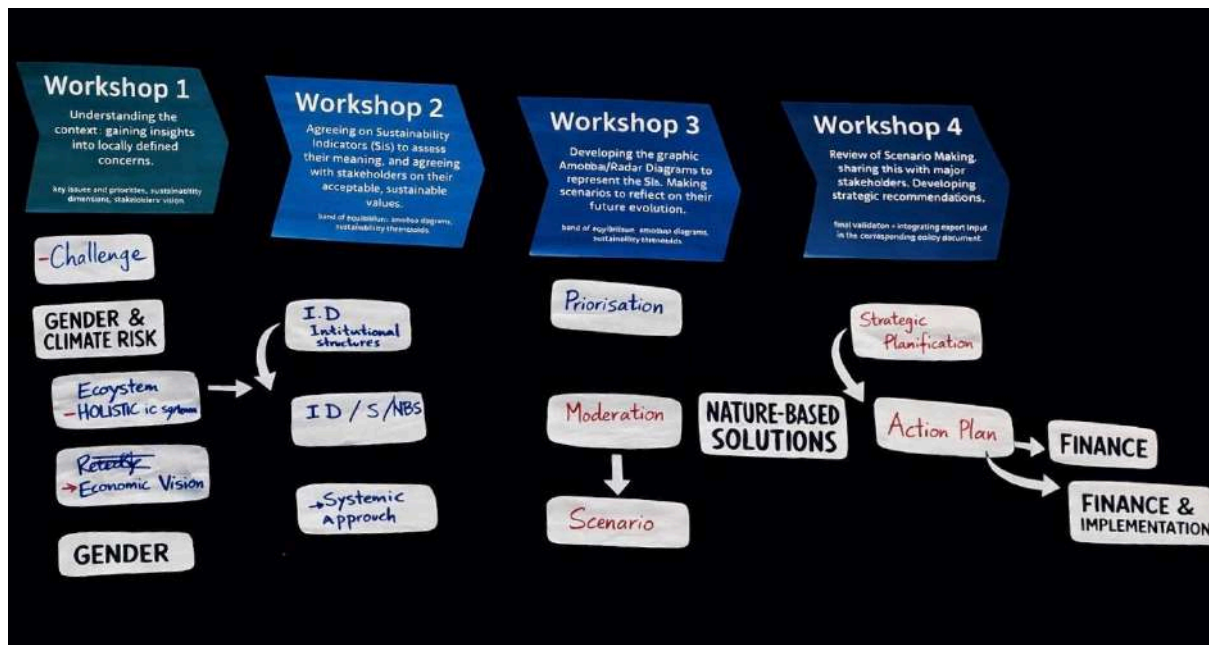
Figure 11. General proposed improvement of the Climagine methodology. Technical Climagine Workshop (18-19 February 2026)



8.1 ADAPTING THE CLIMAGINE METHODOLOGY TO DIFFERENT CONTEXTS

Over the last years of Climagine implementation, the methodology has been mostly used in the ICZM context. In Lebanon, it has been applied for the first time for the revision of the national ICZM strategy and in the Damour area in the context of an Integrated Management Plan, linking ICZM and Integrated Water Resources Management (IWRM) in the source to sea continuum. This is only one example of the versatile application of Climagine in differing contexts. As stressed at the UNESCO Symposium on 11.02.2026, the application of Climagine in the context of coastal aquifers states another possibility. Participants of the Technical Climagine Workshop also designed a proposition for Climagine process that has a particular focus on NbS implementation in for example marine national parks, choosing indicators that are well-aligned with the IUCN standard for NbS (see Figure 12). This signifies again that Climagine consists of several key elements that need to be transferred for an effective implementation. However, in the adoption process of the methodology some elements can be changed to make it fit with the local, national or regional context and topics, **whether it is ICZM, IWRM, coastal aquifers, NbS or MPA management plans.**

Figure 12. Climagine adapted to focus on NbS implementation in a marine national park context. Technical Climagine Workshop (18-19 February 2026)



