Building the Mediterranean future together

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Strengthen, structure and sustain a Science Policy Interface (SPI) for IMAP implementation in the Mediterranean

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Plan Bleu

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1. Context and background

The Mediterranean Sea is subject to an increasing number and intensity of land and sea-based human pressures: these are responsible for environmental changes, many of which have negative consequences on coastal and marine habitats and on biodiversity [1], [2]. Almost all Mediterranean maritime sectors (such as tourism, shipping, aquaculture, offshore oil &gas), except commercial fisheries, are expected to grow during the next 15 years, thus further intensifying existing risk for environmental degradation [3]. Understanding and managing the consequences of environmental change of the Mediterranean Sea is a complex task, as problems are numerous, interlinked and with highly uncertain outcomes (e.g. as a consequence of climate change, evolution of macro-economic context, as well as the evolution of political circumstances, in particular on the southern side of the Mediterranean). Moreover, issues often transcend national borders and call for strong cooperation at the regional and sub-regional levels among Mediterranean countries, which are significantly different from each other, e.g. in terms of legislative and institutional framework, experience, capacities, data and tools availability.

UNEP/MAP and the Barcelona Convention (including its seven additional protocols) provide a unique framework for institutional cooperation among all Mediterranean countries and the EU. The convention that aims to improve environmental protection, sustainable management of costal and marine resources (see for example [4]) and the resilience of coastal areas to climate change. This articulated framework is complemented by other international agreements, including the General Fisheries Commission for the Mediterranean (GFCM) and the Agreement on the Conservation of Cetaceans in the Black Sea Mediterranean Sea and Contiguous Area (ACCOBAMS).

The Ecosystem Approach (EcAp) represents the overarching guiding principle to policy developments and implementation under the auspices of the Barcelona Convention. EcAp refers to a specific roadmap: Contracting Parties have committed to implementing EcAp with the ultimate objective of achieving Good Environmental Status (GES) of the Mediterranean Sea and coast. GES has been defined through eleven Ecological Objectives (EO) (often grouped in three clusters: (i) pollution, contaminants and eutrophication; (ii) marine biodiversity and fisheries; (iii) coast and hydrography) and twenty-eight corresponding operational objectives. The IMAP (Integrated Monitoring and Assessment Programme) provides a mechanism to evaluate status and progress towards the achievement of GES by means of a set of common and candidate indicators[1] [5]. The 2017 Mediterranean Quality Status Report (QSR) issued in 2018 [6] collates and synthesises data collected from different sources.

The implementation of IMAP is focussed on integrated quantitative assessment and monitoring of the Mediterranean marine and coastal environment, to inform decision making processes. Science represents a crucial component to the wider knowledge base used to enrich decision making that includes also technological, social, economic behavioural and political considerations. Marine knowledge providers (e.g. research organizations, NGOs, industry, etc.) play an important role in producing and making available knowledge that can be used to inform the policy process. However, several barriers still affect the efficient transfer of scientific knowledge into the policy making process, for example in terms of differences in objectives, expectations, timing and languages, etc.

Therefore, there is an increasing necessity for a clearer identification of policy-related knowledge needs, at the regional, national and local scales. Bridging the gap between science and policy, and connecting information production and knowledge generation to foster its use in the decision-making process at different levels is still considered one of the main challenges of our era. This issue is even more prominent when dealing with the complex environmental challenges that the society of the 21st century faces in addressing emerging issues and sustaining the vitality and integrity of socio-ecological systems [8]. Multi-directional rather than one-way linear relationships between science and policy should be facilitated to allow for exchanges, co-evolution and joint construction of knowledge with the aim of enriching both decision-making and supportive research approaches [ibid].

1 A common indicator is an indicator that summarizes data into a simple, standardized, and communicable figure and is ideally applicable in the whole Mediterranean basin, or at least on the level of subregions, and is monitored by all Contracting Parties. Candidate indicators are indicators, which still have outstanding issues regarding their monitoring and assessment and therefore are recommended to be monitored in the initial phase of IMAP on a pilot and voluntary basis.

2. Science-Policy Interfaces

Science-Policy Interfaces (SPIs) provide ways in which scientists, policy makers and other relevant actors can cooperate to co-create the actionable knowledge, which is needed to design and implement policies. This study considers policies aimed at improving the environmental protection of the Mediterranean Sea. SPIs, in this context, are essential to maximize knowledge transfer, and ensure relevant scientific information is available for consideration by knowledge users across the marine stakeholder and policy sectors [9].

SPIs can be defined as "…social processes which encompass relations between scientists and other actors in the policy process, and which allow for exchanges, co-evolution, and joint construction of knowledge with the aim of enriching decision making" [10]. Similarly, the United Nations Environment Programme (UN Environment) defines SPI as a structure or a process that aims to improve the identification, formulation and evaluation of policies to improve the effectiveness of governance [11].

Although other (slightly different) definitions of SPIs are available, there is a common agreement on the criteria that SPI should meet [12]:

- Credibility: perceived validity of information, methods and procedures provided and applied via an SPI;
- Relevance: extent to which the work carried out within an SPI is responsive to the conditions and needs of the policy process; and
- Legitimacy: perceived fairness, balance and political acceptability of its outputs.

Since the essential scope of SPIs is to bridge the gaps between science and policy making, bi-directional communication is key: joint development of problem understanding and co-creation of knowledge-based (policy) solutions are therefore the core components of the SPI mechanisms.

In the Mediterranean context, scientists are challenged to clarify how their research is policy relevant, how it can feed into national and regional EcAp monitoring programmes and plans, and how it can be translated in guidelines and recommendations. The other way around, policy makers should clearly define research needs and expectations [13], [14], [15], [16] as well as practical knowledge of policy constraints and bottlenecks. Knowledge co-creation is not only essential to fill existing gaps, but also to focus on key information needs, including emerging ones, avoiding both underuse and duplication of data.

SPIs aim to remove barriers hindering the dialogue between scientists and policy makers and specifically to reconcile some of the trade-offs that typically affect communication between the two:

- Complexity and clarity trade-off: detailed assessment and understating of processes vs. simple messages needed for policy making;
- Different timing trade-off: in-depth quality assessment vs. needs for quick responses;
- Push-pull trade off: supply-driven vs. demand driven research.

For this reason, an optimal SPI needs to increase the connectivity between science and policy-making / management to promote continuous or recurring interactions and collaborations. An evolution in the practice of science-policy activities has been occurring in the last decade. This evolution has been catalysed through the innovation and experimentation of the leading actors in science-policy interfaces. Their understanding and vision of routes to more effective outcomes has changed many people's perception of what the work involves [17].

The science-policy interface is now understood to be much wider and includes many more decision-makers and non-institutional players. It engages with the complexities of policy-making and is a multi-directional flow of evidence and information [18]. In addition to increasing interaction and collaboration between the science and policy spheres, modern SPIs should also foster interaction with society, to engage stakeholders from the economic sectors and the civil society in a dialogue on the results of scientific research and on the needs for specific scientific knowledge. Scientists, on the other side, can enrich their research process with practitioner knowledge from the group. This can be encompassed by an "extended" SPI (Figure 1). The presence of a third component in the interface (the economic sectors and society) is important since the ultimate aim of environmental policy should be the long term

sustainability of human activities (including the environmental, social and economic dimensions) and the well-being of marine and coastal communities and the society at large.

Such a complexity is well illustrated in the diagram included in a recent UN-Environment publication on SPI gaps [17] and reproduced below (Figure 2).

Figure 1: Designing optimal Science-Policy Interfaces: extended SPI interface. Modified from [13]

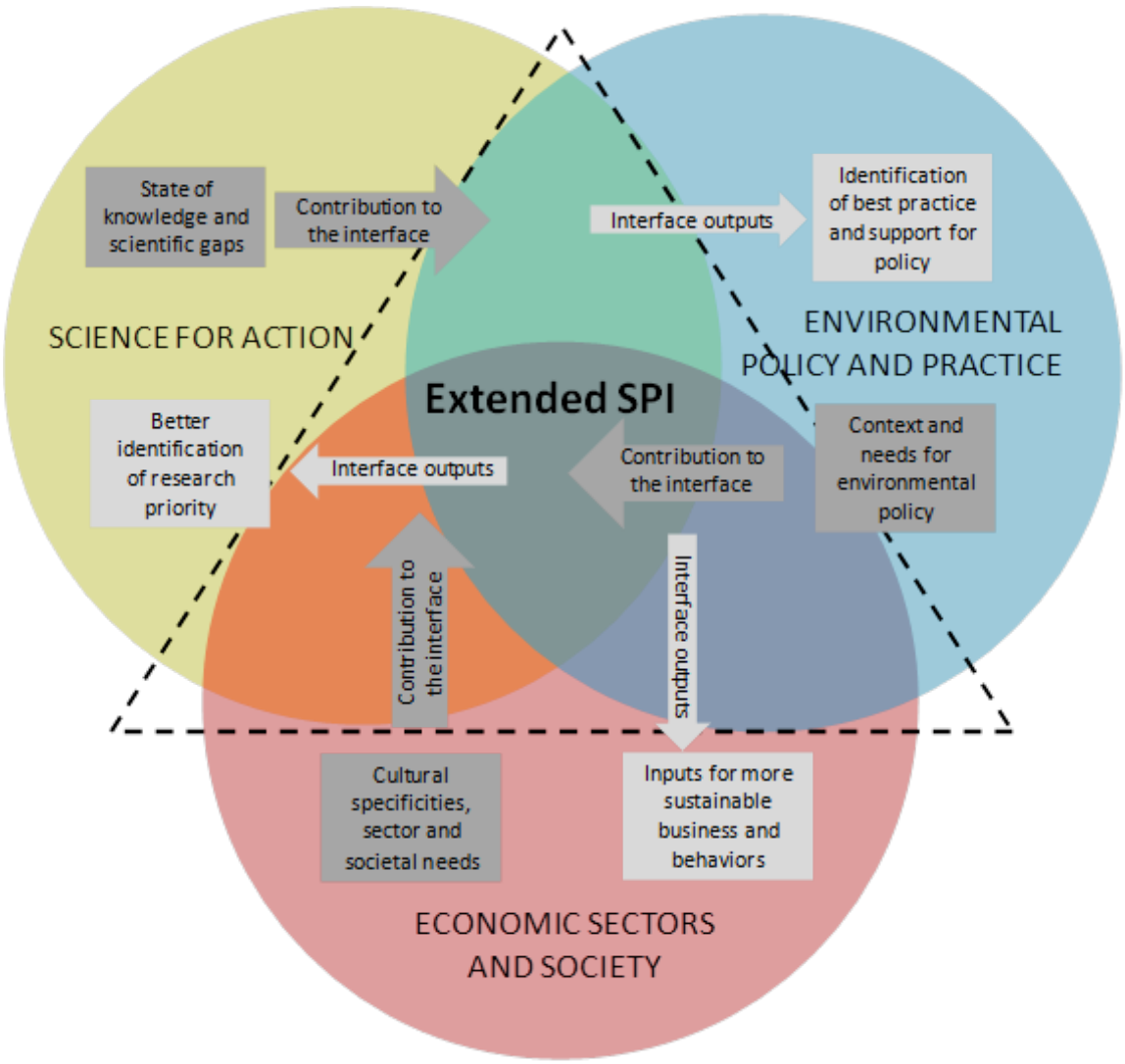
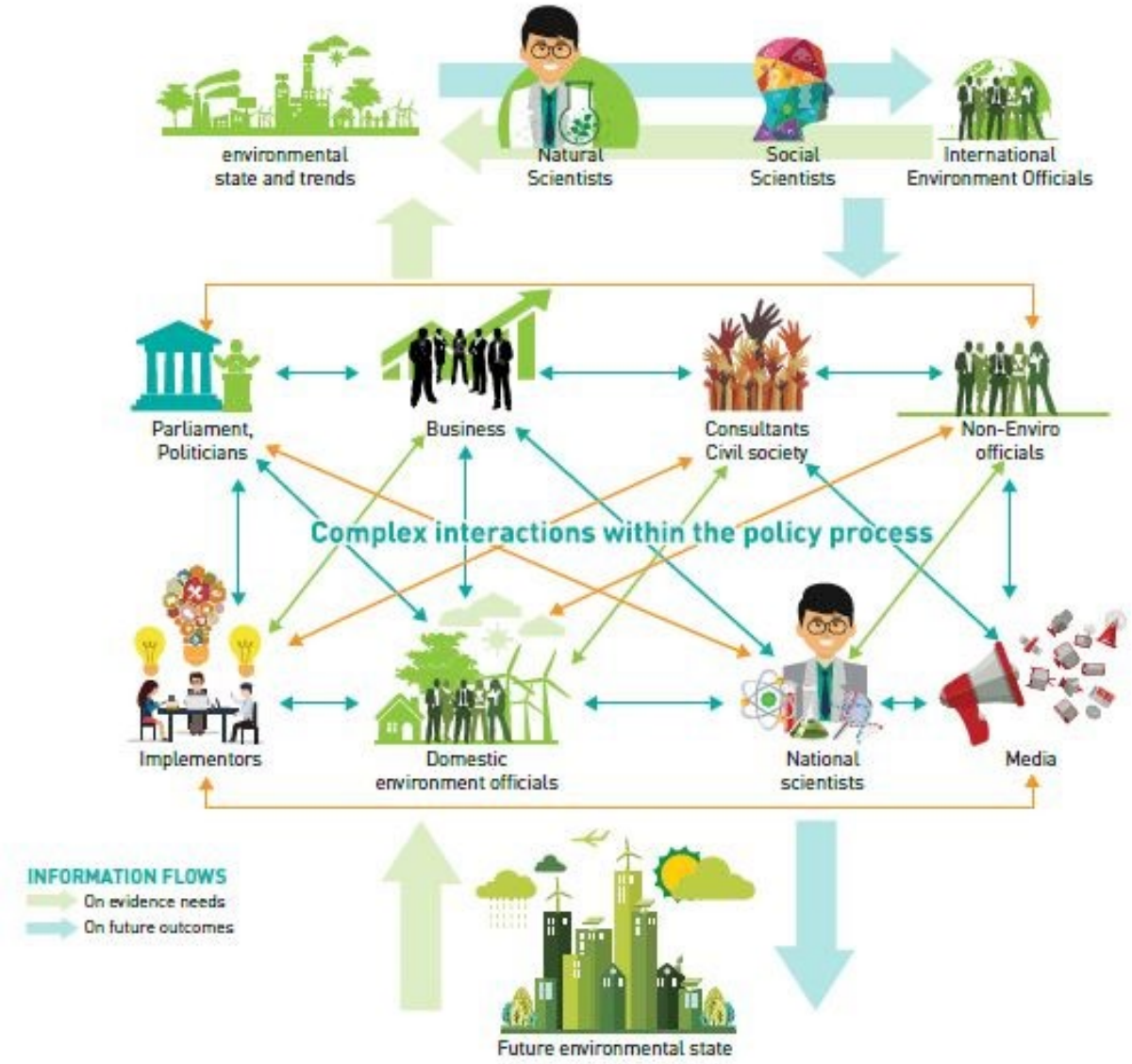


Figure 2: SPI actors: people who could use science to influence the set of decisions that affect future environmental states. From [17]



2.1. CHALLENGES OF SPIS: BARRIERS AND OPPORTUNITIES

A recent UN Environment report [17] analyses the major challenges that have driven or are expected to drive the evolution of SPI activities:

1. Complexity of problems, which requires the co-operation of a multitude of decision makers with divergent priorities and scientists from a wide-range of disciplines, as well as the understanding of interactions between achievements of parallel goals.
2. Need to support the implementation of international environmental agreements in counties and regions.
3. Need to deal with a changed context for science-policy work: decisions are urgent, uncertainty is high, and political will fluctuates rapidly.

Complexity represents indubitably a core issue and its components may be identified as follows [19]:

- Different communities have characterised this relationship through various mental models that identify a range of challenges and propose different solutions.

- A linear relationship between science, policy and practice is only applicable in relatively simple systems where there is strong agreement about goals among stakeholders and where problems are largely technical in nature.
- More complex and large-scale problems require attention to the social and institutional context in which research is used, particularly in the face of: (a) controversy (many stakeholders with differing goals); (b) complexity (uncertainty about feedback, risks and potential interactions between system drivers such as social, biophysical and ecological change); (c) urgency (a need or demand for decision-making within short timeframes)
- There are many possible approaches that can be used to improve the influence of science in policy and practice. These can be informed by theory and practice from sectors beyond conservation. Any proposed solution must be tailored to the particular problem, location, stakeholders and governance setting.

To respond to these challenges SPI are expected to: (i) shift from the "simple" identification of problems to uptake of solutions, (ii) deal with a wider audience and divergent viewpoints, (iii) increase effective exchange of evidence [17].

Following on similar considerations, the results from an analysis on the barriers to knowledge exchange between scientists and decision makers and on possible actions to facilitate knowledge exchange are summarised in Table 1 [20].

Table 1: List Barriers and opportunities for SPI. From [20]

Barriers to knowledge exchange between scientists and decision-makers	
Cultural differences	In general scientists construct theories, test hypotheses and refine conceptual models over time based on rigorous methodological approaches to withstand the highest degrees of public scrutiny and criticism. In turn, in the world of decision-making science is just one point of view, and frequently not the most influential.
Institutional barriers	Inadequate measures of science impact that do not account for engagement activities, lack of organisational support for engagement activities, insufficient time in addition to other responsibilities, lack of funding. In addition: some outreach activities that typically constitute the type of work involved in knowledge exchange activities are not widely accepted as legitimate forms of scholarship.
Science in-accessibility	Long time needed to publish in scientific journals: information may thus be out of date and less useful to decision-makers by the time it is made available. Part of scientific literature not freely available to decision makers due to scientific journals requiring subscription to access the contents.
Conventional approaches to knowledge exchange	Linear and uni-directional knowledge transfer processes often applied (from science to policy). These approaches fail to acknowledge and integrate the diversity of social contexts among end-users or the multiplicity of actors involved, preventing the uptake of information into the decision-making process.
Personal perceptions and worldviews	While scientific knowledge is often presented to decision-makers in an explicit form (e.g. through media such as written reports or oral presentations), the information being presented is interpreted by individuals who make sense from that information based on their own personal knowledge and past experiences.
Opportunities: overcoming barriers to knowledge exchange	
New models of knowledge exchange	Develop knowledge coproduction with managers actively participate in scientific research programs collaborating throughout every aspect of the study. Permanently embed research scientists within organisations dominated by decisions-makers. Embed knowledge brokers within research teams or institutions. Use boundary organisations (external entities) to improve knowledge exchange among producers and users of scientific knowledge.
Improved access to scientific information	Develop systematic literature reviews in relation to natural resource management: while 'narrative' review papers are routinely published in relation to marine systems and span a range of topics, they are not developed in a systematic manner to address concerns relating to science inaccessibility.

Enabling conditions to improve knowledge exchange	Need for institutional innovation. For research organisations, this should include formally recognising engagement and communication activities as a core component of a scientist's role, and thus supporting these activities with both dedicated funding and time allocations. Research founders and donors should promote the establishment of new criteria for awarding research funding that include measures of stakeholder engagement, and the provision of dedicated funding to solely support stakeholder engagement activities

3. A SPI to support IMAP implementation

3.1. SPI IN THE CONTEXT OF IMAP

Specific interest in a SPI for IMAP was expressed at the 19th Ordinary Meeting of the Contracting Parties to the Barcelona Convention (COP19) held in Athens in February 2016. The Parties adopted then several decisions calling for a stronger science-policy interface, including, for example, those on the Mediterranean Strategy for Sustainable Development - MSSD 2016-2015 [21] calling for a participatory approach to policy and decision-making, and underlying the importance of evidence-based policy and the Regional Climate Change Adaptation Framework Programme [22]. This requirement to strengthen the science-policy interface also features in the biannual UN-Environment/MAP Work Programme [23]. The Parties have called for efforts to structure relationships between the UN Environment/MAP system and scientific communities by creating scientific committees and expert groups with an advisory role to support policymaking processes.

In the context of implementing the EcAp Roadmap adopted by the Contracting Parties to the Barcelona Convention in 2008, the MAP system has delivered in 2017 the first ever Quality Status Report for the Mediterranean [24]. This is the first assessment product based on the MAP Ecological Objectives and IMAP indicators. All available data for the IMAP Common Indicators were used. Data gaps were addressed with inputs from diverse sources where appropriate. Each Indicator assessment provides all the sources of information used, including assessments, reports, publications and information provided from the Contracting Parties and other partners [24]. This includes information related to national reports on the implementation of the Barcelona Convention and its Protocols, implementation of the National Action Plans (NAPs), Coastal Area Management Programmes (CAMPs), as well as the results of regionally and nationally driven implementation of relevant policies, programmes and projects.

Mainstreaming the EcAp into the work of UN Environment/MAP Barcelona Convention and achieving the GES of the Mediterranean Sea and Coast through the EcAp Roadmap have been supported by two projects:

- **EcAp-Med I project** (2012-2015): Implementation of the EcAp in the Mediterranean by the Contracting parties in the context of the Barcelona Convention for the Protection of the Marine Environment and the Coastal region of the Mediterranean and its Protocols. The overall objective of this project was to support UN Environment/MAP to implement the Conference of Parties decisions regarding the application of the EcAp in the Mediterranean in full synergy and coherence with the implementation of the European Union (EU) Marine Strategy Framework Directive (MSFD).
- **EcAp-Med II project** (2015-2018), supported by the EU: Mediterranean implementation of the EcAp, in coherence with the EU MSFD. With the ultimate objective of achieving the Good Ecological Status (GES) of the Mediterranean Sea, this project seeks to support UN Environment/MAP Barcelona Convention and its Southern Mediterranean Contracting Parties to implement the EcAp in synergy and coherence with the implementation of the EU MSFD. At this stage of the EcAp implementation, the project aims particularly to support Southern Mediterranean Contracting Parties to implement the EcAp Roadmap, through assisting them in establishing new monitoring programmes in line with EcAp.