8.2 SIMPLIFYING THE AMOEBA DIAGRAM: THE "DOUGHNUT" MODEL

To improve public and decision-maker buy-in, the complex Amoeba diagrams used in the Climagine methodology can be simplified using the "Doughnut Economics" visual model. A more detailed description can be found in Box 3. This concept clearly illustrates a "safe operating space"—equivalent to the Climagine Band of Equilibrium—which is defined by two distinct boundaries:

- **The Social Foundation (Avoiding "Shortfall"):** This inner boundary represents the minimum standards required to meet basic human needs. If a society fails to provide these, it falls into a shortfall, meaning people are left falling short on life's essentials.
- **The Ecological Ceiling (Avoiding "Overshoot"):** This outer boundary represents the planet's biophysical limits. If human activity exceeds these limits, it results in an overshoot, which degrades ecosystems and destabilizes Earth's life-supporting systems. The ideal goal of sustainable development is to stay in the space between these two boundaries (the "Doughnut"), ensuring that human needs are met without disrupting the environment.

Practical Application for Workshops

Because traditional, quantitative Amoeba diagrams can be confusing for non-expert audiences, they should be replaced with accessible alternatives during public sessions. General audiences and stakeholders can instead map social shortfalls and ecological overshoots using a simplified 1-to-7 color scale or qualitative multiple-choice assessments. The complex, quantitative Amoeba models are then exclusively reserved for the "Expert Track," where technical experts process the qualitative community inputs behind the scenes to build the final formal data.

8.3 CONSENSUS-BUILDING AND CONFLICT RESOLUTION

To effectively manage the diverse and sometimes competing interests of stakeholders, the methodology must prioritize consensus-building and conflict resolution. This requires establishing consensus-building mechanisms at the regional level among local and national government stakeholders.

The methodology should integrate approaches that balance these diverse stakeholder interests, deepen coordination between municipalities, and encourage meaningful collaboration among them. To achieve this, it is crucial to provide additional training and support for local or external facilitators on conflict resolution and workshop facilitation, enabling them to effectively navigate complex power dynamics, overcome institutional disagreements, and unify conflicting narratives.

8.4 CONTINUITY OF THE CLIMAGINE PROCESS

Ensuring the continuity of the Climagine process requires smoother communication between workshops and different phases of the project. To maintain momentum, a continuous monitoring and retrospective feedback mechanism must be established between sessions. This can be achieved by utilizing short briefing notes, pre-workshop questionnaires, online platforms for ongoing dialogue, and formal post-workshop follow-ups. Furthermore, Climagine workshops should be directly connected with the milestones of strategic coastal plans and national strategies, ensuring that indicator discussions take place in synergy with the actual planning process rather than as isolated exercises.

8.5 INDICATOR DATABASE

To streamline the indicator selection process and avoid asking participants to build complex indicators from scratch, a "Climagine Indicator Library" or systemic encyclopedia of indicators should be developed. This database should aim to cover approximately 75% of standard needs and be strictly aligned with broader Mediterranean and international frameworks, such as the MSSD, IMAP, and the UN Sustainable Development Goals. Expert teams can then select and filter matching indicators from the library using the RACER (Relevant, Accepted, Credible, Easy, Robust) criteria to ensure they are practical and manageable for the specific local context.

8.6 ADVANCING THE UNDERSTANDING AND VISUALISATION OF THE METHODOLOGY

To bridge the gap between technical experts and the general public, the methodology must advance its understanding and visualisation techniques. It is highly recommended to translate abstract data and Amoeba diagrams into "emotional storytelling" and tangible visual renderings. By utilizing local artists, AI-generated imagery, and printed maps, alternative scenarios can feel much more relatable to local communities. Additionally, the Practitioner's Guide provides here step-by-step explanations, checklists, a list of common pitfalls, and practical templates to make the methodology easier to understand and replicate for facilitators.