Plan Bleu has been mandated to coordinate one of the key activities of the EcAp MED II project, focusing on SPI strengthening. In the framework of the implementation of the EcAp, the IMAP has been adopted to monitor 27 indicators to assess the status of the Mediterranean Sea and Coast towards to achieving GES. In order to enable implementation of IMAP, it is crucial to bridge existing gaps between the scientific and policy making spheres.

From December 2015 to March 2018, Plan Bleu organized a series of workshops dedicated to the strengthening of the science-policy interface to support the full implementation of IMAP. Around 15 key cross-cutting and topic-specific knowledge gaps to be filled for the complete implementation of IMAP have been identified, along with proposed actions to address these gaps

Building on the proposals formulated during these workshops, by scientists and technical ministries representatives, led to identify and structure recommendations to ensure that the knowledge produced by scientists contributes to

the operational implementation of IMAP. So, in February 2019, Plan Bleu published 3 brochures (one per IMAP Cluster: Marine biodiversity and fisheries; Pollution and Eutrophication; Coast and Hydrography) to provide Mediterranean stakeholders with key technical and scientific recommendations and conclusions that emerged from the workshops. The brochures are collected in a recently published paper [25].

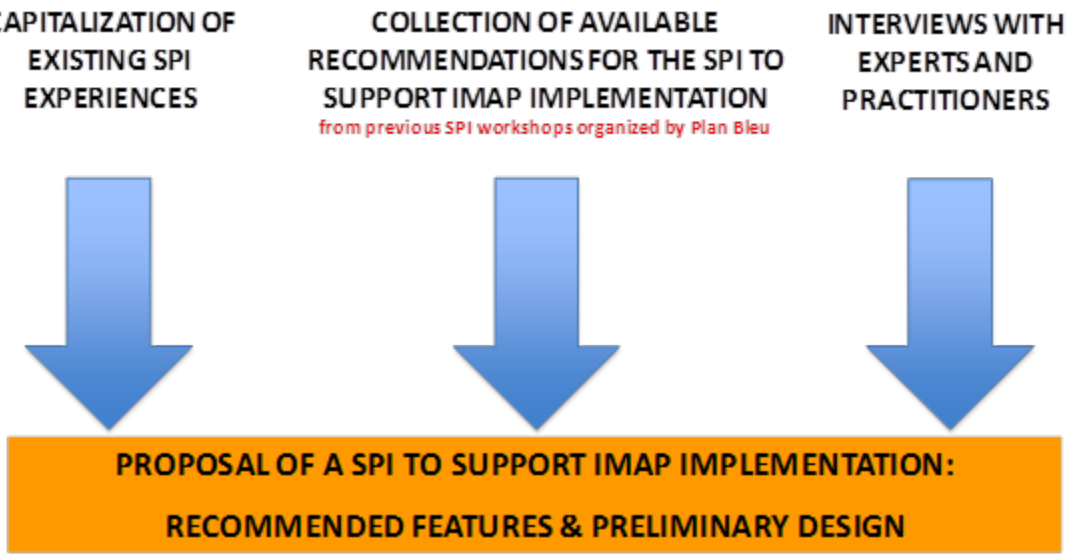
3.2. AIM AND METHODS OF THIS STUDY

Building on the three brochures, this study aims to take a broader perspective and capitalize on experience with SPI in the context of EcAp. This study will provide operational SPI recommendations for future actions to support countries and institutions part of the Barcelona Convention system in the full implementation of IMAP. The study also specifically aims to identify possible features of a SPI for IMAP, including possible actors, roles and structure.

The following activities were undertaken (Figure 3):

- Review of existing SPI experiences through (i) desk analysis of available literature and (ii) survey with questionnaires addressed to the experts that participated in the EcAp MED II project (workshops participants);
- Compilation of recommendations for a SPI IMAP formulated within previous phases and projects (in particular the EcAp MED II project);
- Identification of open issues and formulation of questions to be addressed through interviews to experts and managers/practitioners, as further detailed below;
- Definition of the features of the proposed SPI for IMAP implementation;
- Final report preparation including recommendations for SPI at the regional and national level.

Figure 3: Activities undertaken under the present study



Based on the desk analysis, SPI possible characteristics, needs and major gaps were identified. Such findings were verified through targeted interviews with representatives from the EcAp clusters on (i) pollution, contaminants and eutrophication; (ii) marine biodiversity and fisheries; (iii) coast and hydrography. A total of five interviews were arranged with scientists and managers/practitioners from the IMAP clusters.

Within the limited time available for the study and the consequent small size of the consulted panel, we have tried to ensure a good distribution across the beneficiary countries, the EcAp clusters and the role of interviewees (scientist or policy maker/practitioners), as summarised in Table 2. Contact persons for interviews were indicated by Plan Bleu.

Table 2: Performed interviews with scientists and managers/practitioners from the IMAP clusters

	Scientists				Policy side		
	Coast and Hydrography	Biodiversity	Pollution		Coast and Hydrography	Biodiversity	Pollution
Tunisia			X				
Libya		X					
Egypt						X	
Morocco							X
Algeria	X						

Other interviews were conducted with some of the UNEP/MAP RACs particularly involved in the IMAP process: PAP/RAC, INFO/RAC and MEDPOL provided their contribution.

In collaboration with Plan Bleu, a questionnaire was prepared (in English and French) to be used during all interviews. The questionnaire *(in Annex)* was sent to interviewees some days before the interview.

In addition, with the aim to expand the consultation to a larger number of actors, and to be able to identify national and sub-national experiences, an on-line survey was conducted. All participants in the EcAp MED II workshops (60 persons) were invited to participate in the survey. Notwithstanding the reiteration of the request and the additional time provided for compilation, we were able to collect only eight responses. The survey template is *in Annex*.

Results from interviews and survey are fed into different sections of the report: National and sub-national experiences (section 4.4), Recommendations (chapter 5); Proposal of an SPI for IMAP (chapter 6).

Finally, a glossary was compiled, for most important terms used within this report (see the box below).

GLOSSARY

Policymakers. Those who develop policies in environmental protection, relevant for the Mediterranean Sea and coasts.

Practitioners. Those who implement environmental policies relevant for the Mediterranean Sea and coasts in practical contexts, at international, national or local scale.

Managers. Same meaning as practitioners. Also named "executives" in relation with their role in the institutional organization.

Scientists. Those engaged in scientific research activities in a field relevant for any 11 ecological objectives used to define the ecological status according to EcAp, the related indicators and any piece of knowledge relevant to them.

SPI. The structured productive exchange of evidence between individuals who can use this information to influence the outcomes of policy decisions on the environment [17].

4. Review of relevant existing SPI experiences

SPIs can take many forms, from informal discussions between scientists and policymakers to the creation of intergovernmental bodies and the implementation of research projects to facilitate the implementation of specific public policies. In this context, a wide variety of initiatives of different kind exist, internationally, across the EU and at regional scale. These include formal or informal networks, series of meetings and workshops, publications and IT services (web sites, IT platforms, data portals) for research results communication, news distribution and exchanges.

Aiming at identifying existing SPI characteristics, needs and major gaps, and to capitalize on this information to construct a possible structure of the SPI for IMAP, a review was prepared considering international, European and regional sea initiatives. Some information on national SPI initiatives, not available in the literature, was obtained during the interviews and from the on-line survey. Results from the many projects having SPI components are also available and they were included in the review.

4.1. INTERNATIONAL SPI EXPERIENCES

A wide number of SPI experiences are available at international level, also as a consequence of initiatives and efforts aiming to support coherent implementation of international agreements dealing with environmental protection and sustainable use of natural resources. Some of these SPIs are intergovernmental bodies with a formalised and legally based structure that enables involving member states in their operative mechanism; they can be somehow permanent or specifically activated for one-off assessment. Other international SPI experiences are scientific bodies and networks not strictly linked to formalised structures; these might find it more difficult to directly feed scientific evidence into the policy decision processes.

The **Intergovernmental Panel on Climate Change (IPCC)** was established in 1988 by UN Environment and the World Meteorological Organisation (WMO) to provide periodic detailed scientific studies and understandings, and syntheses for policymakers of current knowledge on climate change (thus providing multi-layered products). Summaries are specifically addressed to policymakers to provide them with a reliable scientific basis for formulating climate policy. The IPCC members are States and IPCC reports are approved by consensus among these members. To ensure the credibility and legitimacy of the reports, the IPCC has established a rigorous peer review mechanism whereby each of its reports is reviewed twice by a wide community of experts [13]. Coordinating Lead Authors, Lead Authors and Review Editors for each report chapter are nominated by IPCC Focal Points, Observer Organizations and/or IPCC Bureau Members after the outline of a report has been agreed. Review Editors help identify expert reviewers, ensure that all substantive comments are afforded appropriate consideration, and advise Lead Authors on how to handle contentious or controversial issues. Authors, Editors and expert work on a voluntary base.

The IPCC is divided into three Working Groups and a Task Force. Working Group I deals with The Physical Science Basis of Climate Change, Working Group II with Climate Change Impacts, Adaptation and Vulnerability and Working Group III with Mitigation of Climate Change. The main objective of the Task Force on National Greenhouse Gas Inventories is to develop and refine a methodology for the calculation and reporting of national greenhouse gas emissions and removals. Other Task Groups may be established by the Panel for a set time period to consider a specific topic or question. One example is the decision at the 47th Session of the IPCC in Paris in March 2018 to establish a Task Group to improve gender balance and address gender-related issues within the IPCC.

The **Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)** was formally established in 2012. The objective of this independent intergovernmental body is to strengthen the science-policy interface on biodiversity and ecosystem services, for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development. The IPBES implements a consultative approach, creating a work programme that responds to requests from decision-makers involved in biodiversity governance [13]. The structure of IPBES includes:

- Plenary: the governing body of IPBES, is composed with representatives of IPBES member States

- Observers: any State not yet a member of IPBES, the Convention on Biological Diversity (CBD) and other biodiversity-related conventions, related UN bodies, as well as many other relevant organizations and agencies;
- Bureau: the administrative functions of IPBES
- Multidisciplinary Expert Panel (MEP): Five expert participants from each of the five UN regions, overseeing all IPBES scientific and technical functions
- Stakeholders: all contributors to and end-users of the IPBES outputs
- Expert Groups & Taskforces: Selected scientists and knowledge holders carrying out the IPBES assessments and other deliverables
- Secretariat (Includes Technical Support Units): Ensures the efficient functioning of IPBES.

IPBES activities include: (i) Preparation of thematic assessments and methodological issues at both the regional and global levels; (ii) Policy Support through the identification of policy-relevant tools and methodologies, facilitating their use, and facilitating their further development; (iii) Building Capacity & Knowledge by identifying and meeting the priority capacity, knowledge and data needs of our member States, experts and stakeholders; (iv) Communications & Outreach by ensuring the widest reach and impact of their work.

The **Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects** (Regular Process) is a global mechanism established after the 2002 World Summit on Sustainable Development to regularly review the environmental, economic and social aspects of the world's oceans, both current and foreseeable. It is accountable to the United Nations General Assembly, and its purpose is to contribute to the strengthening of the regular scientific assessment of the state of the marine environment in order to enhance the scientific basis for policymaking. The first cycle of the Regular Process ran from 2010 to 2014 and produced the First Global Integrated Marine Assessment (also known as the "First World Ocean Assessment"), detailing the state of the world's ocean, the extent of human knowledge of the oceans, and the effect of human activities on the oceans. The second cycle of the Regular Process was launched in late 2015 and will end in 2020.

While the first cycle focused on establishing a baseline for measuring the state of the marine environment, the second cycle will also evaluate trends and identify gaps. This second cycle is working on two main outputs: 1) the Second World Ocean Assessment and 2) direct support to other ocean-related intergovernmental processes, including: the implementation of the 2030 Agenda for Sustainable Development, the process for the development of an international legally binding instrument under the United Nations Convention on the Law of the Sea (UNCLOS) on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, as well as the processes under the UN Framework Convention on Climate Change and the UN Open-ended Informal Consultative Process. In parallel, the Regular Process has organised regional workshops aimed at improving the participation of countries in the assessment and more generally reinforce the science-policy interface.

The "Ad Hoc Working Group of the Whole" of the General Assembly, established in 2008 oversees and guides the Regular Process. A 15-member Bureau, consisting of representatives of 15 Member States and established in 2012, puts into practice the decisions and guidance of the Ad Hoc Working Group of the Whole, while a group of maximum 25 experts carries out the assessment. In addition, a much larger Pool of Experts has been created to assist the Group of Experts in conducting the assessments and to provide effective peer-review. The Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs of the United Nations was designated by the General Assembly as the secretariat of the Regular Process.

Previously described experiences deal with the assessment of some specific, although wide in scope, environmental aspects (climate change, biodiversity and ecosystem services, marine environment). The **Global Environment Outlook** (GEO) of UN Environment provides an integrated analysis and assessment of all major environmental topics. GEO is a consultative and participatory process to prepare an independent assessment of the state of the environment, the effectiveness of the policy response to address major environmental challenges and the possible pathways to achieve various internationally agreed environmental goals. Recognising the importance of continuing assessment, UN Environment has produced 6 GEO reports until 2019 and a series of regional assessment (in 2016) providing key policy messages for the 6 UN Environment regions: Africa, Latina America and the Caribbean, North America, West Asia, Pan European region, Asia and the Pacific. While environmental decision makers and managers are the main target users of GEO, reports and other GEO products also provide knowledge to other users, as local communities, business sectors and the youth. GEO reports include summaries for policy-makers, often available in most commonly used languages.

The **Millennium Ecosystem Assessment (MA)** was a one-off assessment lunched in 2001 by the UN, to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the

conservation and sustainable use of these ecosystems. A Board was established to represent key users of the findings of the MA. It included representatives of the Convention on Biological Diversity (CBD), the UN Convention to Combat Desertification (CCD), Ramsar, and the UN Convention on Migratory Species (CMS); national governments; UN agencies; civil society representatives (including indigenous peoples); and the private sector. Board members representing institutions were selected by those institutions. In addition, 10 "at-large" members were selected by the Steering Committee and an additional 10 members were chosen by the Board at its first meeting.

The MA was undertaken by an international network of scientists and other experts, with a process modelled on the IPCC. More than 1,300 authors from 95 countries were involved in the MA, organized into 4 working groups. MA working groups involved both natural and social scientists, many of whom are leaders in their fields. The Assessment Panel, comprising the co-chairs of the working groups and a few additional scientific experts, oversaw the technical execution of the assessment work. Each working group was assisted by a Technical Support Unit (TSU) to help coordinate the network of scientists and experts involved.

The MA's four technical volumes underwent two rounds of review by experts and governments. Together with 44 governments and 9 affiliated scientific organizations, over 600 individual reviewers worldwide provided around 18,000 individual comments. The review process was overseen by an independent Board of Review Editors, composed of Chapter Review Editors who ensured that all review comments were adequately handled and responded to by MA authors.

The **International Council for the Exploration of the Sea (ICES)** is an intergovernmental marine science organization, meeting societal needs for impartial evidence on the state and sustainable use of our seas and oceans. It is a network of more than 5,000 scientists from 20 member countries. ICES primary role is to advance and share scientific understanding of marine ecosystems and the services they provide - and to employ this knowledge to generate state of the art advice on meeting conservation, management and sustainability goals.

ICES draws on scientific work and data to provide impartial scientific advice for a wide range of recipients, including its member countries and international organizations and commissions, such as the Oslo Paris Commission (OSPAR), the Helsinki Commission - Baltic Marine Environment Protection Commission (HELCOM), the North East Atlantic Fisheries Commission (NEAFC), the North Atlantic Salmon Conservation Organization (NASCO), and the European Commission (EC).

ICES is organized around various committees, expert groups, and workshops. The core of ICES work is accomplished through Expert Groups (EG) and workshops. Steering Groups (SG) manage the expert groups and workshops portfolio:

- Aquaculture Steering Group
- Ecosystem Processes and Dynamics Steering Group
- Fisheries Resources Steering Group
- Human Activities, Pressures and Impacts Steering Group
- Integrated Ecosystem Assessments Steering Group
- Ecosystem Observation Steering Group

ICES has a well-established Data Centre, which manages a number of large dataset collections related to the marine environment. ICES maintains also Thematic Data Portals e.g. Biodiversity database (Joint OSPAR/HELCOM/ICES Working Group on Marine Birds - JWGBIRD, Working Group on Marine Mammal Ecology - WGMME); Contaminants, biological effects, and biological community data; Eggs and Larvae database; etc.

The **Deep Ocean Stewardship Initiative (DOSI)** is predominantly a scientific network involving experts from across disciplines and sectors formed to develop new ideas for sustainable use and management of deep-ocean resources. DOSI seeks to integrate science, technology, policy, law and economics to advice on ecosystem-based management of resource use in the deep ocean and strategies to maintain the integrity of deep-ocean ecosystems within and beyond national jurisdiction. DOSI is coordinated by a restricted group of scientists, it has an Advisory Board and it works by Working Groups. Beyond thematic Working Groups (e.g. mineral, Biodiversity Beyond National Jurisdiction, oil & gas, climate change, etc.), DOSI includes some other groups with a significant SPI component:

- Policy, aimed at enhancing the linkage between DOSI science and the formulation of policy related to the deep ocean, both within and beyond national jurisdictions. The Policy Group builds on the policy-related activities of the Deep Ocean Stewardship Initiative across Working Groups and provides connections to external legal entities and instruments.

- Knowledge Gaps & Global Ocean Assessments, ensuring that assessment and management of the deep ocean are based on comprehensive input from the scientific community, including natural and social scientists.
- Capacity Development, focused on awareness and building capacity, especially in developing nations.

As with other SPI initiatives, DOSI provides different typologies of outputs for different targeted users, including: policy briefs, newsletters, brochure, webinars, workshops, reports, etc.

Summary table: Key features of the international SPI experiences	
Intergovernmental Panel on Climate Change (IPCC)	- Intergovernmental body producing independent scientific advice for policy-makers - Preparation of periodic detailed scientific studies and understandings, and syntheses for policymakers - Rigorous peer review mechanism - Structured around three Working Groups and a Task Force (for methodological developments) - Additional Task Groups are temporally activated to deal with specific topics
Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)	- Intergovernmental body producing independent scientific advice for policy-makers - Consultative approach, creating a work programme that responds to requests from decision-makers - IPBS structure: Plenary, Observers, Bureau, Multidisciplinary Expert Panel (MEP), Stakeholders, Expert Groups & Taskforces, Secretariat - Preparation of: (i) thematic assessments and methodological issues; (ii) policy-relevant tools and methodologies; - Building Capacity & Knowledge &Communication
Regular Process for Global Reporting and Assessment of the State of the Marine Environment, including Socioeconomic Aspects	- Intergovernmental body producing independent scientific advice for policy-makers - Direct support to other ocean-related intergovernmental processes - Formalised and articulated structure - Wide group of experts involved, also providing effective peer review - Workshops focused on SPI
UN Environment Global Environment Outlook	- Continuing assessment and multi-layered reports - Targeted assessment for environmental decision making, including products also for other users - Macro-regional assessments, reflecting specific characteristics of different world macro-regions. - Based on integrated assessment approach and consultative process
Millennium Ecosystem Assessment (MA)	- One-off assessment - Board representing national governments and international organizations - International network of scientists and other experts organized in four Working Groups, each one supported by a Technical Support Unit - Rigorous peer review mechanism
International Council for the Exploration of the Sea (ICES)	- Intergovernmental body producing independent scientific advice for policy-makers - Steering Groups organizing expert groups and workshops, covering a wide range of issues - Provide impartial scientific advice to international organizations and commissions and member countries - Data Centre and Data Portals
Deep Ocean Stewardship Initiative (DOSI)	- Union of experts - Coordinated by a restricted group of scientists, it has an Advisory Board and it works by Working Groups - Preparation of targeted outputs, including webinars and briefs

4.2. EUROPEAN SPI EXPERIENCES

The European Commission has launched a number of science-policy initiatives directly targeted at enhancing environmental policy implementation. They mainly consist in IT services, like portals for news, research summaries and data exchange.

An example of a web portal for communication of news on research results is represented by the **Science for EU Environment Policy Interface (SEPI)** which is a free news and information service published by the Directorate General Environment of the European Commission. It is designed to help the policymakers keep themselves up-to-date with the latest environmental research findings needed to design, implement and regulate effective policies. SEPI covers information in about 30 thematic areas, including: agriculture, biodiversity, chemicals, climate change & energy, flooding, marine and coastal, urban environment, waster, water, etc. A range of information sources are provided by the service, including:

- Science for Environment Policy News Alert, an email service which presents summaries of key studies across a range of environmental topics. Contents of the News Alert are rigorously reviewed by an independent network of European advisors and the DG Environment policy staff, to ensure that only high quality research is featured.
- Thematic Issues on hot policy topics, with accessible summaries of studies and a guest editorial;
- Policy briefs which explore the evidence around emerging environmental issues;
- In-depth reports which take a comprehensive look at the latest science for key policy topics.

The SEPI web portal also provides access to short videos, interviews, infographics and related research publications on relevant and emerging themes (e.g. valuing and accounting for ecosystems, sustainable aquaculture, etc.) for environmental policy.

The **Joint Research Centre** (JRC) is the European Commission's science and knowledge service which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy. In this perspective it also play an SPI role at the EU level on a wide range of topics, including agriculture and food security, environment and climate change, health and consumer protection. Among the various services, JRC provides access to scientific tools, databases, and publications in partnership with policy departments of the European Commission, manages knowledge and competence centres. Knowledge centres have been established recognising that often the main bottleneck is not data availability, but the way data are used to address most pressuring challenges. These centres help policymakers understand the latest scientific evidence in a transparent, tailored and concise way. JCR and partner EC services manage and operate six knowledge centres on: food fraud and quality, territorial policies, migration and demography, disaster risk management, bioeconomy and global food security.

The **Disaster Risk Management Knowledge Centre** (DRMKC) provides a networked approach to the science-policy interface in DRM, across the Commission, EU Member States and the DRM community within and beyond the EU. The centre builds on three main pillars: (i) development of partnerships and networks to improve science-based services targeted to risk management, (ii) better use and uptake of research and operational knowledge, (iii) advancing the knowledge on innovative tools and practices for risk and crisis management.

Other IT services activated by the European Commission are more data oriented and finalized to data and information sharing with a wide arena of stakeholders. An example of this is given by the **Water Information System for Europe – WISE**, the European information gateway for water issues, which is managed by partnership between the European Commission (DG Environment, JRC and Eurostat) and The European Environment Agency. WISE includes two major components: **WISE Freshwater** and **WISE Marine**. The first is a web-based service launched for public use in March 2007. It aims to improve accessibility of knowledge to support the implementation of the Water Framework Directive (WFD) and other related legislation and policies (e.g. the Flood Directive). It provides access to information on EU water legislation and policies, data and statistics, modelling including now-casting and forecasting services (specifically the European Flood Alert System - EFAS and the European Drought Observatory – EDO, both managed by JRC), project and research outcome.

The Water Data Centre, hosted at the European Environment Agency, provides a central access point to several web-services: interactive maps, data viewers, European datasets and indicators. These services are mostly based on reporting from countries as part of implementation of EU directives or via the Eionet framework.

Similarly, WISE Marine is a gateway to share accurate and timely information on the state of the European marine environment, ecosystems and resources in support to ocean governance and ecosystem-based management. It

specifically supports the implementation of the Marine Strategy Framework Directive (MSFD) and is structured into different sections dealing with marine policies, topics, data, maps and research outcome. WISE Marine also hosts a section dedicated to the activities on environmental monitoring and protection carried out by the four regional sea cooperation structures, while a section still under construction will enable countries to provide links and information about their marine environment and activities related to the implementation of the MSFD.

In general, WISE addresses several user groups: (i) EU institutions as well as Member States national, regional and local administrations working in water policy development or implementation; (ii) professionals working in the water field from public or private organisations, with a technical interest on water, (iii) scientists working in the water field, (iv) general public, including in this group those working in private or public entities not directly related to water policy but with an indirect interest in water (regular or sporadic).

Finally, the structure of the **Common Implementation Strategy (CIS) of the Marine Strategy Framework Directive (MSFD)** can also provide inputs for the design of an SPI structure for IMAP. CIS is an informal programme of coordination designed to facilitate Member States input under MSFD. The CIS is composed of the following working groups (Figure 4):

- Marine Directors: Highest level political group focused on ensuring the overall implementation of the Directive.
- Marine Strategy Coordination Group: Link between Marine Directors and Working Groups, preparing material for the Marine Directors and overseeing the work of the Working Groups. This group (and its subgroups) is a Commission expert group within the meaning of Commission decision.
- Working and Technical Groups: Prepare common methods for implementation of the Directive:
  - WG on Good Environmental Status to support Member States in the determination of GES.
  - WG on Programmes of Measures and Socio-Economic Analysis to develop common methodologies and approaches to carry out the economic and social analysis of the use of the marine waters.
  - WG on Data, Information and Knowledge Exchange to support Member States with their data reporting obligations.

Figure 4: Structure of the CIS of the MSFD. From ec.europa.eu/environment/marine/eu-coast-and-marine-policy/implementation/index_en.htm

The **Biodiversity Information System for Europe - BISE** is an IT-based service designed as a single entry point for data and information on biodiversity supporting the implementation of the EU biodiversity strategy and the Aichi targets in Europe. As in the case of WISE, BISE is a partnership between the European Commission, DG Environment and the European Environment Agency. BISE provides information at the European level on the state and trend of the different components of biodiversity (genetic resources, species, habitats and ecosystems, on threats and impacts, as well as on benefits of ecosystem services for human well-being and on instruments implemented in order to stop the loss of biodiversity and to conserve nature (responses). Other entry points to BISE include sections on: (i) policy and legislation on biodiversity, (ii) data, statistics and maps (the biodiversity data centre managed by EEA provides access to a wide range of data and information); (iii) important EU-wide research projects related to biodiversity and ecosystem services, (iv) countries, providing a wide range of information on biodiversity for EU Member State, such as biodiversity factsheet, progress in mapping and assessment of ecosystem services, and overview on activities on green infrastructure. Moreover, BISE links to a number of other SPIs supporting the EU Biodiversity Strategy to 2020, as: (i) the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), described above; (ii) The Biodiversity Knowledge initiative resulting from the EU funded research project KNEU (FP7) to help societal actors in the field of biodiversity and ecosystem services make better informed decisions, (iii) The EU funded SPIRAL project, described below. BISE contents and services are developed in collaboration with key users and information providers.

The **European Climate Adaptation Platform (Climate-ADAPT)** represents another example of SPI strongly-based on IT services. The platform was launched in 2012 as a partnership between the European Commission (DG CLIMA) and the EEA to overcome the lack of a consistent knowledge base on climate change adaptation in Europe. The EU Adaptation Strategy recognised it as a key element for better-informed decision-making. Climate-ADAPT intended target audience includes governmental decision-makers and the organisations supporting them in the development, implementation and evaluation of climate change adaptation strategies, plans and actions at EU, transnational, national and sub-national levels. Experts from EU-funded research projects and various governance levels acting on policy processes provide information to the platform. The main task of the platform is to inform its users about adaptation policy at EU level and provide an entry point to a rich collection of sources of adaptation information in Europe. Climate-ADAPT is maintained by the EEA with the support of the European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation (ETC/CCA). To ensure that it remains a trusted information source, it collaborates only with registered information providers and follows a quality assessment procedure based on clear eligibility criteria. The platform is promoted through a wide range of channels and supports capacity-building on adaptation, but also on maintaining adaptation platforms in Europe [14]. Climate-ADAPT helps targeted users to access information on: expected climate change in Europe; vulnerability of regions and sectors; adaptation strategies and plans developed at the European, transnational and national levels; adaptation case studies and adaptation options; tools supporting adaptation planning. Information on adaptation initiatives at the national level is voluntary provided by EEA Member countries.

On the specific topic of Maritime Spatial Planning (MSP) and the related obligations for Member States foreseen by the MSP Directive (Directive 2014/89/EU), the European Commission (DG-MARE) has activated an Assistance Mechanism for MSP with the aim to support MS in the implementation of the Directive. The Assistance Mechanism has taken the form of the **EU MSP Platform**, which holds some of the characteristics of an SPI initiative. The European MSP Platform is an information and communication gateway designed to offer support to all EU Member States in their efforts to implement Maritime Spatial Planning (MSP) in the years to come. With the aim to allow officials, planners and other stakeholders interested in MSP to build on available knowledge and avoid duplication of efforts, the Platform runs a web site acting as an exchange forum for the MSP knowledge generated in past, current and upcoming MSP formal processes and projects (i.e. status of MSP implementation, MSP practices, relevance of maritime spatial planning for conflicts, events and news on MSP, etc.). Beyond managing the web site, the Platform also organises conferences, workshops and events to discuss topics, which are essential in MSP implementation and disseminate related results and practices. It also supports the EC on the organization of the Member States Expert Group on MSP, which periodically meet to discuss common challenges and opportunities. Finally, the Platform produces other MSP resources targeted to different users including policy briefs, detailed studies, newsletter and other dissemination materials.

Summary table: Key features of the European SPI experiences	
Science for EU Environment Policy Interface (SEPI)	- Targeted services for environmental policy design, implementation and enforcement - Products with different levels of details (from policy briefs to in-depth reports) for different user typologies - Accurate quality check on sources and information involving both scientists and policy experts - Attention to emerging environmental issues
JRC Knowledge Centres	- Focus on some major societal challenges - Collaboration between researches (JRC) and policy experts (policy departments of the EC) - Better and channelled use of existing knowledge - Development of wider partnerships and networks to improve science-based services
Water Information System for Europe (WISE)	- Strong link between monitoring and implementation of policy on the protection of freshwater and marine ecosystems - Wide range of different user groups addressed through dedicated services - Multi-entry points - Direct relation with the national scale: country reporting provides data for the Water Data Centre
Biodiversity Information System for Europe (BISE)	- Direct support to the implementation of EU and international policies on biodiversity - Multi-entry points for different user typologies - Links to other biodiversity-relevant SPIs and initiatives - Co-generation of knowledge and services, including country level contribution
Climate-ADAPT	- Direct support to the implementation of the EU Strategy on climate change adaptation - Multi-entry points - Quality check and assessment of provided information through transparent criteria - Great attention to the platform dissemination, evaluation from the users' perspectives and revision.
EU MSP Platform	- Direct support to the implementation of EU policy and legislation on Maritime Spatial Planning (MSP) - Diversified services: web-site, organisation of workshops and conference, in-depth studies, policy briefs, etc. - Effort in extracting policy relevant knowledge from both statutory processes and project-based experience - Wide networking with knowledge users and providers.
Common Implementation Strategy (CIS) of the Marine Strategy Framework Directive (MSFD)	- Working and Technical Groups to prepare common methods for implementation of the Directive: - Marine Strategy Coordination Group providing link between Marine Directors and Working Groups, preparing material for the Marine Directors and overseeing the work of the Working Groups - Marine Directors representing the highest level political group focused on ensuring the overall implementation of the Directive

4.3. REGIONAL SEA SPI EXPERIENCES

In addition to significant developments at the international and European levels, science-policy interfaces are also crucial at regional sea and sub-regional sea scales. Regional Sea Conventions for the protection of the marine environment provide the frame to key co-operation structures which among their tasks also foster science-policy exchange, particularly regarding issues related to national and European legislation on environmental aspects (e.g. assessments of "good environmental status" under the Marine Strategy Framework Directive) [9].

The **Baltic Marine Environment Protection Commission (HELCOM)** is the central and the most mature transnational cooperation body in the field of environment in the Baltic Sea region. HELCOM plays an important role as transnational environmental policy maker for the Baltic Sea by developing common environmental objectives and actions, but also acts as environmental focal point providing information about the state of and trends in the marine environment, the efficiency of measures to protect it and common initiatives and positions, which can form the basis for decision-making in other international fora. Therefore, HELCOM provides a form of science-policy interface. HELCOM recently completed the State of the Baltic Sea holistic assessment, which is a multi-layered product, including: a summary report, thematic assessment covering 6 major topics, several supporting HELCOM assessment reports, core indicator reports and spatial data fact sheets [15]. Moreover, through the activities of HELCOM, the scientific contribution of research projects is mediated to a large number of other interlinked policy initiatives, such as the United Nations Convention on Biological Diversity, the EU Strategy for the Baltic Sea Region, the EU Marine Strategy Framework Directive, the EU Common Fisheries and Agriculture policies, the VASAB Long-Term Perspective for the Territorial Development in the Baltic Sea Region, and others. In this perspective, a relevant role is played by **BONUS**, the joint Baltic Sea research and development programme producing knowledge to support the sustainable development and ecosystem based management of the Baltic Sea region. BONUS is funded jointly from the national research funding institutions in the eight EU member states around the Baltic Sea and the European Union programmes for research. In the BONUS projects relevant marine environmental issues have been addressed such as eutrophication, biodiversity, hazardous substances, and maritime activities (including maritime spatial planning), which are the key topics addressed by the **Baltic Sea Action Plan**. The Baltic Sea environment governance and decision making were also addressed [16].

Similarly to HELCOM, the SPI approach is incorporated - although often in the form of initiatives not immediately framed and/or perceived as real SPI - in other regional sea institutional frameworks, as in the case of OSPAR and UN Environment MAP [13]. **OSPAR** is the mechanism by which 15 governments and the EU cooperate to protect the marine environment of the North-East Atlantic, including five regions: Arctic Waters, Greater North Sea, Celtic Seas, Bay of Biscay and Iberian Coast, and Wider Atlantic. Work to implement the OSPAR Convention, its strategies and its vision for "a clean, healthy and biologically diverse North-East Atlantic Ocean, used sustainably" is taken forward through the adoption of decisions, recommendations and other agreements. Beyond this, the OSPAR Commission provides a more evident SPI role issuing a wide variety of products, including reports, background documents, data reports, etc. Two quality status reports (QSR) were issued in 2000 and 2010. The 2010 holistic report was based on ten years of joint monitoring and assessment of the marine environment; its development involved many experts from OSPAR contracting parties and stakeholders who provided input to OSPAR Working Groups and Committees. A peer review by a group of international scientists coordinated by the International Council for the Exploration of the Sea (ICES), and an e-consultation have both helped to critically review the gathered evidence and the conclusions drawn. In 2017 OSPAR issued the Intermediate Assessment, an indicator-based assessment linked to data and map services. This assessment covers both status and trends across the North-East Atlantic, presents a picture of this important marine area and includes consideration on biological diversity, eutrophication, hazardous substances, radioactive substances, offshore oil and gas industries, a range of other human pressures, ocean acidification and the impact of a changing ocean climate. Attention is also given to socio-economic analysis and the methodology required to undertake a full ecosystem assessment. The OSPAR Assessment Portal provides access to all OSPAR's reports as well as to data and information which have been used in the assessments. Each assessment is fully traceable from input data through to final assessment products. Also included on each assessment page are standardised metadata.

In the Mediterranean Sea, **UNEP-MAP and its six RACs** play an important role in transferring scientific knowledge to policy making and implementation, with specific focus on the key topics addressed by the Barcelona Convention system (e.g. implementation of the ecosystem approach, ICZM, biodiversity conservation, monitoring and control of marine pollution, etc.). Within this context, the **Mediterranean Commission on Sustainable Development (MCSD)** provides an advisory body that assists Contracting Parties to the Barcelona Convention to integrate environmental issues in their socioeconomic programmes and to promote sustainable development policies in the Mediterranean

region. A wide number of technical reports and assessments have been developed by the MAP system, including the 2011 Initial Integrated Ecosystem Approach assessment or the 2012 report on the State of the Mediterranean Marine and Coastal Environment, just two mentioned few examples. In addition, in 2017 the MAP system delivered the first Quality Status Report for the Mediterranean [24], which is based on EcAp Ecological Objectives and the related IMAP indicators.

In addition to the QSR 2017 and 2023, Plan Bleu and UNEP/MAP have started the preparation of the 2019 Report on the State of the Environment and Development in the Mediterranean (SoED 2019). The report will present a comprehensive and updated assessment of the status and main sustainability issues related to environment and development in the Mediterranean region. Programmed to be produced as a key output during the Mediterranean Action Plan (MAP) programme of work 2018-2019, it will be aligned with the work conducted by the UNEP/MAP under its Mid-Term Strategy 2016-2021 and will be the result of a collective effort of all MAP components and other partners, with Plan Bleu supporting its organization and coordination. By applying an integrated and holistic approach, the SoED 2019 will aim at:

- Increasing awareness and understanding of environmental and development status and trends in the Mediterranean, their driving factors and impacts;
- Providing a foundation for improved decision-making at all levels, from the individual to national governments and international organizations, NGO's, civil society, businesses or academics;
- Facilitating the measurement of progress towards sustainable development; and
- Enhancing the delivery of the Mediterranean Strategy for Sustainable Development 2016-2025 (MSDD).

The SoED 2019 will synthesize disparate data into meaningful and relevant information, and communicate the results to decision-makers. Throughout its different chapters, the SoED 2019 will address the following main questions: What are the state, the evolution and the trends of the environment and development in the Mediterranean region? What are their driving forces and root causes? What are the current and required policy and societal responses to the situation? The SoED 2019 will identify priority areas for action, based on available scientific data and reliable information.

Among various initiatives promoted in the frame of the Barcelona Convention system, **MED 2050 - a new foresight initiative on future visions of the Environment and Development in the Mediterranean for 2050** shall be mentioned as it holds an important component of SPI. Started in 2017 and coordinated by Plan Bleu, this participatory foresight exercise aims at building a global vision of the Mediterranean in 2050. Specific objectives of this initiative are: (i) confronting and integrating a set of several possible visions; (ii) facilitating dialogue between countries in a complex geopolitical context; (iii) sensitizing a wide audience: scientists, citizens, politicians, technicians etc. and mobilizing stakeholders outside the restricted circle of experts; (iv) shaping possible futures to foster public policies in the Mediterranean towards sustainable development; (v) anticipating actions to promote sustainable development in the Mediterranean region for the coming decades. The MED 2050 Foresight Network is composed of experts, decision makers and members of civil society from all Mediterranean countries. The network will communicate through a web platform, used to share documents, information and initiatives, and share its progressive achievement through various channels (e.g. newsletters, reports, etc.).

Beyond the articulated frame provided by the Barcelona Convention system, the Mediterranean Sea is characterised by a great richness and variety of complementary science-to-policy initiatives. Some of these are focused on specific aspects (e.g. climate change, Blue growth, biodiversity protection, etc.), while others are cross-cutting by nature.

The network of **Mediterranean Experts on Climate and Environmental Change (MedECC)** was created in 2015. MedECC is based on an open and independent international scientific expert network acting as a mechanism of on-going support for decision-makers and the general public on the basis of available scientific information and on-going research. The construction of this network responds to several intentions of regional institutions, such as the UNEP-MAP through the MSSD 2016-2025 and the Regional Framework for Climate Change Adaptation in the Mediterranean, and the Expert Group on Climate Change of the Union for the Mediterranean (UfM CCEG). MedECC includes more than 600 scientists from 35 countries. Membership is open to all scientific experts working on climate and environmental change from the natural sciences, social sciences and/or a humanities perspective. One of the main objectives of MedECC is to bridge the gap between research and policy making on climate and environmental change, contributing to the improvement of related policies, by updating and consolidating the most advanced scientific knowledge and render it more accessible [26]. To respond to this objective, MedECC intends to develop output and services for different targeted uses, including: regular report on the status of climate and environmental

changes in the Mediterranean, summary for policy-makers, specific reports on demand by decision and policy makers, scientific workshops, training for decision makers and professionals, and improved dialogue between the scientific community, decision makers and other stakeholders. Its scientific secretariat is hosted by Plan Bleu/RAC under a partnership with UfM.

SPI VALUE OF SUB-REGIONAL INITIATIVES IN THE MEDITERRANEAN

The Mediterranean Sea hosts two important sub-regional initiatives which among the others aim at supporting sustainable Blue Economy, ensuring the due protection of the marine environment.

The EU Strategy for the Adriatic and Ionian Region (EUSAIR) is a macro-regional strategy adopted by the European Commission and endorsed by the European Council in 2014. The Strategy was jointly developed by the EC, together with the Adriatic-Ionian Region countries and stakeholders, in order to address common challenges, create synergies and foster coordination. For the implementation of the Strategy, an Action Plan was defined, structured around four pillars of strategic relevance: 1) Blue Growth, 2) Connecting the Region (transport and energy networks), 3) Environmental quality, 4) Sustainable tourism. Objectives of pillar 3 are: (i) to ensure a good environmental and ecological status of the marine and coastal environment by 2020 in line with the relevant EU acquis and the ecosystem approach of the Barcelona Convention; (ii) to contribute to the goal of the EU Biodiversity Strategy to halt the loss of biodiversity and the degradation of ecosystem services; (iii) to improve waste management by reducing waste flows to the sea and to reduce nutrient flows and other pollutants to the rivers and the sea.

The WestMED Initiative on blue economy has been created to help public institutions, academia, local communities, small and medium-sized enterprises and entrepreneurs from both sides of the Western Mediterranean develop local and regional maritime projects together. It is the result of years of dialogue between ten countries in the western Mediterranean region involved in the '5+5 Dialogue' (France, Italy, Portugal, Spain, Malta, Algeria, Libya, Mauritania, Morocco and Tunisia). A Framework for Action, drafted following extensive consultation, lays out the steps to achieve the initiative's goals and priorities. Its main goals are: (i) a safer and more secure marine space, (ii) a smart and resilient blue economy, (iii) improved maritime governance. A number of priorities and targeted actions have been set for each goal. The western Mediterranean Steering Committee (WMSC) provides high-level stewardship for the implementation of the Framework for Action and it's supported by technical working groups. The WestMED Assistance Mechanism supports participating countries with improving their policy framework to enable investment and attract business in the blue economy sectors. Within such assistance mechanism national hubs have been set up to address national priorities.

Both EUSAIR and the WestMED Initiative have not a direct SPI mandate. However, as they play a relevant policy role in the common sustainable management of the sea at the sub-regional scale, they need to rely on scientific evidence for policy-making and implementation. In this sense, they can surely benefit from existing SPI initiatives and the same time capitalize and mainstream these initiatives at the country level and towards the other stakeholders involved.