8.7 IMPLEMENTATION AND FUNDING

To successfully bridge the implementation gap, funding and Special Climate Change Fund (SCCF) finance activities—such as webinars, roundtables, reports, and capacity assessments—must start earlier and run in parallel with the Climagine process. Engaging the private sector, such as real estate developers and insurance companies, from the very beginning ensures that the proposed Nature-based Solutions (NbS) and coastal adaptation measures are financially viable and directly linked to concrete investment portfolios.

Also, a dedicated preparatory phase (Phase 0) should be formalized, featuring a Rapid Stakeholder Assessment (RSA) and an analysis of power dynamics to ensure balanced demographic representation, including youth and gender inclusion. To rapidly scale the methodology, approaches like "train-the-trainers" and "twin learning" should be adopted, potentially establishing a regional "Climagine & ICZM Hub" to pair new pilot sites with experienced regions.

9. Conclusion

Over the past decade, the Climagine methodology has evolved from a pilot participatory tool into a robust, systemic foresight framework for Integrated Coastal Zone Management (ICZM) in the Mediterranean. Through its application across diverse socio-ecological contexts—including Croatia, Tunisia, Montenegro, Morocco, and Lebanon—it has successfully bridged the gap between scientific diagnostics and local realities by treating local stakeholders as "experts at their own level".

As we look toward the future, the most significant challenge in Mediterranean coastal governance remains the "implementation gap", the risk of strategic plans remaining as static documents on shelves without translating into concrete actions. To address this, Climagine must continue to support the transition from strategic foresight into operational governance. By integrating concepts like Nature-based Solutions (NbS) and Ecosystem-based Adaptation (EbA) into the participatory workshops, Climagine aims to empower stakeholders to translate identified priorities into realistic, actionable measures.

Future applications of Climagine should also aim to embrace the Source-to-Sea continuum and consider integrated approaches, such as the Water-Energy-Food-Ecosystems (WEFE) nexus, to overcome institutional silos and ensure that upstream water management aligns with downstream coastal conservation.

Recent field applications demonstrate that the operational impact of Climagine depends entirely on strengthening the integration between these participatory processes, indicator systems, and formal planning instruments.

Ultimately, Climagine does more than produce coastal plans; **it helps transform top-down mandates into socially validated agreements**. By placing local communities, women, and youth at the core of the decision-making process, Climagine ensures that they are **not just participants, but the true architects and stewards of Mediterranean coastal resilience**.

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11. Annexes

ANNEX 1: LESSONS LEARNED FROM MEDPARTNERSHIP (CROATIA AND TUNISIA)

In the Annexe, lessons learned from the Climagine process in Croatia and Tunisia in the frame of the MedPartnership are summarized.

Box 4. Lessons learned from Climagine in Croatia (MedPartnership)

Lessons learned from Croatia:

Context (addition compared to Imagine):

- Climate vulnerability and climate change cost assessment, according to the Dynamic Interactive Vulnerability Assessment (DIVA) model, for key socio-economic sectors such as tourism, agriculture, health and infrastructure, including potential damage caused by forest fires.
- Elaboration of the Integrated Coastal Zone Management Plan (ICZMP), with specific focus on climate variability, impacts and potential adaptation solutions
- Climagine = innovative approach in Croatia, collective learning process

Challenges:

- **Data collection:** difficult for amoeba diagrams (but Amoeba is very important).
- **Consistency of participation:** same participants should attend all workshops to maintain continuity, otherwise good coordination and hand-over are required.
- **Maintaining momentum:** between the workshops, difficult due to length of the process; participants must work between workshops to sustain progress.
- **Implementation gap:** once financing ends, there is little legacy or implementation of the recommendations.
- **Climate literacy:** local actors have poor knowledge on but interest in climate change
- **Prioritization task:** often difficult and remains vague, leaving the final choice to decision makers.