The **BLUEMED Initiative** is a research and innovation initiative for promoting the blue economy in the Mediterranean Basin through cooperation. The BLUEMED Initiative aims to contribute to the creation of new 'blue' jobs, social well-being and a sustainable growth in the marine and maritime sectors through the implementation of its Strategic Research and Innovation Agenda, the **BLUEMED SRIA**. The initiative has an SPI component since it aims to support and facilitate cooperation and coordination among all the Mediterranean countries, in order to promote the alignment of programmes and pooling of resources and investments to address the challenges identified in the BLUEMED SRIA. Development of the strategic agenda was based on a detailed analysis of existing and on-going regional, national and European projects and initiatives, and the identification of knowledge and innovation gaps. These enabled to identify the challenges to be addressed through the SRIA in order to realise the shared vision for a healthier, more productive, more resilient and better known and better valued Mediterranean Sea. Public dialogue with national stakeholders is essential for implementing the objectives of the BLUEMED Initiative and in particular for the monitoring and the update process of the SRIA. As a tool to ensure constant consultation, four thematic Platforms at Mediterranean level are being created: Knowledge Platform, Economy Platform, Technology Platform and Policy Platform, specifically dealing with SPI aspects. BLUMED also coordinates with regional and sub-regional

initiatives, as the WESTMED initiative – Towards a Sustainable Blue Economy Initiative for the Western Mediterranean, and the EUSAIR – European Strategy for Adriatic-Ionian Region, to enhance the efficiency of the actions, the investments in marine and maritime research, innovation and technology and reduce fragmentation and duplication of efforts.

The **PANACeA** project aims to streamline networking and management efforts in Mediterranean Protected Areas (PAs) as a mechanism to enhance nature conservation and protection in the region. The initiative aims at ensuring synergies between relevant Mediterranean stakeholders – managers, policymakers, socio-economic actors, civil society and the scientific community – and to increase the visibility and impacts of projects' results towards common identified strategic targets. PANACeA acts as an SPI to foster the exchange of experience and knowledge sharing on biodiversity protection in the Mediterranean, to influence a behavioural and policy change. In this perspective, PANACeA has built a community of nature conservation stakeholders and acts as the communication and capitalisation instrument of projects funded by the INTERREG MED 2014 – 2020 programme dealing with protection of biodiversity and natural ecosystems. Through its tool, the **Mediterranean Biodiversity Protection Knowledge Platform (BPP)**, PANACEA ensures the transfer of synthesised various MED projects' outcomes and their dissemination across and beyond the region. This Platform contains recommendations and data gathered by the Mediterranean biodiversity protection community participating in PANACeA, together with external validated open source information and data. By uniting scientific evidence, practice and policy, BPP serves as a reference for guiding policy enforcement and future measures affecting natural resource management in protected areas.

The **European Marine Observation and Data Network (EMODnet)** is a network of organisations supported by the EU's integrated maritime policy. These organisations work together to observe the sea, process data according to international standards and make that information freely available as interoperable data layers and data products. EMODnet aims to benefits all marine data users, including policy makers, scientists, private stakeholders and the public. The network is organised in 7 thematic lots: bathymetry, geology, seabed habitats, chemistry, biology, physics, human activities and coastal mapping. Moreover, six sea basin checkpoints are in operation, including the **Mediterranean Sea one**. As other checkpoints, this integrates some SPI characteristics. EMODnet checkpoints have the main goal of assessing the quality of current marine monitoring systems, identify gaps and bottlenecks, and demonstrate how monitored data can meet the needs of users, including policy makers. Monitoring systems and data are tested against specific end-user challenges, which are of paramount importance for the sustainable management of a given sea basin. In the Mediterranean Sea, selected challenges are related to: wind farm siting, marine protected areas, oil platform leaks, climate and coastal protection, fisheries management, marine environment and river inputs. The checkpoint service is driven by two types of access/usage, public and restricted for project use (challenges partners, experts and contributors). The public service serves primarily institutional policy/decision-makers as well as data producers and data providers, to improve the adequacy of existing monitoring systems for the scope of the EU marine policies. Synthesis information is provided to support decision makers in monitoring gaps and prioritizing needs for future development and improvement of monitoring and observing infrastructure.

Summary table: Key features of the Regional Sea SPI experiences	
SPI initiatives under HELCOM	- Multi-layered report on the state of the marine environment - Uptake of project results into policy making (e.g. Baltic Sea Action Plan) - Science outcome are mediated by HELCOM to a large number of other interlinked policy initiatives - Direct link to BONUS, the joint Baltic Sea research and development programme, framed to support sustainable development and EBM in the Baltic Sea
SPI initiatives under OSPAR	- Reports, background documents, data reports, etc. - Quality Status Reports based on joint monitoring and assessment - Indicator-based report - Portal providing access to all reports, data and metadata
MED 2050	- Great emphasis on the participatory approach - Priority to the creation of a foresight vision - Involvement of experts and decision makers, but also members of civil society - Thematic and regional working groups

Summary table: Key features of the Regional Sea SPI experiences	
Mediterranean Experts on Climate and Environmental Change (MedECC)	- Strong link to needs of major cooperation framework at the regional scale (UNEP-MAP and Union for the Mediterranean) - Products with different levels of details (from summary for policy-makers to in-depth reports) for different users - Accurate quality check of sources and information - Participation open to any experts working on climate and environmental change, form different perspectives
BLUEMED Initiative	- Detailed assessment of existing experience and identification of gaps - Strategic Agenda, living document defining actions based on the state of the art knowledge on Blue Growth - Great emphasis on public dialogue - Creation of a Policy Platform, specifically dealing with SPI aspects
PANACeA	- Creation of a community involving different stakeholders working on nature conservation: managers, policymakers, socio-economic actors, civil society and the scientific community - Great emphasis on capitalization and dissemination of fresh results of on-going projects - Open access knowledge platform
EMODnet MedSea Checkpoint	- Strongly based on the principle “collect data once and use them for many purposes” - Marine monitoring systems are assessed according to real policy challenges defined by the end-users - Different typologies of end-users and targeted services - Synthesis information supporting decision makers in defying priorities for improvement of monitoring and observing systems

4.4. NATIONAL AND SUB-NATIONAL EXPERIENCES

Mapping SPI initiatives at the national and sub-national scale is surely more challenging than addressing the larger scales (international, EU, regional). Information on existing experiences at the national and sub-national levels is hardly available on-line. In many cases, potentially relevant initiatives are not structured or neither labelled as SPI, making their mapping particularly complex. The surveys and interviews conducted during this study enabled to identify some national-based experiences which can be assimilated to SPI.

TUNISIA

The exchange of knowledge between science and policymaking in Tunisia is a recent, not institutionalised experience. New mechanisms are being created to bring science results to policy, specifically in relation to fishery and aquaculture as well as climate change and sea level rise impacts. The General Secretariat of the Sea (Secrétariat Général dela Mer) is a structure that was created to work horizontally on marine issues (therefore providing a context to connect science and policies) and has been inspired by the French Secrétariat Général de la Mer. This will be the first step in a strategy for the sustainable exploitation of the Mediterranean Sea. In the same context, the creation of a federation of maritime trades is in progress, in particular those related with the blue economy.

POINT OF STRENGTH → The General Secretariat of the Sea is an important step towards the improvement of coordination of initial SPI experiences.

CHALLENGE → Horizontal integration among different institutions working on specific coastal and marine sectors as well as collaboration among research centres are still great challenges. Both are highly needed to strengthen SPI.

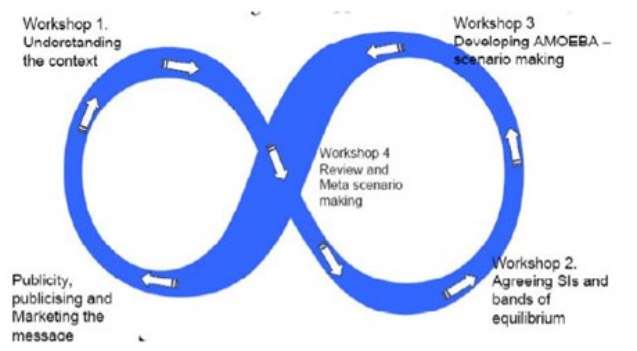
SPAIN

The CAMP Almeria run in Spain provides an example of SPI initiative at the sub-national level. The Imagine methodology (precursor of Climagine method) was used in this case with the aim of mapping coastal sustainability. Representatives of the scientific community and of different administrations (at local, sub-national and national levels) were involved, to discuss issues related to coastal zone management. Activities also included engagement of local communities and society at large to raise awareness about the importance of a sustainable development of the coast. Beside environmental sustainability, cultural heritage conservation was also tackled, adopting a holistic approach to the management of the local "socio-ecosystem".

POINT OF STRENGTH → The experience highlighted the importance of involving both scientists and policy/decision makers together in the same process and in the same time. Citizens were also engaged to raise awareness on environmental issues and local sustainability.

CHALLENGE → The initiative identified a major challenge: engagement of scientists and policy makers through disconnected process can lead to important drawbacks, such as impeded communication, lack of real discussion, lack of prompt responses to key questions, etc.

Figure 5: Diagram representing the IMAGINE model. From "Levante de Almería, a laboratory to test Integrated Coastal Zone Management" - English version



MOROCCO

In Morocco, the Laboratoire National des Etudes et de Surveillance de la Pollution provides technical and scientific support to the Ministry of the Environment on pollution issues.

In this perspective it has an SPI function, as it allows exchange of information and knowledge between scientists and policymaker/practitioners. The laboratory coordinates monitoring campaigns on the Mediterranean coast of Morocco and acts as a tool for decision making, e.g. on bathing waters. Among its SPI oriented results the Laboratoire produces annual summary reports with synthetic results and infographics adapted to policymakers and practitioners.

POINT OF STRENGHT → Translation of scientific monitoring results in synthetic messages and visual products for environmental policy practitioners. Production of periodic reports that allow understanding the evolution of environmental status.

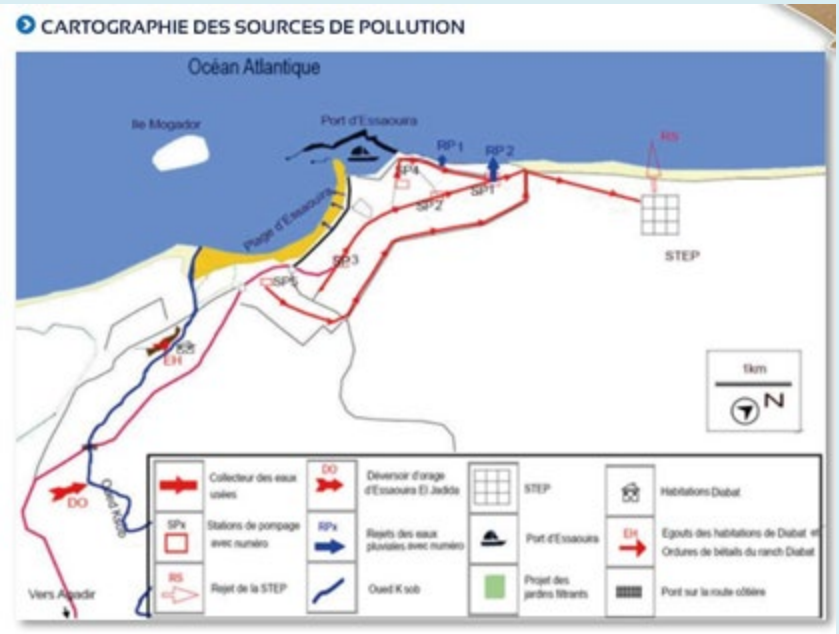
CHALLENGE → Extension of this practice to other environmental aspects related the 11 EcAp ecological objectives.

Morocco has also initiated a process for establishing a national authority for the IPBES. This body will be supported by a network of experts from different disciplines and will be an integral part of the National Committee for Biological Diversity. Within this frame, the Ministry of Environment of Morocco organized a dialogue workshop in Rabat in September 2016 to establish national structures for IPBES in all Francophone African countries. Roadmaps have been developed for the process of setting up the appropriate national structures for each country.

POINT OF STRENGHT → Establishment of a national SPI mechanism embedded in the overall international process (IPBES) and effort to provide a common approach to all Francophone African countries.

CHALLENGE → Long term durability of the common approach in Francophone African countries.

Figure 6: Map of main sources of pollution. From the Rapport National - Edition 2017



ALGERIA

RASmer was the Algerian Network of Marine Sciences, which coordinated SOMBA, the Observation System of the Sea in Algeria. RASmer was set up in 2014 by the Ministry of Higher Education and Scientific Research to improve communication among scientists and to bring science knowledge on the sea closer to the decision-making process. Among the various activities, RAMSER initiated a dialogue on coastal risks, including related normative and governance aspects. According to the interviewee (a scientist specialized on coast and hydrography topic), RASmer stopped working due to some administrative obstacles. Other informal and not structured SPI efforts might exist in the country; however these are mainly punctual actions lacking communication on performed activities and resulting usable knowledge. Moreover, improved coordination among and strengthening capacity building of existing structures (e.g. the National Coastal Commissariat – CNL, the National Agency for Climate Change – ANCC, the Environmental Observatory) are necessary pre-condition towards the developed of more organised SPI initiatives.

POINT OF STRENGTH → RASmer provides an example of a mechanism in Algeria that aimed at bridging the gap between scientists and decision makers on marine sciences issues.

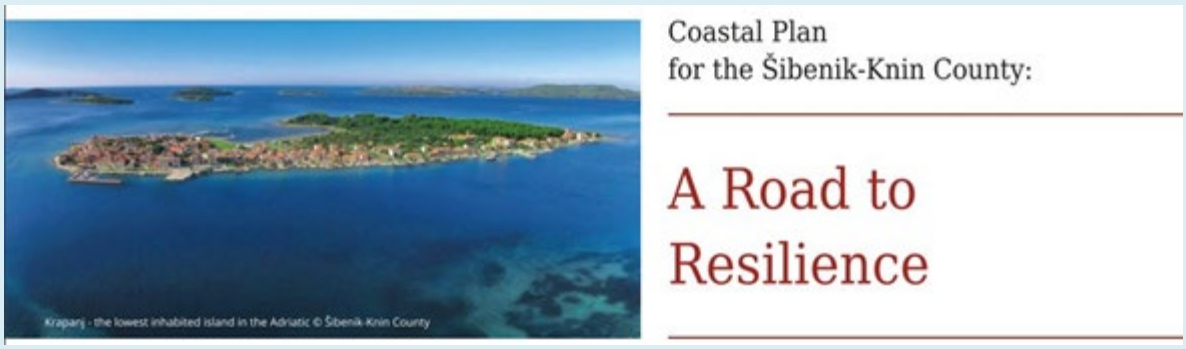
CHALLENGE → Improved communication of informal initiatives, strengthening of coordination and capacity building.

CROATIA

In Croatia, the experience of Šibenik-Knin county within the ClimVar project can be mentioned at the sub-national level. Such experience led to the development of the county coastal plan, which also included climate change considerations. The plan elaboration was highly interactive: a series of workshops (based on the Climagine methodology) was organised involving various stakeholders since the beginning of the process. The aim was to recognise and question previous, present and future levels of sustainability of the project area, and monitoring the road of the system towards sustainability. Critical issues on the County coastal development and jointly sought solutions to maintain sustainability and resilience to climate change in the coastal areas were discussed.

POINT OF STRENGHT → The application of a science-policy-society dialogue method enabled creating a sense of common ownership of the plan, which also supported the plan endorsement and approval. The experience is continuing within the recently started AdriAdapt project, focusing on climate change adaptation.

CHALLENGE → Extension of this practice to the complex system of the 11 EcAp ecological objectives and durability beyond the project-based experiences.



SLOVENIA

Green infrastructure and corridors for sustainable development with regards to transboundary and multi-level dimensions[2]

To achieve the good environmental status (GES) of the Mediterranean, which is the objective of Barcelona Convention, and to give a proper guidance to planners and decision makers a concept of Ecosystem Approach (EcAp) is promoted and developed. A concrete spatial manifestation of EcAp is the development of green infrastructure (GI) and its sub unit green corridors (GI). Namely, the recognition of a certain space as a GI, doesn't support only the biodiversity but also provides various ecosystem services, which are a guarantee for long term human wellbeing and resilience to environmental, economic and social changes or disturbances.

Green and Blue corridors connecting land and sea green infrastructures and improving GES in junction of three macro regions (Alpine, Adriatic Ionian and Danube).

- Under the "green infrastructure and corridors" **umbrella in Soča/Isonzo river basin with the adjacent part of Adriatic Sea** (Gulf of Trieste) and its coastal surroundings multiple activities and projects have been taking place and are still going on. This case is especially interesting because it is **transboundary** and in **junction of three macro regions, Alpine, Adriatic Ionian and Danube.** These projects and activities support the planning of GI at multiple levels and fields and its concrete installation. Activities consist of : (i) **education and awareness raising** to build a common understanding of EcAp and GI, (ii) development of spatial analysis methodologies for decision making and GI concrete spatial planning (**project GREVISLIN**) and of (iii) activities which connect and harmonize nature and ecological objectives with present economic activities and objectives (**projects CAMIS and SUPREME**).

[2] Authors: Helena Caserman & Dr. Sašo Šantl (Institute for Water of the Republic of Slovenia)

- To improve connectivity between different levels of planning and decision making, common decision-making bodies have been established in Slovenia **(e.g. Council for Vipava/Vipacco river, foreseen Council for the coast and Regional Council)**. This gives the opportunity on the one side for local needs to be considered, and on the other side for relevant policies (Water Framework Directive, Marine Strategy Framework Directive, Coastal Management Directive et.) to be addressed.
- Within such a harmonized environment, also results of large-scale researches (e.g. **project COHENET** for developing and testing a methodology to assess the efficiency and coherence of Marine Protected Area networks) will be more correct and viable in next implementation stages.
- Social dimension with multiple point of views as one of the three main pillars of sustainable development must be incorporated in the process.

Within the mentioned activities and projects, research activities are going on. They are focused on methodology development which comprises spatial data analyses and multi criteria analyses approaches. Collaboration between researchers and stakeholders at different decision-making levels is performed. Emphasis is given to involvement of stakeholders into entire process, from GI benefits awareness rising, education at different levels, objective presentation of sectoral needs and confronting opposite and crosswise ones, and also in development of technical and spatial analysis methods to support final decision making. This is mostly performed through numerous sectoral and cross-sectoral workshops. *More information regarding the SPI experience in relation to Green infrastructure and corridors for sustainable development is available in Annex.*

FRANCE

Organisation of the scientific and technical support for implementing the Marine Strategy Framework Directive – The experience of France

Reminders on the Marine Strategy Framework Directive and its implementation in France.

The aim of the Marine Strategy Framework Directive (MSFD, 2008/56/EC) is to achieve or maintain Good Environmental Status of the marine environment by 2020 (Art. 1). Eleven qualitative descriptors serve to define the good environmental status (Annex 1 of the MSFD). This definition of the good environmental status is specified in France by a ministerial decree pursuant to Art. R. 219-6 of the French Environmental Code. In France, the MSFD is implemented jointly with the directive establishing a framework for maritime spatial planning (MSP, 2014/89/EU) through the preparation of a single document for each of the four Metropolitan coastlines: the sea basin strategic document (Art. R219-1-7 of the French Environmental Code), which includes the Marine Action Plan (PAMM, Art. R219-2 to 10 of the French Environmental Code). The competent authorities are the Water and Biodiversity Directorate (DEB) of the Ministry for the Environment (MTES) at the national level and the coordinating prefects at the decentralised level (maritime prefect and coordinating regional prefect). Interregional Directorates for the Sea (DIRM) manage the technical secretariats of the marine action plans (ST PAMM).

Structure of the scientific and technical support for the implementation of the MSFD.

The competent authorities rely on a scientific and technical community to develop and revise the various elements of the PAMM, including the following functions:

- Theme (assessment) leader
- (Thematic) surveillance programme manager
- Expert referents
- Scientific and technical network

The work is coordinated at the national level by the national coordination:

- "Good environmental status of marine waters" assumed by Ifremer[3].

[3] French Research Institute for Exploitation of the Sea (Institut Français de Recherche pour l'Exploitation de la Mer)

- "Economic and social analysis"; "surveillance"; "environmental objectives" assumed by the French Biodiversity Agency (AFB).
- "MSFD", jointly assumed by AFB and Ifremer, ensures overall consistency of the various components of the PAMM.

For the subjects requiring scientific and technical support, relating in particular to assessment and monitoring, the scientific and technical steering committee (COPIL) (comprised of the competent authorities, the national coordination and the main funders of the monitoring programmes):

- Provides the (national, regional and European) policy framework elements.
- Approves the tasks, deliverables and deadlines (overall schedule).
- Examines the progress and the difficulties encountered by the "Monitoring programme manager" and the "Theme leader".
- Examines, guides and approves the proposals for actions (GES methodological developments and monitoring) and prioritises them, in line with the issues identified, the cost-effectiveness analyses and the resources available or to be considered.
- Proposes a collective financial programming.
- Ensures consistency: intra and inter-directives, with the Regional Sea Conventions and the other marine policies.
- Examines and prioritises the banking and data repository needs in relation to the requirements of the MSFD.
- Guides the development of and adopts the knowledge building programme.

Various interactions are involved between the scientific and technical COPIL, the national coordination and the scientific and technical community mobilised on the various themes.

FRANCE

Experience, strategy and policy of the RMC (Rhone Mediterranean Corsica) Water Agency with respect to the strengthening of the Science-Policy Interface for observation and monitoring in the marine and coastal environment

Monitoring and observation in the marine environment have unique specificities. First of all, it is a costly monitoring in terms of the means it requires in a dynamic and changing environment. On the other hand, the development of surveillance protocols must follow certain optimisation rules such as:

- avoiding the multiplication of monitoring activities (potentially time-consuming and costly),
- thinking them globally but addressing local issues,
- adjusting them and ensuring that they are consistent in time and space (frequency, duration, number of stations, etc.),
- providing information to assist in decision-making, in contrast to the systematic acquisition of data for data.

The nature of the marine environment therefore imposes a number of constraints for surveillance actions, which must be taken into account in the technical and financial dimensioning of the proposals.

There are two main surveillance principles: routine surveillance and assessment as well as exploration surveillance.

Routine monitoring addresses objectives for the management of a given environment. In France, a routine surveillance programme defines the surveillance necessary for the permanent assessment of the marine environment. It makes it possible to meet the requirements set by European directives such as the MSFD and the revisions of elements of the Marine Action Plans (PAMM).The concept of surveillance is distinguished by the aim of the monitoring: it involves the collection of data for the purpose of managing the implementation of policies and assessing the results. Surveillance under the marine action plans (PAMM) is required to enable the permanent assessment of the environments and thereby ensure that the objectives laid down in the Directive are achieved (notably the maintenance or achievement of Good Environmental Status, attainment of environmental targets and effectiveness of the measures introduced).

The assessment based on the data collected as part of the surveillance, makes it possible to assess the environmental status of an environment or the attainment of objectives. To carry out this assessment, indicators are defined in order to quantitatively measure the achievement of a target or the progression towards a target. The IMAP[4] decision extends beyond the limits of the MSFD (with which it is consistent) to cover the whole Mediterranean Basin.

Exploration monitoring addresses observation and knowledge enhancement objectives. Owing to the considerable diversity of (marine and coastal) environments, an effort to gain better knowledge of the state of the sea and the impact of pressures and pollution is essential.

The RMC Agency supports scientists and managers in defining marine and coastal monitoring networks. This support requires a strategic approach to monitoring through a targeted allocation of funding and a series of tools. This box shows how the Agency creates, maintains and stimulates the links between scientists and public and private decision-makers.

The mandate of the RMC Water Agency

The RMC Water Agency (« the Agency ») supports the managers and local authorities to meet the requirements for implementation of the MSFD and the IMAP decision. The Agency is working to consolidate the science-management interface by providing general assistance with contracting by calibrating in advance the monitoring mechanism project, reorienting it along the way if necessary, and ultimately ensuring that the expected deliverables have been met.

Situated at the interface between the manager (the local authority) and its partners, the Agency's mission consists in overseeing the technical design of the projects and in carrying out a work of translating the terminologies which are sometimes too institutional or scientific, in favour of a local appropriation, starting with decision makers. The quality of the "decision makers/technician" pair is regularly invoked as the key for taking action, ensuring the joint mastery of the project's technical and policy dimensions. Indeed, the projects are better designed on a technical level, more pragmatic, with a strengthened expertise and clearer methodological frameworks, by breaking down the boundaries between sciences and decisions.

Key principles of the intervention of the Water Agency:

- Conditionality of the Agency's funding: a targeted allocation

The RMC Water Agency has financial competences such as the allocation of grants, collection of fees, contracting of loans, etc. The collected fees finance the programmes of measures. The allocation of funding for the surveillance is determined by the clear prioritisation of surveillance and observation needs and their bringing into line with the management objectives for the achievement of GES.

The funding allocated by the Agency also strengthens the Science-Policy interface by optimising resources (human and financial). In return, the protocols and monitoring networks for the achievement of GES and the provision of information for environmental status monitoring indicators are more effective.

- Single desk

The Agency focuses on ensuring the consistency of the different measures and partnerships by:

- ✓ Involving funding bodies in the strategic and operational reflection on the marine environment quality surveillance,
- ✓ Adapting the measures of financial advance and loans to the managing organisations,
- ✓ Ensuring consistency and homogenisation of the methodologies but also their constant improvement,
- ✓ Maintaining the cofounding practices and consistency in the operations between financial partners.

Within the Agency, specific lines of aid exist and could evolve (subject to implementation and valorisation) towards lines of support to the operation of organisations, such as coastal and marine observatories, including in partner countries. The usefulness of these observatories, both for managers and users, is widely recognised but they are struggling to develop and become permanent due to a lack of dedicated human and financial resources. Thus, one of the projects of the Agency is to accompany the emergence of a resource centre on

[4] Decision IG.22/7 Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast and Related Assessment Criteria; UNEP(DEPI)/MED IG.22/28.

monitoring methods in one of the countries of the Mediterranean Basin (possibly in Morocco).

- ✓ Community sharing for the provision of information to users and technical and scientific exchange networks

In the 1980s, the sea degradation factors came mainly from polluting discharges. Nowadays, the estimates show that 50 % of the degradations of coastal environments are caused by uses of the marine and coastal environment[5], in particular pleasure boating. New challenges are therefore emerging to make the uses more compatible with the achievement of GES in the Mediterranean.

Thanks to the national analyses performed within the framework of the European directives (Habitats[6], Marine Strategy[7] and Water[8]) many pressures on the environment have been characterised, documented and mapped for European Mediterranean countries.

The Rhone Mediterranean Corsica Water Agency supported for example the characterisation of an emblematic pressure: the mooring of pleasure crafts on meadows of *Posidonia oceanica*, "goddess[9]" of the Mediterranean. Those seagrass beds are exposed to physical impacts of various origins while their economic value is considerable. These studies gave rise to a prefectoral decree regulating anchoring conditions for large-sized pleasure vessels[10]

The Water Agency financed the development of the Medtrix mapping platform which makes available various marine data to scientists, decision-makers and users of the environment. These data are: RECOR: coralligenous assemblage monitoring network; TEMPO: Posidonia meadow monitoring network; Anthropo-map: Anthropogenic pressure modelling (aquaculture, open anchorage, sea disposal, coastal development, land use and coastal population); SURFSTAT: Continuous seabed mapping.

These data have notably made it possible to develop the DONIA[11] community application to help boaters identify anchorage areas outside fragile ecosystems. A collaborative work between scientists, elected representatives, users, managers and funders made it possible to characterise the pressure related to a use (anchorage / mooring of large pleasure vessels > 24 m in particular) and identify associated risks (degradation and decline of water plant communities and coralligenous reefs) as well as to develop digital tools in response.

As part of the observation and monitoring of coastal and marine environments, the RMC Water Agency therefore assists in the setting up and perpetuation of science-society-manager interfaces and emphasises the resulting mutual benefits. The technician managers are primarily concerned by the results of these monitoring efforts. There is however a real challenge of exploiting these results in a form understandable by all the pleasure boating users to improve how the necessary protection of a vital coastal resource is taken into account.

4.5. EU PROJECT BASED SPI EXPERIENCES

In addition to the EU initiatives described above (paragraph 4.2), the European Commission made important efforts in the last years to strengthen the policy relevance of the research projects and link the cycle of research funding more closely to policy needs. The adoption of a systemic approach to innovation has been stimulated, i.e. innovation that aims for a system-wide transformation by affecting the system's economic, social and environmental dimensions as well as their interconnections. This implies a challenge-driven, solutions-oriented, trans-disciplinary perspective that integrates technology, business models and economic organisation, finance, governance and regulation as well as skills and social innovation, and involves co-creation of knowledge and co-delivery of outcomes with economic, industrial and research actors, public authorities and/or civil society. This has been attempted, for instance, through

[5] Colloque Méditerranée, le cap de la qualité retrouvée ! [Mediterranean Colloquium, the stage of restored quality] 04/07/2019 https://www.eaurmc.fr/jcms/pro_95340/fr/mediterranee-le-cap-de-la-qualite-retrouvee
[6] Directive 92/43/EEC of the Council of 21 May 1992
[7] Marine Strategy Framework Directive 2008/56/EC of 17 June 2008 (MSFD)
[8] Water Framework Directive (2000/60/EC)
[9] Medtrix monitoring book, "Impact du mouillage des grands navires en méditerranée française", June 2019, 15p.
[10] Prefectoral Decree No.123/2019 Establishing The General Framework For The Anchoring And Stopping Of Vessels In French Inland And Territorial Waters Of The Mediterranean: https://www.premar-mediterranee.gouv.fr/uploads/mediterranee/arretes/eec503812bac663e9c5536c6d5a59ee1.pdf
[11] https://donia.fr/

requiring a policy interface component for each FP7 project, as well as by supporting meetings that bring together researchers and policy makers [27]. Under its Societal Challenges, the Horizon 2020 program reflects the policy priorities of the Europe 2020 strategy and addresses major concerns shared by citizens in Europe and elsewhere [28]. A challenge-based approach has been requested to bring together resources and knowledge across different fields, technologies and disciplines, including social sciences and the humanities. This is expected to cover activities from research to market with a new focus on innovation-related activities, such as piloting, demonstration, test-beds, and support for public procurement and market uptake.

4.5.1. Most suitable characteristics for a SPI

In addition to the thematic projects on specific topics having an SPI component (see some examples in the following paragraph 4.5.2), some projects were developed with the aim to study the best features of SPI on environmental-related topics and provide recommendations for strengthening science-policy dialogue and improving efficiency of transfer of scientific results to decision makers.

The **STAGES project** focussed on supporting the achievement of a Good Environmental Status in EU marine waters, bridging the MSFD science-policy gap and improving the scientific knowledge base to allow Member States to achieve GES. STAGES prepared a Proposal and Recommendations for a Science-Policy interface (SPI) to support MSFD implementation [29]. This document includes the need for SPI processes that foster science-driven and policy-driven dialogues, the need for relevant and timely interaction with wider stakeholders, and the need to take into account the geographical scales and cyclical nature of the MSFD implementation process.

The project identified four components that are considered crucial to build a fully functional science-policy interface to support MSFD implementation, namely: (i) harnessing MSFD-relevant scientific knowledge, (ii) scientific and technical advice; (iii) expert evaluation and synthesis of scientific knowledge; and (iv) knowledge brokerage. These four components are presented along with key recommendations. The project also prepared an architecture of the proposed science-policy interface (SPI) to support MSFD implementation and a roadmap for SPI implementation.

The **SPIRAL project** results are also particularly relevant for this study. Guidelines (The SPIRAL Handbook) [8] were prepared for SPIs, elaborating about the interaction between research projects and policy actors and stakeholders. The guidelines provide information on interfaces and communication, and suggest elements to be considered in the SPI design phase, and for implementation and improvement of real-life science-policy interfaces. Some fundamental steps in the process of SPI construction and management are highlighted:

- Clarify why SPIs are needed
- Clarify what the SPI can and cannot do
- Know who will form the SPI
- Keep people in the project motivated
- Be flexible if possible
- Be ready to compromise
- Learn from past mistakes and successes
- Accept it takes time and resources but is worth it.

The SPIRAL guidelines illustrate how SPI can be very formal and purposively-designed structures, such as the Intergovernmental Panel on Climate Change (IPCC), or the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). There are also many SPIs with less formalised structures: informal discussions with policy-makers before preparing a project proposal, workshops, field trips are all different forms of SPI. Moreover, SPIs are also not limited to direct exchanges between science and policy actors. SPIs may involve multiple other actors such as farmers, fishermen, foresters, land managers, city planners, businesses and non-governmental organisations (NGOs). Other actors can also help shape the policy priorities and the sort of science questions that should be addressed. For example, the media can play a key role in mediating science-policy links.

The **SWIM project** aimed to contribute to reducing marine pollution and to a more sustainable use of scarce water resources in the southern Mediterranean countries. It also provided a review of projects discussing ways to strengthen and improve SPI in the field of pollution prevention, remediation and water use. Within this study a thorough screening, assessment and analysis of the most important research and innovation results and knowledge outputs from the EU funded Research and Innovation Framework Programmes (FP7 and Horizon H2020/Research)

and other relevant sources such as projects funded by the EU Eco-Innovation, LIFE+, ENPI-CBC MED, INTERREG MED and IPA Adriatic programmes, was conducted, optimizing the time and resources allocated for the task (Table 3).

Table 3: List of the SWIM project screened programme's databases and their respective links. From [27]

Programmes	Project database's links
ENPI-CBC MED	https://www.keep.eu/keep/search
EU Eco-Innovation programme	https://ec.europa.eu/environment/eco-innovation/projects/
EU funded Research and Innovation Framework Programmes	https://ec.europa.eu/programmes/horizon2020/en/h2020-sections-projects
INTERREG MED	http://www.programmemed.eu/en/the-projects
IPA Adriatic	https://www.keep.eu/keep/search
LIFE+	http://ec.europa.eu/environment/life/project/Projects/index.cfm

Through an extensive analysis of 32 projects, selected out of more than a hundred, operational recommendations to strengthen SPI for environmental management and sustainable water use were provided around the following themes [27]:

- Improve the EU calls for projects, design and implementation of EU science-policy projects
- Enhancing access to outputs and results of science-policy projects
- Making the science-policy interface more 'fit-for-purpose'
- More effective data gathering, management and sharing
- Enhancing science to policy communication
- Greater recognition of science for policy.

4.5.2. Examples of EU projects with a SPI component

While the previous projects deal directly with the analysis of SPI characteristics, related policy recommendations and possible structure (i.e. they have studied how to develop an SPI), a high number of projects funded by EU include an SPI component among their activities. The following examples of this type of projects are given to showcase their characteristics.

HERMIONE

HERMIONE project aimed to make available information on deep seas for decision makers from national to global levels to motivate the public and policy makers to keep the oceans on the public agenda and ensure policy effectiveness. The study sites included the Arctic, North Atlantic and Mediterranean. A Science Implementation Panel was established to provide HERMIONE with feedback on the policy needs, relevance and political and societal issues. To let EU and global policy co-evolve with the results, a SPP (Science Policy Panel) was stablished with the goal to provide actors – mostly policy makers – with relevant information. This SPP consisted of high-level policy makers involved in the process from the start.

Together with and for the SPP, workshops were organized to discuss and share the findings of HERMIONE and to raise awareness for the work and give feedback on the process. Next to the SPP was a panel of policy makers from DG Mare, DG Environment, DG Research of the EC and NGO's and industry actors. The main task of this panel was to help shape the research and results as well as to help identifying time limits in the policy field [30].

PERSEUS

PERSEUS is also an example of a marine research project aimed to supporting the creation of science-based policies. The project also focussed on the marine environment and specifically on the objectives of the Marine Strategy Framework Directive (MSFD), 2008/56/EC.

PERSEUS identified, develop and promoted tools and methods to assess environmental status across the Mediterranean Sea and the Black Sea basins with emphasis on non-EU countries, in accordance with the principles and objectives of the MSFD. PERSEUS designed an Adaptive Policy Framework, a framework for adaptive policies and

management schemes to promote better governance across the Southern European Seas. A decision support system was built based on a scenario planning approach. A stakeholder platform was also organized involving relevant experts and decision-makers in the Adaptive Policy Framework construction process, through a participative approach.

DEVOTES

The **DEVOTES** project aims to develop tools for understanding marine biodiversity, assessing the state of the environment and assisting policy implementation. The project helps understand the impact of human activities and climate change. Maps on monitoring and ecosystem services were produced. A description of the socio-economic implications was done, particularly from a legal angle. The main obstacles to achieve GES were identified. Support software for the selection and refining of state indicators has been developed and used for national waters of several Member States and at regional level. For the project DEVOTES, SPI has taken the form of a management support tool summarizing all results of the "NEAT" (Nested environmental assessment tool) provided for policy makers, citizens, researchers and NGOs.

The NEAT software aims to represent a flexible and user-friendly desktop application implementing the assessment tool developed under the DEVOTES project (Integrative assessment of biodiversity). It integrates results from human pressures and climate change and indicator analysis, in order to be a central access point to the data collected in the DEVOTES project and to make use of these data for biodiversity assessment.

COCONET

CoCoNet project focused on the Mediterranean and the Black Seas and its objectives were to produce: (1) Guidelines for the institution of networks of Marine Protected Areas (MPAs); (2) Smart Wind Chart evaluating the feasibility of Offshore Wind Farms (OWFs). Project results provide two SPI components.

The first is a manual identifying four steps to follow in order to design a Network of MPAs:

- Step 1: Collect all information on the environment and the human activities that will make up the network, so as to build a geo-referenced database;
- Step 2: Define spatially explicit management and conservation units;
- Step 3: Identify networks and priority areas and their objectives by analyzing the information of the database, spatially organized in the conservation units;
- Step 4: Design a management plan of networks of MPAs, based on their objectives and the strategies to reach them.

The second SPI component is the Smart Wind Chart, synthesizing both opportunities (wind availability) and constraints (biodiversity and ecosystem conservation, socio-economic potentials), of wind energy development.

THE ODYSSEA PROJECT: ADDRESSING IMAP KNOWLEDGE GAPS

The European Union Horizon 2020 project ODYSSEA ('Operating a network of integrated observatory systems in the Mediterranean Sea') is establishing an interoperable, user-driven platform that integrates data from various networks of observing and forecasting systems across the Mediterranean Sea. Besides drawing from existing ocean observation data, the project is setting up nine *in situ* monitoring Observatories in data-poor regions. The ODYSSEA Platform aims to support decision-making for a sustainable blue economy and effective conservation of marine ecosystems and biodiversity in the Mediterranean Sea by facilitating access to data and tailored information services. The potential end-users of the ODYSSEA Platform include decision-makers from the public sector, industry and conservation, as well as members of the public, education and research institutions. One particular objective of ODYSSEA is to support policy-related processes in the Mediterranean Sea region, such as IMAP.

The 'gap analysis' suggests that ODYSSEA data and information services could contribute to filling some of the current knowledge gaps for 12 IMAP Common Indicators, supporting more comprehensive and integrated monitoring of seven Ecological Objectives. The analysis further suggests that activities under ODYSSEA could support efforts to strengthen the science-policy interface for IMAP. A set of priority areas for collaboration between ODYSSEA and IMAP are identified, with particular focus on monitoring of marine mammals (abundance, distribution) and marine litter (beach litter, microplastics), but also eutrophication (nutrients,

Chlorophyll *a*), pollution (harmful contaminants, oil spills; underwater noise) and hydrographic conditions.

To support the IMAP process through the ODYSSEA Platform, a two-step approach for the alignment between IMAP and ODYSSEA is proposed. In the medium-term, ODYSSEA data and services could contribute to the preparation of the next Mediterranean Quality Status Report in 2023 (MED QSR 2023). In the long-term, if the ODYSSEA Observatories can be established as a reliable and quality assured data source, the data they provide could support the respective Contracting Parties in their national monitoring efforts under IMAP.

4.6. CONCLUDING REMARKS FROM THE ANALYSIS OF EXISTING EXPERIENCES

The analysis of existing SPIs confirms that these initiatives are rather diverse in terms of typologies and components, although they all share the essential objective of strengthening interactions among involved stakeholders (mainly, but not exclusively, scientists and policymakers/managers) to enable the co-creation of the scientific knowledge needed in the processes of policy making and implementation.

Available examples of SPI range from formalised structures to more informal initiatives and can include diverse components (e.g. networks, forum, working groups, advisory groups, data portals, IT platforms, etc.). Some initiatives are clearly labelled as SPI while others actually act as science to policy interface although they are not immediately recognized as such. The analysis of this diversity of initiatives has enabled to identify some conclusive remarks useful for the formulation of recommendations (Chapter 5) and the proposal for an SPI to support IMAP implementation (Chapter 6). These remarks have been clustered around 4 major thematic issues:

1. **Production, quality assessment and delivering of actionable knowledge**

   - Co-design and co-production of actionable knowledge are common elements for any SPI initiative. These imply a deep interaction among involved stakeholders, which also means bi (or multi) directional communication: from science to policy and from policy to science.
   - Quality, validity and adequacy of information and knowledge are essential to ensure the SPI is credible and actually used in the policy making process. Therefore transparent quality assessment and quality check are essential components of the knowledge creation process in many analysed examples. These components can involve specific internal SPI experts or even rely on external peer reviewers.
   - The analysis of available SPI experiences stressed the importance of diversifying outputs and enabling different entry points to the same SPI. Different outputs should be designed for different target users, encompassing a wide range of product typologies (e.g. policy briefs, newsletters, brochure, briefing papers, webinars, workshops, technical and methodological reports, presentations, etc.). More complex outputs, such as detailed report, are often designed as multi-layered products, including for example a summary for policymakers, a technical summary or briefs on key facts.
   - The analysis showed the importance of focusing SPI activities on major challenges. However, an SPI should always be ready to address and put the attention on emerging problems, which might not be immediately perceived as urgent and critical by the overall society.

2. **Operation of the SPI**

   - SPI are often called to deal with complex and wide problems (e.g. climate change mitigation and adaptation, biodiversity protection, sustainable management of natural resources, etc.). Working or task groups are often created to deal with specific aspects. Anyhow, integration of sector-based analysis is often recognised as a real need, which requires ad hoc mechanism within the SPI (e.g. forum or plenary events).
   - The IT component is not essential but can magnify the dissemination and capitalization opportunity for an SPI. A wide number of examples of SPI provided with an IT platform is available. Such platforms go beyond data sharing systems, which however remain essential, as they enable to share products and practices, disseminate pre-digested knowledge and provide a virtual space for continuous interaction among involved stakeholders. As demonstrated by various examples mentioned in the previous paragraphs to be effective IT platforms must ensure open accessibility to users.
   - The daily operation of an SPI is often ensured by dedicated resources, which may take the form a secretariat or a coordinating unit.

3. Embedding the SPI within a policy-making organisation

- An important distinction can be made between SPI initiatives which are directly framed within policy making organisations (in particular at the international, European and regional sea levels) and those figuring as scientific networks. Both can contribute to the science policy interface process, but we can expect the latter encountering more difficulties in feeding their scientific evidence into policy making.
- It is not surprising that the supra-national context provides a rich collection of SPI examples. A wide number of SPI initiatives were born within or have been linked to formal cooperation processes, which often are direct results of international agreements. Moreover, the supranational level ensures greater visibility, providing opportunities for the dissemination of information on SPI initiatives. Mapping SPI initiatives at the national and sub-national scale is surely more challenging, also because some potentially relevant initiatives are not structured or neither labelled as SPI.
- Besides policy making organisations that are directly involved in or part of SPI initiatives, others can play an important role in capitalizing SPI outputs and supporting their mainstreaming towards a wider arena of stakeholders, as for example the European EUSAIR and WestMED sub-regional Initiatives in the Mediterranean Sea.