Recommendations:

- **Enhancing climate literacy:** integrate informative presentations on the effects of global climate change challenges and impacts at the local scale with local experts, helps understanding, brainstorming on climate adaptation and building ownership.
- **Pre-workshop surveys and interviews:** help map local needs and guide workshop focus.
- **Local expert team and Climagine indicators:** local experts can propose key indicators and their “Bands of Equilibrium” (BoE) for verification during the Climagine workshops, or the BoE can be defined jointly in the workshops and later validated by experts. Indicators should be selected at the start of the Climagine process (was not the case in Croatia or Tunisia), to ensure that they fit with local realities and concerns.

Prerequisites :

- **Stakeholder mapping:** share this list with the working team, to determine if any other stakeholders are missing.
- **Data:** identify and select good data providers
- **Capacities:** mapping of countries’ existing capacities (legal instruments and policies)
- **Local facilitator:** with strong moderation skills, understanding of the Climagine and Coastal Plan process, and trust of the local community (communicating in their language) is vital to generate interest in this joint work.
- **Knowledge:** methodological (how to articulate the successive workshops) and technical (definition and population of indicators and building scenarios)

Implementation - Integration of Climagine Results and political will

*"By incorporating the results of Climagine into the Coastal Plan, Climagine gains new significance as it becomes part of a document that offers solutions to the complex priority issues facing the coastal zone. Through the **adoption of the Plan by the public administration bodies**, the chance that its proposals are implemented and that change on the ground actually takes place are **significantly increased**."*

- Vladimir Lay (Climagine Consultant)

*"The process of implementing Climagine and drafting the Coastal Plan are crucial to creating or maintaining the **political will for implementation**."*

- Vladimir Lay (Climagine Consultant)

Box 5. Lessons learned from Climagine in Tunisia (MedPartnership)

Lessons learned from [Tunisia](#):

Context - Methodology:

- **Initial focus:** coastal erosion as the major climate risk; revision of the 2008 ICZM Plan
- **Data constraints:** prevented the application of the RIVAMP model; limited the application of the full Climagine methodology (Sustainability Indicators and Amoeba Diagram, key outputs, not produced)
- **Methodology adapted:** The Services - Threats – Solutions (STS) approach was used to identify key ecosystems, related threats and recommended possible solutions (local knowledge combined with spatial and GIS analysis)

Challenges:

- **Data constraints:** insufficient resources for continuous or regular data collection and limited data sharing;
- **Data recommendations:** survey for participants of the launching/inception workshop, on available data and share samples of these data; early data availability and quality assessment to decide on feasible scientific methodology and modelling approach; collect data samples after the launching/inception workshop, set-up a task team that works closely with the experts
- **Technical expertise - Sustainability Indicators (SI):** define Sustainability Indicators based on local knowledge, consultation workshops, and analytical work (lack of analytical work in Tunisia due to limited available scientific expertise within the team, limited budget to mobilize additional expertise and timeline).
crucial to include technical expertise provision in the initial design of the project
- **Lack of awareness of existing plans:** few Climagine participants were familiar with the 2008 ICZM Plan (none mentioned it as a framework to align their actions with) → objective of the Climagine process shifted towards the development of strategic policy recommendations for coastal ecosystems resilience.
- **Missing final consultation workshop:** last workshop on concrete measures to implement and assigning responsibilities was missing; could have been used to share the coastal plan and present investment opportunities, including for the private sector.
- **Lack of ownership and progress towards implementation** of the ICZM Plan (e.g. the Integrated Management Unit envisaged by the ICZM Plan to be in charge of leading and monitoring its implementation was not created). This is a common problem in the Mediterranean and ICZM Plans often "remain on the shelves", mainly due to the lack of integration of coastal plans actions in available investment mechanisms.

Recommendations:

- **Institutional engagement:** engage national institutions responsible for leading the high-level implementation of the planning process, especially regarding fund mobilization.
- **Local stakeholders:** hold local knowledge, active involvement crucial for the actions' sustainability.
- **Location of the consultation workshops:** influences the level of the stakeholders' participation in terms of representativity (proximity to their workplace) and the nature of their contribution. Local stakeholders generally

feel less intimidated when the workshop is taking place in their area, an alternate mixed-approach could be adopted.