4. Long-term durability of the SPI initiative

- Notwithstanding their difference, a wide number of SPI initiatives stress the importance of keeping the process alive. Continuity implies going beyond one-off assessment and/or project-based experiences, which however can be very important initiators of longer standing processes. In this perspective, clear identification of responsibilities and roles and proper earmarking of economic and human resources are essential to ensure durability of the SPI process. The adoption of a long-term approach, the creation of an SPI foresight vision or the elaboration of a strategic agenda can also help to ensure continuity to the SPI initiative.

5. Recommendations for a SPI to support IMAP implementation

A series of recommendations on how to develop an optimal SPI and how to fill most common gaps in science-policy dialogue can be derived from literature analysis. In addition to the work done in the previous phases of the EcAp MED II project, in this study an effort was made to collect tailored recommendations for an SPI for IMAP from scientists and policy makers/practitioners engaged in IMAP, and from RACs' representatives, through structured interviews (see paragraph 3.2). The recommendations presented in this chapter are therefore derived from literature analysis, including the results of the EcAp MED II project, and from the interviews and the on-line survey conducted during the study.

Any relevant recommendation provided by the consulted sources has been capitalized and organized according to five main conceptual pillars (paragraph 5.2): Formalization, Simplicity, Accessibility, Continuity/sustainability, Enabling conditions, Mainstreaming into projects. The review of recommendations presented below (paragraph 5.2) is preceded by the identification of the goals, needs and gaps of a SPI for IMAP (paragraph 5.1), also derived from literature and interviews.

5.1. GOALS, ADDED VALUES, NEEDS AND GAPS

At global level UN Environment [11] identified the following main gaps in SPI processes:

1. gaps in the chain of capable, motivated people exchanging evidence between scientists and final decision makers;
2. gaps in available evidence, and
3. gaps in the effective transfer of evidence between the people in this chain.

The same source also provides numerous suggestions on how to address them. These can be clustered in five categories, each including one or few more steps: (i) Build your own understanding of gaps and capacities, (ii) Build partnership to grow your capacity to act, (iii) Fill gaps in available knowledge, (iv) Build the capacities of other participants, (v) Create practice for the effective exchange of evidence [17].

At Mediterranean level, the participants in the Inception Workshop of the EcAp MED II project (held in Sophia Antipolis, France on the 15-16th 2015) agreed the **main goal of an SPI for IMAP is enhancing the relationship between science and policy, in order to improve the delivery of IMAP in terms of monitoring and assessment of the status on the Mediterranean Sea and coastal areas, as a basis for further and/or strengthened measures and informed policies for achieving GES** [31].

5.1.1. SPI for IMAP – Specific goals

The following **specific goals** are derived from the overarching one [25]:

- ensure that results of recent and ongoing scientific projects consisting in data collection and knowledge generation are considered in the country-specific and regional IMAP monitoring programmes;
- provide that the policy process supports the articulation of policy challenges in relation to monitoring and assessment where scientific input is necessary;
- reinforce links between IMAP and other monitoring programs and policy at regional and national level, to ensure that their outcomes are reflected in regional policy developments related to IMAP and possibly also in the country specific EcAp monitoring implementation plans, beyond the EU;
- make the scientific community engaged in coastal and marine research more aware of environmental policy needs and challenges at regional and national level.

From a practical point of view, the following **operational objectives** are identified [32]:

- reflect relevant scientific recommendations and results in the documents prepared by UNEP/MAP;

- follow-up with targeted communication material, ensuring further knowledge sharing and specific scientific input both to the development of national work (monitoring implementation plans), sub-regional and regional policy-development..

Finally, it is worth clearly specifying that **the objectives of the SPI for IMAP are focussed on and limited to the knowledge and provisions related to the 11 EO** used to define the ecological status according to GES definitions/determinations of the related indicators and any piece of knowledge relevant to them.

5.1.2. SPI for IMAP – Added values

Achieving SPI goals is unquestionably demanding in terms of effort the parties involved need to dedicate. It is therefore key to rely on and strengthen overlaps between SPI goals and the missions the parties involved must already implement, given their mandate. The existence of **mutual benefits** for the different parts involved in an SPI should be highlighted. Exploitation of mutual benefits can act as driver for SPI implementation. The interaction of the parties involved in the SPI would allow the creation of a virtuous "decision chain" (Figure 7) contributing to strengthen the implementation of environmental policies.

IMAP-SPI added value for scientists

- Ensure that scientists are aware of policy makers and managers' needs and constrains (i.e. in terms of feasibility of actions).
- Make science more action-oriented, in response to specific societal and political demands and overcome constraints (which are various: different visions, misunderstandings related to semantics and terminology, etc.) that limit the effectiveness of exchanges between scientists and decision makers.
- Help scientists answer calls for fending research proposal with arguments referring to specific policy-maker support.

IMAP-SPI added value for policy makers

- Understand the complexity of the marine and coastal environment and its evolution to develop relevant and adaptive policies.
- Enable that environmental policies are based on sound scientific knowledge to be more robust and to generate more acceptance and legitimacy of public interventions.

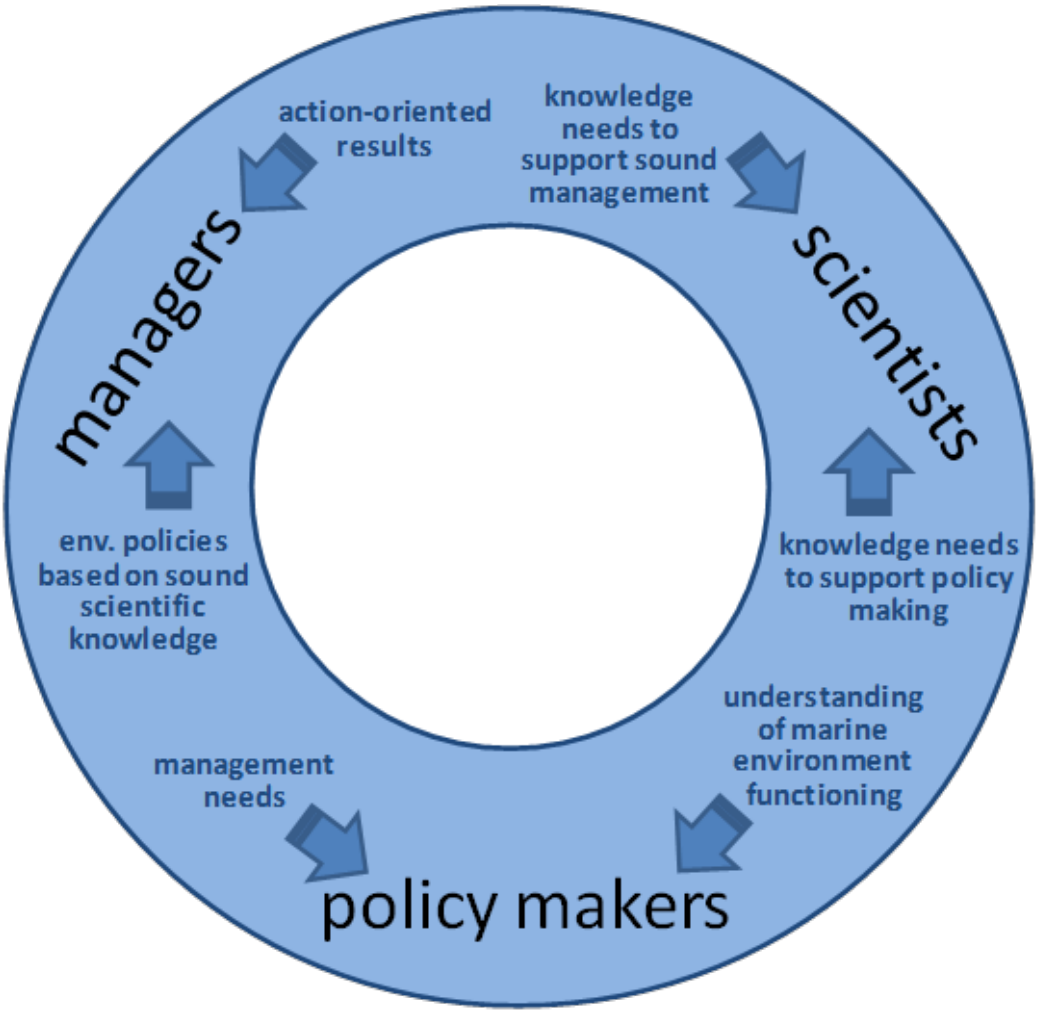
IMAP SPI added value for managers/practitioners

- Strengthen "Marine and coastal governance" in a context of multiple actors taking into account societies and markets.
- Coordinate, and provide guidance on concrete management needs, engage in collaboration with scientific communities at national and regional levels.

IMAP SPI added value for economic sectors and society at large

- Benefit from healthy and productive marine and coastal ecosystems for both economic activities and the human society (e.g. coastal communities) at large
- Effective policy and regulation systems
- Know-how about environmentally sustainable practices for business
- Awareness about environmentally sustainable practices and behaviours for citizens.
- Scientific support to mandatory monitoring requirements in the policy cycle.

Figure 7: Benefit exchange through an SPI



5.1.3. SPI for IMAP - Needs

In December 2015, Plan Bleu initiated a series of workshops called "Implementation of the Ecosystem Approach in the Mediterranean: strengthening the science-policy interface" [31], [33], [34], [35]. Discussion undertaken during the workshops highlighted a number of **needs for strengthening SPI for IMAP** [13]. During the preparation of the present report, 8 interviewees were asked to score the relevance of these needs, which are presented in the following points, in the (average) order of priority assigned by interviewees.

I. Develop new research projects that would specifically include an SPI component and which would guide research towards measures or parameters that are important for policymaking.

II. Reflect relevant scientific recommendations and results in the documents prepared by UNEP/MAP (for example in its planned Mediterranean Quality Status Report).

III. Follow-up with targeted communication material, ensuring further knowledge sharing and specific scientific input both to the development of national work (monitoring implementation plans) and sub-regional and regional policy-development.

IV. Strengthen technical expertise in SPIs by including doctoral students and young professionals specialised in politics and policymaking.

V. Carry out pilot SPI projects including both scientists and policymakers at different scales on different topics.

VI. Include social scientists in research projects to facilitate communication between scientists and policymakers.

VII. Involve public policymakers in projects from the outset.

The following, additional needs were suggested during the interviews:

- Ensure that stakeholder engagement in the SPI process is balanced and neutral, which implies early and durable engagement of all key actors (scientists and policymakers mainly, but not exclusively).
- Mutually adjust (or adapt) the languages of the two SPI components to improve communication: simplify and adapt the scientific language to improve communication of research results to policy makers.
- Proactively communicate policymakers' needs and priorities, as well as availability of resources, operational bottlenecks and policy timing, to scientists, to jointly understand what is feasible and what it is not
- Highlight socio-economic implications (pros and cons) of different environmental management choices based on scientific knowledge, in terms of economic development, job creation, education, gender equality, etc.
- Focus SPI activities on major challenges, but also consider emerging environmental and climate issues.

5.1.4. SPI for IMAP - Gaps

A number of **gaps related with SPI for IMAP** have been identified during the workshops mentioned above and they were scored by the interviewees contacted in the present study. The gaps are presented in decreasing order of importance here below, considering the (average) scores assigned by interviewees.

I. Heterogeneous spatial distribution of knowledge availability. Generally, a gap between Northern and Southern Mediterranean countries can impact the robustness of regional Mediterranean models and knowledge.

II. "Ecosystem functioning" approach. Currently available knowledge on the functioning of Mediterranean marine and coastal ecosystems is still lacking, although the mobilization around EcAp and the MSFD has so far succeeded in developing new knowledge.

III. Scientific results to inform different processes. Scientific research results need to be suitable to cater different purposes integrated in IMAP: (i) monitoring, (ii) integrated environmental assessment and (iii) IMAP further revisions.

IV. Monitoring versus obtaining new knowledge. There is a relevant difference between routine activity with the purpose of monitoring and scientific activities for obtaining new original knowledge. Furthermore, if new knowledge is considered GES relevant, a sustainable monitoring process should be developed.

V. Lack of knowledge. Scientists are not in all areas currently able to provide necessary knowledge to policymakers to support the goal of achieving GES.

The following, additional gaps were suggested during the interviews:

- Lack of appropriate representation of science and policy components within CORMONS: participants to CORMONS often do not properly represent the two components. They have some technical knowledge on IMAP process but at the same time they lack of a clear mandate for decisions.
- Lack of financial capacity and limited availability of technical skills and tools, which were pointed out as an important limitation to SPI in the southern Mediterranean countries.
- Concentration of knowledge in few subjects and lack of knowledge dissemination.
- Heterogeneous methodologies, tools and protocols of monitoring systems (in terms of harmonization and standardization of risk-based and analytical monitoring protocols).

5.2. RECOMMENDATIONS

Recommendations for an SPI for IMAP can be clustered around five pillars illustrated in Figure 8.

Figure 8: Recommendation pillars

5.2.1. FORMALIZATION

Participants to the inception workshop of the EcAP MED II project pointed out that any SPI for IMAP has to be based on a formalized process with clearly defined structures and procedures and with a dedicated budget [31]. This suggestion was confirmed by the interviewees contacted during this study. A certain degree of formalization is needed to ensure commitment to the SPI process, involvement of national representatives at the regional level and overall durability of the interface. The importance of a certain degree of formalization is also confirmed by various existing international long-standing SPI initiatives, as intergovernmental panels or bodies (e.g. IPCC, IPBES, ICES), which rely on formalised stricture and processes. At the same time, it was recommended to develop less formal components of the SPI, for example to deal with specific challenges and issues and/or to enable the involvement of a wider community of science and policy experts beyond those participating in the formal process.

Formalization implies that the science-policy interface could be framed within and strongly anchored to the Barcelona Convention system. In this sense, the SPI would benefit from the identification of a body responsible for its coordination. This body would be similar to those activated in other SPI experiences and could be created *ad hoc* or integrated into an already existing structure of the UNEP-MAP constellation, as for example one of the RACs. Anyhow this coordinating unit (control room as defined in chapter 6) will have to interact with the other components of the Barcelona Convention system, including the Mediterranean Commission on Sustainable Development (MCSD), given its scientific advisory role [13].

Arrangements supporting the formalization and mainstreaming of IMAP's SPI can be facilitated through the following mechanisms [31]:

- Add official provisions on SPI into the Integrated Monitoring and Assessment Guidance
- Describe SPI structure and process in project documents to define how SPI is embedded in project activities
- Establish advisory boards strongly involving (i) policy makers in research projects and (ii) scientists in policy development and governance projects
- Sign Memoranda of understanding (MoU) between involved actors, projects, institutions, organizations, etc.
- Establish partnership agreements with local actors (fishers committees for example)
- Set-up a network of projects; clustering of projects with similar scope and approach can help to identify commonalities and capitalize results towards policy development and implementation.

5.2.2. SIMPLICITY

Based on available SPI experiences, it can be suggested to guide SPI for IMAP according to simple principles**.** Though there can be no 'one-size-fits-all' set of recommendations for the 'ideal' SPI, there are some general features that tend to support success: credibility, relevance, legitimacy (CRELE). These CRELE attributes are widely accepted and used, and can explain an SPI's influence [8]. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) considers the CRELE attributes as relevant for its activities. The Intergovernmental Panel on Climate Change (IPCC) uses CRELE to evaluate scenarios, draw lessons from past experiences and explain assessments' influence.

The relevance of adopting procedural rules for preventing conflicts of interest can be also analysed. Such rules do not currently exist in the UN-Environment/MAP but have been developed within some global conventions on biodiversity [13].

Simple SPI should be designed as light as possible and, to the extent possible, embedded in existing processes and mandates to facilitate their long-term viability.

CRELE ATTRIBUTES [8]

Credibility is the perceived quality, validity and scientific adequacy of the people, processes and knowledge exchanged at the interface.

Senior and respected participants enhance the credibility of the SPI. Key human resources, including 'champions' in strategic organisations, leaders, science translators, and charismatic 'ambassadors' can improve visibility and credibility.

Relevance is the perception of the usefulness of the knowledge brokered in the SPI, how closely it relates to the needs of policy and society, and how responsive the SPI processes are to these changing needs. Using understandable language adapted to the specific audiences is crucial to relevance.

Avoiding jargon, explaining concepts, and establishing common assumptions all help to build understanding and increase the chance of outputs reaching and influencing the intended audiences. Skilled "translators" or knowledge brokers can help to improve knowledge exchange.

Legitimacy is the perceived fairness and balance of the SPI processes. It is especially important when knowledge is contested and in all situations where conflict may arise.

Wide coverage and participation of different expertise and perspectives helps legitimacy. It may sometimes be necessary to have balanced membership for example through 'seats', voices or votes for relevant interests, sectors, or geographical areas.

In addition to the CRELE the following attributes have been also identified as recommendable for the SPI for IMAP:

- Bi-directionality: SPI should encompass two-direction process, from policy to science (research and knowledge needs) and from science to policy (research results)
- Multi-scalar: SPI structure and processes can be designed to meet needs at different scales: national, sub-regional and regional. Interplay among scales is also very important and shall be considered when designing an SPI.

5.2.3. ACCESSIBILITY

Accessibility to data and knowledge on the status of the Mediterranean and on pressures, activities and threats are guaranteed **to all relevant actors**. In addition, in order to guarantee sound environmental management and identification and implementation of actions to reach GES in the Mediterranean, information has to be transformed in actionable knowledge, easily understandable and usable by policy makers and environmental managers. In view of this, this pillar encompasses two components:

- **Need for a common, harmonized and fully accessible system for IMAP data, to guarantee accessibility of knowledge to all relevant actors.**
  According to the Decision IG.22/7/2016 the IMAP requires an updated and integrated data and information system for the UNEP/MAP Barcelona Convention with clear set roles for data handling and assessment for the various components and with a user-friendly reporting platform for Contracting Parties, based on the following strategic points: (i) data and information activities aim to achieve a reliable, quantitative assessment of the status of the Mediterranean Sea and Coast; (ii) the infrastructure will facilitate access to environmental information for the general public [31].
  This could serve as a tool to manage the available knowledge and become the central underlying structure of IMAP's SPI. It will handle data and information from different sources and ensure that documents, data, and products are managed consistently and easily available to users. Such infrastructure will also facilitate integrated assessments.
  Finally, SPI processes and outputs (data, information on events, reports) will be available and accessible to anyone.
- **Need to transform data into actionable knowledge, to guarantee accessibility to concepts usable for the management of Mediterranean Sea and its coastal areas.**
  Different local, national and regional initiatives and projects have produced a tremendous amount of knowledge relevant to Mediterranean marine and coastal ecosystems. Much of this knowledge can be useful for assessing the gap with the GES and can thus potentially serve as inputs to IMAP, which represents a great opportunity for IMAP. However, the amount of knowledge available is such that it is presently unmanaged and therefore "inaccessible" to decision makers. In fact, knowledge production is chronically suffering from a lack of coordination, which hinders stakeholders to take full advantage of the available scientific results [31]. Translation of scientific results into communicable and actionable knowledge is therefore key.

5.2.4. ENABLING CONDITIONS

Enabling conditions to make the IMAP SPI structure function should be ensured. This regards not only **economic sustainability** – which however was pointed out to be essential by both the respondents to the on-line survey and interviewees - but also tailored **governance** and availability of specific technical **capacities**.

Sustainability and long-term durability of an SPI implies clear commitments, clear governance structure and definition of roles. More specifically, three key elements for an effective science-policy interface can be identified [11]:

- Links in the chain: Motivated and capable individuals, able to utilise and exchange evidence and expertise to influence decision outcomes;
- The right evidence: Availability of the appropriate data and expertise;
- Productive exchange: of this evidence between individuals in the pathways.

An effective, focussed and regular SPI for IMAP requires specific competences and capacities. For example coordination and administrative capacities are essential. Training and capacity building are therefore highly needed as well as dedicated profiles in communication to talk with the outside / other actors. In fact the SPI activity cannot be reduced to the merge of experts and expertise; it requires real integration and proactive approach. These capacities can be developed all over the Mediterranean, but especially in those countries where they are particularly lacking.

Enabling conditions also encompass the circumstances under which scientists are encouraged and supported in their contribution to SPI. The main recognized barriers are a self-perceived lack of competence at navigating the science–

policy interface, as well as past negative experiences and institutional norms that did not support them. Lack of time and resources are lesser factors [36].

Professional societies, government-relations departments at some universities, and organizations supporting scientists in their SPI activities (e.g. COMPASS [37]) could help.

SUSTAINABILITY OF SPI FOR IMAP

In order to ensure long-term sustainability the following aspects should be put in place along with availability of economic resources:

Develop a strategic vision. SPI activities should be planned from a strategic point of view, following a shared vision. In such a case resources can be more easily mobilized.

Build trust. Investing energy in building/strengthening mutual trust among stakeholders participating to the SPI is essential to enhance their commitment in the process.

Build on synergies. Synergies with already existing initiatives should be developed. For example coordinating existing SPIs within MAP activities is recommended. SPI could be incorporated in already existing process and initiatives by improving the current system in place and not create an additional one. The same SPI knowledge can serve more than a single scope, e.g. EcAp and nature based or ecosystem based solutions.

Highlight the advantages of SPI. Interest in science policy dialogue must be raised by highlighting concrete advantages for all components contributing to the SPI. SPI should be promoted as an umbrella activity for other goals like economic development, job creation, social well-being. Under this perspective, synergies with economic sectors should be developed, engaging SPI in being a common base for dialogue.

Include SPI within routine business. SPI activities for scientists and managers / decision makers should be included within regular responsibilities.

Raise awareness about costs. Consideration and awareness of costs involved in IMAP should be increased in both scientific and management component of the SPI. If scientists advance some proposals on monitoring, they should be aware also of related costs and resource needs. At the same time, policy managers shall be aware of the consequences of taking or not taking scientists' message on board.

Define priorities. Given the limited availability of resources and time, definition of priorities is highly important, also to ensure long-term sustainability of the SPI. Prioritization enables to streamline the process on real priorities and produce real benefits.

Work with networks. SPI for IMAP should rely and benefit from existing networks of experts, practitioners and other stakeholders.

5.2.5. MAINSTREAM SPI INTO PROJECTS

Scientific activities in the Mediterranean have a highly developed project culture and they produce useful inputs for IMAP, while not being formally part of IMAP or EcAp. The mainstreaming of IMAP should take place already during the project design phase. The mainstreaming of IMAP into such projects will furthermore support stakeholders in achieving shared ownership of results and thus encourage better outreach and impact and involve a maximum of stakeholders [31]. Design interfacing activities before the launch of research projects and improve coordination between projects have been recommended [13]. Mainstreaming also limit the risk of regularly "reinventing the wheel" by designing new and short-lived monitoring system on a project basis. Building on IMAP (to populate indicators or develop new ones) could be made an explicit condition for funding, thus supporting collaborations from the research design phase onwards.

The mainstreaming concept is also important under another perspective. Beside IMAP-SPI being specifically meant to improve environmental monitoring, assessment and management capacity, in particular within the IMAP framework, mainstreaming SPI contents into all relevant sectors is essential to make them fully aware of the deep link they have with the ecosystem functions and services, which highly depend on environmental protection.

5.3. RECOMMENDATIONS FOR SPI AT THE NATIONAL LEVEL

Based in the results of the interviews conducted during the present study the following recommendation can be identified:

- **National specificities.** The need for national specificities of SPI for IMAP is recognized and considered. SPI should be adapted to the context (local, national, sub-regional, regional level). Specifically, at national level it is needed to take into consideration the specific circumstances of the country. SPI is shaped at country level, to be able to meet cultural specificities institutional set-up and country heritage.
- **Decentralization.** At national level, decentralization (towards sub-national regions, counties or provinces) of SPI might be considered, where relevant, to support decision making at the sub-national scale in particular in areas identified as critical in a role-based approach.
- **Independence**. To be effective, the SPI shall act as an independent structure, with a clear mandate to bridge scientists and policymakers/practitioners' needs. This does not necessarily imply that the coordinating unit of the SPI is hosted in a new entity; To reduce the cost SPI are preferably framed in an already existing structure with a durable mandate.
- **Enabling conditions**. Enabling conditions to make the SPI structure functioning are considered: capacity building and financial capacity are ensured. These components have a high degree of country specificity.
- **Sustainability**. Light and sustainable structures should be preferred, with sustainability thought through since the design phase and not treated as a pending question until the end of a project-based funding.
- **Policy commitment**. A strong policy interest and commitment is the overarching enabling condition for the establishment of an SPI and its durability. Awareness raising on the importance and benefits of SPI might be needed to trigger such policy interest.
- **Capitalization and optimization of existing structures and frameworks, and creation of synergies**. SPI for IMAP at the national level can be newly created or based on existing experiences. The latter option can be definitively much easier to implement in some contexts, for example those with limited technical and financial capacities. Above this, it is always recommendable to optimize existing frameworks in order to avoid duplication, confusion of roles and additional effort. Existing inter-sectoral committees or bodies (as those on ICZM or sustainable development) could fit to this scope. Once created, the national components should collaborate within the Forum described in chapter 6.
- **Ensuring training and capacity building**. SPI is still a novel concept, which requires a change in the attitude of involved actors. Training and capacity building might be needed depending on country specificities.

6. Proposal for a SPI to support IMAP implementation

Possible key features of an SPI for IMAP are identified in this chapter, according to the outcomes from desk analysis, interviews and the on-line survey.

Identification of key features of SPIs is structured according to what is suggested by the results of the SPIRAL project [7]:

- Goals
- Inputs (not included in SPIRAL results, proposed as a complementary feature)
- Structure
- Processes
- Outputs
- Outcomes.

6.1. GOALS

The main goals of an SPI for IMAP are described in paragraph 5.1. In addition to these, the following objectives for strengthening the SPI were identified during the "Workshops on science-policy interfaces for strengthening implementation of the IMAP", carried out within the EcAp MED II project [13]. The objectives are reported herein, in the order of priority assigned by the interviewees contacted during this study.

I. Make scientific research more “action”-oriented by more precisely targeting social and political needs, moving beyond structural obstacles such as semantic or ideological misunderstandings that can limit the effectiveness of dialogue between policymakers and scientists.

II. Highlight the critical role of science in drawing up relevant and suitable environmental policy. Ensuring that environmental policy is based on strong scientific knowledge on the environment and changes helps policy to be more effective and legitimate.

III. Coordinate cooperation between scientific communities and collaboration between scientists and national or regional public policymakers in order to guide them towards real management needs.

IV. Strengthen “marine and coastal governance” in a context involving multiple stakeholders and the market working on social or economic themes.

Like any relevant existing SPI structures (e.g. SEPI, BISE) the SPI for IMAP is not a general platform for dialogue between scientists and policy makers but aims to provide targeted services for environmental policy design, implementation and enforcement in the context of EcAp.

6.2. INPUTS

Inputs for an IMAP SPI are the data relevant for the assessment of the 11 ecological objectives used to define the ecological status, according to EcAp, and the calculation of the related common indicators (and in future of the candidate indicators). Such data can be derived from national monitoring programs (where in place) and from results of research projects.

Other relevant input to SPI for IMAP are represented by scientific papers and reports synthesizing information on the state of the Mediterranean sea and coast (or the status of some specific sub-regions) on particularly important topics, related with the ecological objectives identified by EcAp (e.g. the report on the status of climate and environmental changes in the Mediterranean, including a summary for policy-makers, that MedECC is developing).

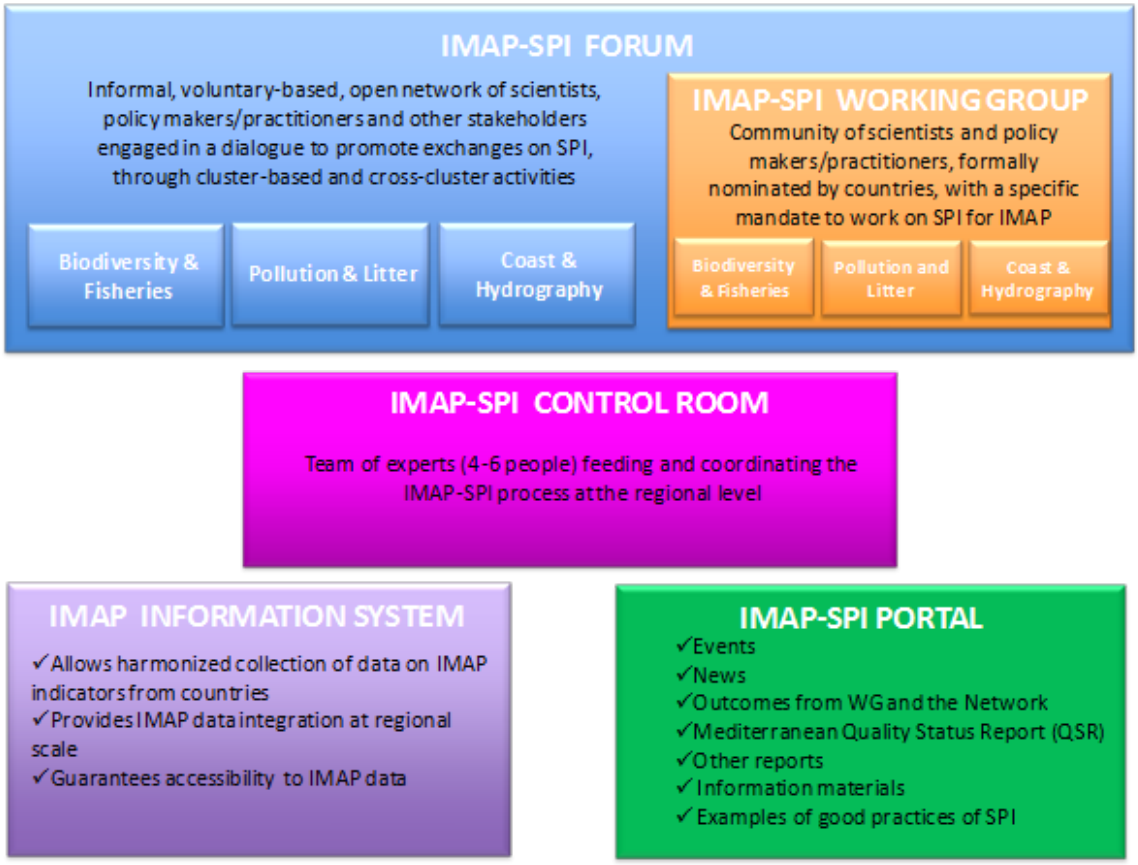
Finally, IMAP being a dynamic and adaptive process, it is important that SPI input is updated also with data and information related to emerging topics, not yet structured within the IMAP system.

6.3. STRUCTURE AND PROCESSES

The section below outlines what could be a fully fledge regional SPI for IMAP, building on exciting structures and processes within the MAP system while further developing them. Alternative options including options building on initiatives outside the MAP system could be the subject of a dedicated Med SPI workshop.

SPI for IMAP includes both human and IT components, as identified in the diagram of Figure 9 and described herein. In the following text references to features characterizing the existing SPI experiences described in chapter 2 are written in blue or highlighted in boxes, in order to make links with such initiatives evident.

Figure 9: Possible IMAP-SPI structure at regional level



6.3.1. IMAP-SPI FORUM

Building on the examples of other relevant SPI initiatives (e.g. ICES, DOSI, MED 2050), the Forum is a large, informal community of scientists, policy makers and practitioners and other stakeholders from public or private entities, as well as NGOs (regional scale ones), interested in contributing to the work on SPI for IMAP. Participation is voluntary, free, not paid and adhesion to the Forum is registered.

Like many other existing SPI experiences (e.g. IPCC, MA), the Forum is organized in three clusters, corresponding to the CORMONS groups: Biodiversity & Fisheries, Pollution and Litter, Coast & Hydrography. In addition, cross-cluster topics are also discussed and cross-cutting initiatives are addressed to all participants in the Forum.

Possible topics of discussion in the IMAP-SPI Forum are, for example tools and methods for efficient SPI at national scale, improvement of data integration from national to regional scale, IMAP contribution to other policy obligations, etc.

Participants in the IMAP-SPI Forum are engaged in workshops, conferences, on-line discussions, webinars at regional and national level. For example, workshops can be organised at the national level on specific monitoring aspects, to improve local capacity. At the regional or sub-regional scale, workshops can have the scope to provide input for the

definition of common procedures, favour the exchange of experiences and practices, debate emerging issues impacting the status of the coastal and marine environment. Emphasis on the participatory approach can be given, together with the priority to the creation of a common foresight vision, in the framework of MED 2050.

Building on the example of HELCOM and BONUS (the joint Baltic Sea research and development programme), a direct link can be built through the Forum between the Barcelona Convention system and the Mediterranean research community. A key role in this process can be played by the Blue Med initiative.

Building a community to foster the exchange of experience and knowledge in the Mediterranean

PANACeA, for example, builds a community of nature conservation stakeholders in the Mediterranean and acts as the communication and capitalization instrument of the projects dealing with protection of biodiversity and natural ecosystems.

Through its tool, the Mediterranean Biodiversity Protection Knowledge Platform, PANACeA ensures the transfer of synthesized projects' outcomes and their dissemination across and beyond the region.

6.3.2. IMAP-SPI WORKING GROUP

It is a community of scientists and policy makers/practitioners, formally nominated by countries, with a specific mandate to work on SPI for IMAP. As for the forum, the working group is organized in three clusters too, corresponding to the CORMONS groups: Biodiversity & Fisheries, Pollution & Litter, Coast & Hydrography.

This restricted SPI community shall be built under the umbrella of IMAP. National Focal Points (NFPs) of different RACs involved in IMAP can designate their representative for the community. It can be expected that each country nominates 2 representatives per cluster, one scientist and one policy maker/practitioner.

In order to rely on existing structures and avoid duplication of effort, the working group could be constituted based on CORMONS as the proper formal process to ensure SPI for IMAP.

However, changes in scope and composition of CORMONS can be needed to better fit SPI for IMAP strengthening needs. In fact CORMONS, at present, have a more narrow composition and scope. Their work is focused on detailed technical aspects of monitoring and assessment. The scope of work of the IMAP-SPI working group is expected to be wider and more complex; it shall be considered if presently experts involved in CORMONS are in the right position to deal with the needed strategic level. In addition, CORMONS are affected by some degree of representativeness weakness: increase participation of experts with a clear mandate to take decisions would improve the efficiency of the process.

Role and structure of the Working Group

This possible role and structure of the Working Group capitalises the experience developed under the MSFD, where, in the frame of the Common Implementation Strategy, the Marine Strategy coordination Group acts as a link between Marine Directors (high political level) and the Working Groups.

The IMAP-SPI Working Group meets regularly to discuss key SPI topics and identify actions to strengthen SPI. Key outcomes of the work of the IMAP-SPI Working Group inform decisions to be approved by COP.

Participants in the Working Group have a double, fundamental role in the IMAP-SPI structure at regional and national level (see also Figure 10).

The IMAP-SPI Working Group also ensures accurate quality check on information shared through the SPI.

Although the activity of the IMAP-SPI Working Group is organised by EO clusters, inter-clusters initiatives shall be activated whenever cross-thematic coordination is needed. For specific reasons temporary thematic working groups (e.g. on climate change related aspects) could be activated.

Role of participants in the Working Group

AT REGIONAL LEVEL

at the interface with the larger community of the IMAP-SPI Forum, they (i) ensure communication and exchange and bring coherence in the cross-cluster debate; (ii) engage stakeholders in the regional arena to keep the IMPA-SPI debate vital and inclusive

AT NATIONAL LEVEL

at the interface with their national community, they have the mandate to link the IMAP-SPI process at regional level with corresponding national initiatives and communities, contributing at ensuring coherence between the national and the regional processes.

6.3.3. IMAP-SPI CONTROL ROOM

It is a formally established group of experts feeding and coordinating the IMAP-SPI process at the regional level. It consists of a newly established structure embedded in one of the units of the UNEP/MAP system and coordinated with the others. Its activities are developed in the framework of RACs activities. The group organizes and promotes activities for the Forum (workshops, conferences), animate and moderate the web-based dialogue, raises emerging issues on specific topics, engages participants to the Forum in the debate, coordinates the production of IMAP-SPI outputs (policy briefs, brochures). The Control Room also coordinates the activities of the IMAP-SPI working group.

The Control Room is constituted by an interdisciplinary team of experts with scientific experiences and environmental management experience. Communication expertise is ensured in the group, together with IT expertise.

6.3.4. IMAP INFORMATION SYSTEM

According to the Decision IG.22/7/2016 the IMAP requires an updated and integrated data and information system for the UNEP/MAP Barcelona Convention. INFO-RAC is responsible for the development of such information system that will allow to collect IMAP data for the 27 common indicators (and other candidate indicators which will take the status of common indicators in the future) from all the Mediterranean countries. Currently INFO-RAC is working on the design and development of the structure of the information system. A pilot structure will be realised by end of June 2019. At the same time, Info/RAC is working on the definition of data standards for all indicators. Based on the pilot, INFO/RAC will consolidate the overall structure and proceed with data gathering.

At present, the designed structure enables all countries to upload, access to and download only their own data. A proposal from INFO/RAC will be discussed about the possibility to provide countries with access to all data from the region, starting from 2020. A Data Policy document is available, but in the next biennium INFO/RAC will keep working and detailing this issue to clarify the mandate. Info/RAC will discuss with each country which data can be shared and which is sensible. Info/RAC will also define how to aggregate data to provide a regional picture.

It is worth noting that developing an SPI for IMAP could facilitate the process of finalization of the IMAP Information System. In fact, in some cases, IMAP indicators are not precisely defined yet. Consequently, it is not possible to define the structure of the data collection system. Strict interaction between science and policy (SPI) can speed up the process.

At European level, example of such a component are represented by WISE Freshwater, WISE Marine and BISE, which are strictly connected to the implementation and monitoring of EU policies (WFD, MSFD and Nature 2000 directives). Specifically, under WISE there is a direct relation with the national scale: reporting at country level provides data for the European (WISE) data centre; these data are also useful for the IMAP process.

IMAP Information System: added value at national level

The IMAP Information System can significantly contribute to IMAP implementation and EcAp achievement by supporting the countries (particularly the ones from southern Mediterranean) to develop their own monitoring program by defining the needed indicators, time and scale for monitoring and other specific contents. At the same time national information systems, where available, are expected to communicate with the IMAP Information System across and beyond the region.

6.3.5. IMAP-SPI PORTAL

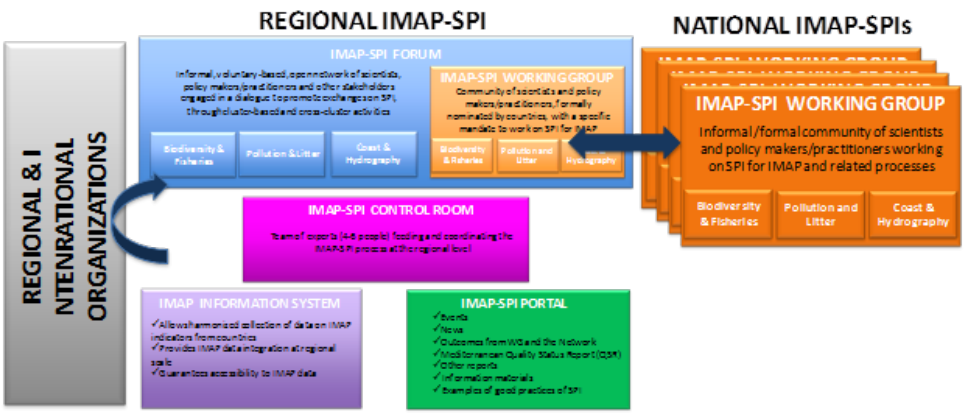
Building on existing experiences (e.g. SEPI, Climate-ADAPT), the Portal is a web site accessible to anyone where updated information on IMAP is available, in a context of science-policy exchange. The Portal hosts news and announcements on the activities of the Forum and the Working Group and the results of their work (minutes, workshop reports). It provides differentiated services and knowledge to different target end-user (multi-entry point to the portal):

- Policy oriented materials for policymakers, as leaflets, brochure, policy briefs, etc.
- More detailed products for experts, as factsheets, technical reports, etc.
- Training materials for practitioners.
- Informative materials for general users, as leaflets or infographics.

The Portal functions as a platform for on-line dialogue for the participants in the Forum. Examples of good practices of SPI at regional and national levels could also be available on the Portal, similarly, for example, to what is done within the EU MSP Platform. As any Portal, the IMAP-SPI one is a living instrument which is expected to evolve as IMAP activities progress; new sections will be therefore co-designed by the joint work of scientists and policymakers/practitioners involved in the IMAP-SPI Working Group.

The Portal could be integrated with external social media functions (LinkedIn, Twitter, Instagram, Facebook) targeting selected and verified information. This is becoming a popular practice by scientists to disseminate their research results [38].

Figure 10: Possible IMAP-SPI interfaces between regional and national SPI, and other international and regional organizations



6.4. OUTPUTS

IMAP-SPI produces a variety of outputs of different nature available, including written materials, tools, physical and on-line events.

The production of written materials is important in an SPI context, in order to facilitate exchange of information, and particularly from scientists to policy makers. The IMAP-SPI Portal provides the gateway where all these materials are available in the electronic format.

The Mediterranean Quality Status Report (OSR) which is produced periodically based on the integration of the IMAP results with other relevant knowledge and data represents one main output of the IMAP-SPI. Capitalizing from the experience of the UN Environment Global Outlook, the QSR is prepared at multiple scales: the national reports, the sub-regional and regional reports, integrating the national contributions with the knowledge available at sub-regional and regional scales. QSRs represent the baseline for defining the measures for progressing towards GES in the Mediterranean and sharpening the monitoring programmes needed to feel the existing gaps.

As IMAP is implemented and a more complete data-base is established, regular thematic reports are developed, based more and more on quantitative rather than qualitative information [24].

Building on the excellent examples from well-known SPI structures and experiences (e.g. IPCC, IPBES, SEPI), the IMAP-SPI provides multi-layered products, implying different products targeted to different users and therefore having different level of detail. Summaries and policy briefs for decision makers are essential outputs for an SPI. Also technical papers could be prepared, focused on very concrete issues, as guidelines and instructions on the work to be done, e.g. how to map coastal and marine habitats or how to approach the problem of ocean acidification. These reports shall use main and last results of scientific research to frame operative indication for monitoring systems and activities.

Ensuring quality check of all outputs could be recommended, like foreseen by most of the existing SPI systems in place (e.g. IPCC, MA, SEPI, Climate-Adapt). A detailed procedure for this process can be designed.

In addition to written material, , tools to integrate data and provide input for assessment and decision support tools could also be provided.