- **Limited representativity** of local participants compared to national ones generated misunderstandings of local realities and a feeling of exclusion by local actors.
- **Core group/ task team** of national and local representatives for close interaction along the process: absence of a structured mechanism for **consensual decision-making** on the selection of the new methodology generated difficulties
- **Sustainability Indicators** include them in the **field surveys**: to pre-identify the indicators and thresholds (e.g. beach width or flooding landmarks), useful for the experts to develop the area's vision and to define the Sustainability Indicators and the BoE.
- **Sustainability Indicators** also based on technical/**vulnerability** assessments: discuss and validate the values jointly with the stakeholders and experts
- In case of **online workshops (Covid-19)**: Stakeholders are often overwhelmed with online events invitations, so stakeholder interactions prior to an online event are key.
Maintain interest by sharing short briefing notes in advance, using pre-workshop questionnaires, sharing their results, and creating online forums for continued discussion.
- **Gender inclusive consultations - stakeholder mapping**: check barriers to women's participation, adjustments in the consultation to overcome these barriers and identify women's organisations, gender experts or gender focal points of sectoral ministries that could be involved.
- **Gender-sensitive coastal plan**: should reflect on differences between women's and men's needs, levels of access and control over resources, opportunities and constraints. Giving equal weight to women's priorities, ensuring equal benefits, and using gender-disaggregated data where relevant (e.g. SI).

GENDER

Implementation - Finance:

Map existing funding mechanisms at the start and secure linkages.

- Develop a sector-based investment portfolio: aligning actions with funding sources
 - 3 funding sources for coastal plan implementation:
- (1.) national funds & (2.) international aid:** coastal plan needs to be incorporated in existent national mechanisms for funds mobilization to create an investment portfolio.
- (3.) private sector:**
- involve the private sector through its representing bodies since the early stages (business associations, unions of farmers, etc.), contribute to shape the coastal plan's actions towards privately fundable ones.
 - involve targeted private stakeholders in specific topics (e.g. insurance companies for climate change risk management, public-private-partnerships regulation units for large infrastructure projects, donor agencies for blended funds, etc.)
 - maintain stakeholder mapping efforts throughout the process and adapt according to the issues/challenges raised during the consultations.
 - **A final roundtable presenting the adopted coastal plan and sending strong messages to the private sector about the commitment of national and local authorities to the plan can be of great assistance.**

"National Development Plan (NDP) is prepared by the Ministry of Planning and adopted by the Parliament for a period of 5 years. It includes sectoral and regional priority investments. All **national funds** are connected to the 5 Years Development Plan. Also, the latter is the reference document for the negotiation with international donors. **It is therefore crucial to have the coastal plan actions included in the 5 Years Development Plan.**"

- Dr. Sarra Touzi (Climagine Consultant, Tunisia)

"If the development of the coastal plan **coincides** with the development of the NDPs, **bridges** between the two processes must be established. If not, **linkages must be sought** in view of the preparation of the next 5-Years Development Plan."

- Dr. Sarra Touzi (Climagine Consultant, Tunisia)

ANNEX 2: SIMPLIFIED TEMPLATES

Power Analysis Matrix

This matrix is a core component of the Rapid Stakeholder Assessment (RSA) conducted during the preliminary step. It helps facilitators map power dynamics, prevent dominant voices from hijacking the process, and determine how to engage different groups.

Stakeholder Name & Organization	Type & Scale of Influence (e.g., Local Gov, NGO, National)	Current Influence / Power (High, Medium, Low)	Current Interest / Engagement (High, Medium, Low)	Status (Primary / Secondary)	Anticipated Role in Process (Inform, Consult, Involve, Collaborate)	Strategic Recommendation (e.g., "Empower via training", "Maintain informed")
Example: Ministry of Environment	National Gov	High	Medium	Primary	Collaborate	Ensure institutional buy-in for the final ICZM plan.
Example: Local Fishermen Coop	Local Civil Society	Low	High	Primary	Involve	Provide capacity building and ensure safe spaces for their voices.

Pre-Workshop Questionnaire

To be sent to invited participants during the Preliminary step to ensure demographic balance, map local needs, and allow stakeholders to prepare relevant data.

Participant Profile:

- Name and Organization: _____
- Role / Title: _____
- Gender: ☐ Female ☐ Male ☐ Prefer not to say (*Used to ensure demographic balance*)
- Age Group: ☐ 18-30 ☐ 31-45 ☐ 46-60 ☐ 60+

Context & Challenges:

1. What do you consider to be the **top three most urgent challenges** for our coastal zone today?
2. How do these challenges specifically impact your sector or community?
3. How are **climate change** and **gender inequalities** currently affecting resource management in your area? (*Addresses cross-cutting themes early*)

Data & Contributions:

4. Does your organization currently monitor any environmental or socio-economic indicators? If so, please list them: _____
5. What specific data, reports, or studies can you bring to the first workshop to support the baseline diagnostic? _____

Indicator Selection Sheet

Used in Step 2 by the technical expert team to filter the "Climagine Indicator Library" and stakeholder inputs. It combines the RACER criteria, DPSIR logic, and the three final filters.

Proposed Indicator	DPSIR Category	RACER (Check if Yes)	Assessment	The 3 Final Filters (Check if Yes)	Final Decision
(Name and Unit)	(Pressure, State, Impact)	☐ Relevant ☐ Accepted ☐ Credible		☐ Legal: Falls under local mandate? ☐ Climate: Reflects climate	☐ Selected ☐ Rejected

	☐ Easy to monitor ☐ Robust	impacts? ☐ Gender: Measures gender equity?	☐ Needs Revision
Ex: Rate of urban Pressure expansion (km ²)	R, A, C, E, R (all checked)	Legal (Yes), Climate (No), Gender (No)	Selected (Core Pressure)

Note: Experts should deliberately prioritize **Pressure, State, and Impact** indicators over Driving Forces or Responses at this stage to ensure actionable monitoring.

Simple Data-Tiering Template

To be used during Step 2 to systematically identify data gaps and avoid the pitfall of selecting unmeasurable indicators.

Selected Indicator	Responsible Source / Institution	Data 3-Tier Classification	Action Required to Bridge Data Gap
Ex: Coastal groundwater level (cm)	Water Authority	☐ Tier 1: Reliable, validated data ☒ Tier 2: Usable estimates ☐ Tier 3: Absent data	Use estimates for workshop Amoeba/Doughnut diagram; establish a formal monitoring protocol.
Ex: Female employment in blue economy	None existing	☐ Tier 1: Reliable, validated data ☐ Tier 2: Usable estimates ☒ Tier 3: Absent data	Use a proxy indicator for Workshop 3; prioritize data gathering as a strategic response measure.

Note: If an indicator is Tier 3, **data gathering must inherently become a strategic response action** in the final plan.

Follow-Up / Implementation Tracking Format

Designed for Step 5 ("Act and Reach Out") to bridge the implementation gap. This format tracks how foresight transitions into legally binding action and sustained financing.

Strategic Priority / Action: _____

Sustainability Indicator(s) & Target (BoE)	Responsible Institution / Coordination Body	Financial Reality Check & Funding Source	Statutory Milestone (Integration Status)	Planning (Integration)	Next Validation / Review Date
Indicator tracking this action and its desired 2030 target value.	Who holds the legal mandate to execute this?	Cost-Benefit Analysis (CBA) results and identified finance mechanisms.	How is this linked to the formal ICZM law or Regional Scheme?		Date for the technical committee to review progress.
Ex: % of wastewater treated (Target: 80%)	Ministry of Environment & Municipalities	CBA positive. Funded via National Water Fund & EBRD.	Drafted into Article 4 of the new Municipal Coastal Decree.		Nov 2026