Meetings are also key outputs of the SPI, as well as represent part of the process. At both national and regional scales the following events could be organised:

- Regular meetings, to constantly advance the discussion and the SPI concept (Working Group meetings)
- Workshop on specific topics, deserving specific focus (Forum meetings)
- Webinar or other remote modalities of interactions on specific topics. This modality enables to organise more quickly (and in case even frequently) events to respond to specific demand, without posing strong limitation on the number of participants.

Additional meetings on urgent policy questions, requiring a quick reaction could be organized with a limited number of selected experts. Moreover, training events (and materials) could also be organised, making the best use of the other outputs provided by the SPI.

6.5. OUTCOMES

Structuring an SPI for IMAP would allow reaching the ultimate objectives of the IMAP process:

- develop a quantitative monitoring of the Mediterranean Sea and coast in an interdependent manner and for the entire regional level (covering biodiversity and non-native species, the coastline and hydrography, marine pollution and monitoring of marine litter).
- establish (new) or update monitoring programs at country level, in accordance with IMAP, taking into account regional and national implementation needs.
- structure information and data in the region.

This would be possible if the IMAP-SPI would ensure that [31]:

- The outputs of IMAP are delivered to decision makers in an appropriate way so as to help them take relevant action towards achieving GES
- Decision makers will make effective use of the scientific information produced under IMAP in view of achieving GES through informed policy making.

6.6. MAIN ACTORS

Scientists and policy representatives are the key essential actors of any SPI and so of the IMAP-SPI. Concerning the latter category, not only high-level officials are to be involved (policy makers), but also managers and practitioners (executives) which are called to concretely implement environmental policy and play an important role in SPI. They

generally hold a sufficient technical competence to understand the matter but in the same time a clear mandate to express an opinion of a technical matter and suggest a solution, proactively participating into the discussion.

In relation to scientists, only those competent in the field of (any of) the 11 ecological objectives are involved in the formal IMAP-SPI process (the Working Group). Instead, participation to the Forum is open, but engagement of individuals with specific competences, relevant for IMAP, can be encouraged.

In some cases, the role of economic sectors is also important, to tackle some specific issues. Sector stakeholders can be engaged in the regional process (at the level of IMAP-SPI Forum) in specific conditions, e.g. in case they can provide data and knowledge for the SPI (as for example sea bottom mapping) or can help framing the use of available knowledge towards policies for the sustainability of a specific sector. Moreover, some specialized companies, like the ones dealing with innovative technologies and services (e.g. based on remote sensing) could be engaged in the exchange based on specific request and considerations. Their involvement is coordinated by the IMAP-SPI Control Room.

At the Mediterranean scale, UNEP/MAP RACs are very important players since their mandate on SPI for IMAP is key. The Barcelona convention components RACs can be all included in the SPI structure at regional level, both in the informal and in the formal structure.

At the regional level other international institutions play a relevant interfacing role on general or specific aspects, as in the case of GFCM for fisheries and ACCOBAMS for cetaceans. Sharing of competences and knowledge among different institutional actors is essential. For example, for coastal land use with UNEP-GRID, based in Geneva. They can be engaged in specific occasions (e.g. workshops, conferences, meetings) and on specific topics. Their involvement is coordinated by the IMAP-SPI Control Room.

At the **national level**, depending on the context of the country, it can be worth engaging also:

- NGOs, local communities and society at large,
- national agencies,
- economic sectors and investors.

Incorporate SPI into existing processes and initiatives

Climate-ADAPT, for example, plays the essential role of information gateway at the EU level informing a supporting the implementation of the EU Strategy on Climate Change Adaptation.

The same happens for *WISE* in relation to the WFD and the MSFD or to BISE for EU biodiversity policies.

HELCOM initiatives on SPI provide for the uptake of project results into policy making in the Baltic Sea, e.g. for the Baltic Sea Action Plan. In this perspective, the direct link to the IMAP process is very relevant.

6.7. SUSTAINABILITY

As reported in the recommendations (5.2, 5.3) to ensure sustainability to IMAP-SPI it is very important to incorporate it in already existing process and initiatives. The relevance of embedding a SPI initiative in existing policy-making organisations clearly emerged also from the review of existing SPI experiences (4.6). In fact, sustainability and durability of a SPI depends very much on its strategic links to on-going policy processes. This can be ensured for example by:

- planning SPI activities from a strategic point of view, to facilitate mobilization of human and economic resources and adoption of a far looking approach;
- building on synergies with already existing initiatives, e.g. coordinating existing SPIs within MAP activities; incorporating SPI in already existing process and initiatives; relying on existing networks of experts, practitioners and other stakeholders;
- strengthening synergies with project-based initiatives, which can provide resources during some specific steps;
- ensuring concrete advantages for parties contributing to the SPI, including those for economic sectors;
- enlarging the arena of SPI potential users, for example involving sub-regional cooperation initiatives like EUSAIR and WestMED, which can further demonstrate the SPI usefulness and contribute to its dissemination;

- including SPI activities within the routine business of scientists and managers / decision makers, avoiding such activities are perceived as an additional and undesired burden;
- co-defining priorities to focus and streamline the process on major challenges, reducing the amount of resources needed and producing real benefits.

At regional scale the current UNEP/MAP system in place could be improved and adapted to better focus on IMAP-SPI. Most of the MAP components already provide a SPI role, contributing to digest data and information into actionable knowledge. This role can be further enhanced and tailored responding to the need of an SPI for IMAP (see also section 6.8). It is therefore important to raise additional awareness about the key role of RACs in improving the dialogue between science and policy areas.

At **national level** it is key to involve and rely on existing institutions which have already an SPI role. No additional structures are needed, but coordination. IMAP-SPI can be gradually included in the regular responsibilities and routing business of officers and executives.

Interest in science-policy dialogue could be successfully raised between scientists and policy actors by highlighting concrete advantages for both sides. Moreover, SPI can be promoted as an umbrella activity for other goals like sustainable economic development, job creations, social well-being, as indirect benefits of the proper implementation of the EcAp approach.

To ensure sustainability to IMAP-SPI it is also key to build synergies with the economic sectors (which can interest in using and valorising IMAP data, but also in sharing its own data on specific aspects), developing SPI as a common base for dialogue. The same SPI knowledge can serve more than a single scope, e.g. EcAp and nature-based or ecosystem-based solutions.

Despite all these initiatives aiming at minimizing the financial needs to sustain the IMAP-SPI, some economic resources are probably needed to set up and maintain the system working. Resources can be dedicated for example to run the Control Room; to develop, populate and maintain the Portal; to prepare the outputs (workshops, conferences, meeting and written materials). Moreover, in addition to synergies above, the need for a dedicated budget at **national level** was highlighted by the interviewees (e.g. Tunisia).

For setting up of the IMAP-SPI at the national level, a dual approach can be suggested:

Bottom-up knowledge creation: indications of what to monitor shall firstly come from the scientific community. However, scientists tend to be very specific and focus on details; there is the need to find a balance with what is really feasible.

Top-down approach: national level institution(s) can help in defining priorities and clarifying feasibility aspects. The top-down process occurring at the country level shall also take in consideration input from the regional scale (in particular those from the UNEP/MAP system).

6.8. HOW TO PROCEED TOWARDS A SPI FOR IMAP

For the regional scale, the structure could be designed and started by the UNEP/MAP system, with the involvement of the coordination unit and the RACs which are already following the IMAP process (SPA/RAC, PAP/RAC and MEDPOL) and already dealing with science-to-policy aspects (therefore also including Plan Bleu). Engagement of countries is key in the design phase, in order to shape the structure in an agreed way and to coordinate this process with the national ones. Co-design and co-development are keywords to be considered in the creation of the SPI, that can involve since the beginning, as far as possible, representatives of both scientists and policy makers/practitioners who then will form the IMAP SPI Working Group. Giving a start to SPI for IMAP from the regional level can also stimulate the SPI creation process at national level and provide a framework for discussion, identification of common solutions and harmonization of approaches.

At **national level**, some interviewees pointed out that the best process to create a SPI for IMAP would be through a political decision. Competent institutions at national level should start the SPI design and development. Subsequently, support from other sector institutions and institutions operating at sub-national levels is required to sustain the initiative.

According to other interviewees, political will is necessary, but it is not enough. Strong motivation and will of the directly engaged parties (scientists and policy/decision makers) are also essential and can require a process to co-design of SPI through a participatory approach. Such approach could also involve the civil society and the EcAp related players from the private sector, where relevant. Local good practices can be disseminated and proposed for capitalization.

Indeed, in some contexts, IMAP-SPI activities at national level could start with pilot projects at local/sub-national level, by engaging stakeholders and institutions and test their willingness to contribute to a SPI stable initiative, focussing interactions on outputs already identified as critical and mutually beneficial.

In general, a gradual process is recommended in any applied approach, using time and effort to explain the importance of the SPI at national (sub-national) and regional level. The need for an exchange platform should emerge from discussion with the parties involved, as well as with other indirect users of the SPI.

6.9. CONCLUDING REMARKS

Design and creation of a SPI is not an end in itself, but rather serves to operationally support the implementation of planning and management processes - in our specific case focussed on the marine and coastal environment and specifically on its monitoring and assessment - which are based on strong, reliable and accurate scientific knowledge. A SPI provides the way and the tools to strengthen and simplify the interactions between science and policy/decision making by facilitating the transformation of scientific results into actionable knowledge, improving its uptake by policy and decision making processes, enhancing wider dissemination and capitalization of scientific knowledge, highlighting key policy priorities which require focussed research and helping optimizing costs and mutual benefits. In this sense, a SPI is an alive experience, which requires long-term vision and sustainability, and continuous maintenance and operation.

This study has focussed on possible ways and approaches to: **1. structure; 2. strengthen; and 3. sustain** a SPI for IMAP implementation and GES achievement in the Mediterranean, providing related recommendations for both the regional (Mediterranean Sea) and national levels. Capitalizing from the wide available literature and other SPI examples, recommendations have been clustered around five pillars: *Formalization*, *Simplicity*, *Accessibility*, *Enabling conditions*, *Mainstreaming into projects*. In this context:

1. **Structure** refers to possible ways to design and model an SPI for IMAP implementation. Besides recommendations reported in sections 5.2 and 5.3, the report depicts an articulated proposal for the SPI structure, as illustrated in chapter 6;
2. **Strengthen** refers to possible actions to reinforce existing SPI experiences or capacities at both the regional and national levels. Recommendations are provided in this sense (section 5.2 and 5.3), looking also at the interactions between the different levels of SPI operation (regional and national);
3. **Sustain** refers to possible solutions to ensure long-term sustainability to a SPI for IMAP. Recommendation are provided for these aspects, also highlighting the importance of strengthening synergies between the parts directly involved in the SPI operation, as well as with other existing structured networks.

Elements extracted from the contents of chapter 5 (recommendations) and 6 (proposal for a SPI to support IMAP implementation) are reported in the following tables. They provide some examples of actions to be implemented to structure, strengthen and sustain a SPI for IMAP implementation. Common elements between the regional and the national level are also included in both the tables.

Structure (1), strengthen (2) and sustain (3) SPI to support countries for IMAP implementation and GES achievement through five pillars: Formalization; Simplicity; Accessibility; Enabling conditions; Mainstreaming into projects (see section 5.2 "Recommendations for SPI at the regional level")		
	Actions at <u>regional level</u>	**Operability / means of implementation / success factors**
(1) STRUCTURE **Structuring a framework for science-policy interface for IMAP in the UN-Environment/MAP**	A structure could be designed and started by the UNEP/MAP system, with: - Coordination Unit and RACs' involvement which are already following IMAP implementation, - other international institutions' and networks' involvement depending on the topic/IMAP cluster *(for e.g.: GFCM for fisheries; ACCOBAMS for marine mammals monitoring; MedECC).* Importance to raise additional awareness in all the institutions working in the Mediterranean about the key role of RACs in improving the dialogue between science and policy areas.	• Engagement of countries is key in the design phase, to shape the structure in an agreed way and to coordinate the regional process with national ones. • This general framework on SPIs could be designed within the UN-Environment/MAP. This body would be similar to expert bodies under international conventions on the environment and could be created ad hoc or integrated into the Mediterranean Commission on Sustainable Development (MCSD), which would interact with a Scientific Committee to strengthen and extend the Commission's consultative mandate. • A certain degree of formalization is needed to ensure commitment to the SPI process, involvement of national representatives at the regional level and overall durability of the interface.
(2) STRENGHEN	Guiding SPIs according to simple principles and set-up	• Develop guidelines and credible, legitimate and relevant principles. These principles could be developed jointly with all UN-Environment/MAP stakeholders under a process similar to the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast (IMAP - Decision IG.22/7). Such principles, among others, could lay the foundations for procedures that promote effective dialogue between scientists and policymakers in the Mediterranean. • Analyse the relevance of adopting procedural rules for preventing conflicts of interest. Such rules do not currently exist in the UN-Environment/MAP but have been developed within some global conventions on biodiversity. • Compile a set of best practices, especially by capitalising on feedback from current initiatives (e.g. IPCC, IPBES) which assess the operation of their expert body and consider restructuring.

(3) SUSTAIN	• Coordinating existing SPIs within MAP activities	• Map SPI initiatives and capacities associated with UN-Environment/MAP activities, differentiating between one-off activities (projects) and long-term activities. • Analyse possibilities for closer cooperation or synergies between existing units and networks, limiting their number and ensuring their sustainability. However, developing closer cooperation between them comes at a cost. Systematic consultation of the same experts and scientists can limit the number of voluntary contributions. The costs and benefits of pooling interfaces need to be considered on a case-by-case basis. Asking all questions to the same set of experts or mobilizing them under a number of disjoint initiatives could be detrimental to their long-term involvement. However, on a given subject, creating a long-term relationship and trust between scientists and policy-makers is a key condition for a functional SPI, with informal interactions progressively building on more formal ones.

ELEMENTS IN COMMON BETWEEN THE REGIONAL AND THE NATIONAL LEVEL	
INNOVATION ELEMENTS	• SPI framework should be flexible and adaptable to different conditions: “one-size-fits-all’ set of recommendations for the ‘ideal’ SPI cannot be formulated. • Building on the examples of other relevant SPI initiatives (e.g. ICES, DOSI, MED 2050)a less formal components of the SPI could be developed ("IMAP-SPI Forum") to deal with specific challenges and issues and/or to enable the involvement of a wider community of science and policy experts beyond those participating in the formal process.
DATA & KNOWLEDGE ACCESSIBILITY	• Need for a common, harmonized and fully accessible system for IMAP data, to guarantee accessibility of knowledge to all relevant actors. • Need to transform data into actionable knowledge, to guarantee accessibility to concepts usable for the management of Mediterranean Sea and its coastal areas. • → IMAP Information System and IMAP-SPI portal as operative tools to ensure knowledge accessibility
MULTI-STAKEHOLDERS APPROACH	• Need to involve Government, regional/local authorities, academia, private sector, NGOs, etc. Meetings are also key outputs of the IMASPI, as well as represent part of the process. At both national and regional scales the following events could be organised: • Regular meetings, to constantly advance the discussion and the SPI concept (Working Group meetings) • Workshop on specific topics, deserving specific focus (Forum meetings) • Webinar or other remote modalities of interactions on specific topics. This modality enables to organise more quickly (and in case even frequently) events to respond to specific demand, without posing strong limitation on the number of participants.

Structure (1), strengthen (2) and sustain (3) SPI to support countries for IMAP implementation and GES achievement through five pillars: Formalization; Simplicity; Accessibility; Enabling conditions; Mainstreaming into projects (see section 5.2 "Recommendations for SPI at the national level")		
	Actions at <u>national level</u>	**Operability / means of implementation / success factor**
(1) STRUCTURE **Structuring a framework for science-policy interface for IMAP at national level**	• **Science-driven knowledge creation**: indications of what to monitor shall firstly come from the scientific community. However, scientists tend to be very specific and focus on details; there is the need to find a balance with what is really feasible. • **Policy-driven approach**: national level institution(s) should start the process of SPI development, define priorities and clarify feasibility aspects. The institutionalised process shall also take in consideration input from the regional level.	• According to some interviewees, **participatory approach to SPI creation is to be preferred.** => Bottom-up processes are essential and can include a process of co-design of SPI through a participatory approach, including also civil society and the EcAp indicators related players from the private sector, where relevant. Winning local experiences can be disseminated and proposed for capitalization. • **But policy-driven approach is also needed (even if not enough)**. => actions undertaken by responsible institutions can start the process at national level as well: a SPI could be a political decision at the start.
(2) STRENGHEN	• Link with economic / private sectors	• The ones dealing with innovative technologies and services (e.g. based on remote sensing).
	• Design interfacing activities before the launch of national level research projects and improve coordination between projects have been recommended.	
(3) SUSTAIN	• Incorporate SPI in already existing process / initiatives and its strategic links to on-going policy processes.	• In some contexts, IMAP-SPI activities at national level could start with pilot projects at local/sub-national level, by engaging stakeholders and institutions and test their willingness to contribute to a stable SPI initiative.
	• Key to involve and rely on existing institutions which have already an SPI role.	• Sometimes need for a dedicated budget.
	• No additional structures are needed, but coordination.	
ELEMENTS IN COMMON BETWEEN THE REGIONAL AND THE NATIONAL LEVEL		
INNOVATION ELEMENTS	• SPI framework should be flexible and adaptable to different conditions: "one-size-fits-all' set of recommendations for the 'ideal' SPI cannot be formulated. • Building on the examples of other relevant SPI initiatives (e.g. ICES, DOSI, MED 2050)a less formal components of the SPI could be developed ("IMAP-SPI Forum") to deal with specific challenges and issues and/or to enable the involvement of a wider community of science and policy experts beyond those participating in the formal process.	

DATA & KNOWLEDGE ACCESSIBILITY	• Need for a common, harmonized and fully accessible system for IMAP data, to guarantee accessibility of knowledge to all relevant actors. • Need to transform data into actionable knowledge, to guarantee accessibility to concepts usable for the management of Mediterranean Sea and its coastal areas. • → IMAP Information System and IMAP-SPI portal as operative tools to ensure knowledge accessibility
MULTI-STAKEHOLDERS APPROACH	• Need to involve Government, regional/local authorities, academia, private sector, NGOs, etc. Meetings are also key outputs of the IMASPI, as well as represent part of the process. At both national and regional scales the following events could be organised: • Regular meetings, to constantly advance the discussion and the SPI concept (Working Group meetings) • Workshop on specific topics, deserving specific focus (Forum meetings) • Webinar or other remote modalities of interactions on specific topics. This modality enables to organise more quickly (and in case even frequently) events to respond to specific demand, without posing strong limitation on the number of participants.

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8. Annexes

8.1. INTERVIEW QUESTIONNAIRE

English version

SPIs can be defined as initiatives which encompass relations between scientists and other actors involved in the policy process (policy makers, managers and practitioners), and which allow for dialogue, exchange, co-evolution, and joint construction of knowledge with the aim of enriching policy and decision making. In our case SPIs provide ways in which scientists, policy makers and other relevant actors can cooperate to co-create the knowledge needed to design and implement environmental policies for EcAp implementation, including monitoring to address the requirements of the Integrated Monitoring and Assessment Programme (IMAP). Therefore, the below questions aim to identify the characteristics that SPIs - at the regional, sub-regional and national level – should have to promote and support coastal and marine environmental monitoring and protection.

For RACs representatives: please consider the questions (i) in the context of an SPI for IMAP at regional level, and (ii) when relevant, in the context of an SPI for IMAP at country level (e.g. considering experiences through the CORMONs).

For national representatives: please consider the questions in the context of an SPI for IMAP at country level.

Contact information *(these data will be kept confidential and not used for the elaboration of the final report)*	
Date of the interview	
Name of the interviewee	
Affiliation	
E-mail address	
Your experience	
Question 1A. Do you have experience on science-policy dialogue/exchange? Question 1B. Or, are you aware of existing experience in your area? Question 1C. What are they about? Which sectors/topics are involved?	
Goals, needs and gaps	
Question 2. What are the goals of an SPI? Please prioritize the goals identified through the EcAp	1. Highlight the critical role of science in drawing up relevant and suitable environmental policy. Ensuring that environmental policy is based on strong scientific knowledge on the environment and changes helps said policy to be more effective and legitimate.

Med II project workshops.	2. Make scientific research more “action”-oriented by more precisely targeting social and political needs, moving beyond structural obstacles such as semantic or ideological misunderstandings that can limit the effectiveness of dialogue between policymakers and scientists. 3. Strengthen “marine and coastal governance” in a context involving multiple stakeholders and the market working on social or economic themes. 4. Coordinate cooperation between scientific communities and collaboration between scientists and national or regional public policymakers in order to guide them towards real management needs.	
Question 3. Are there additional goals of an SPI you suggest to consider?		
Question 4. Please score these operative needs and gaps in the context of SPI, identified through the EcAp Med II project. Please score between 1 and 5 with 1 = of little relevance) and 5 = highly relevant)	**Needs** 1. Develop new research projects that would specifically include an SPI component and which would guide research towards measures or parameters that are important for policymaking. 2. Involve public policymakers in projects from the outset. 3. Include social scientists in research projects to facilitate communication between scientists and policymakers. 4. Strengthen technical expertise in SPIs by including doctoral students and young professionals specialised in politics and policymaking. 5. Carry out pilot SPI projects including both scientists and policymakers at different scales on different topics 6. Reflect relevant scientific recommendations and results in the documents prepared by UNEP/MAP (for example in its planned Mediterranean Quality Status Report) 7. Follow-up with targeted communication material, ensuring further knowledge sharing and specific scientific input both to the development of national work (monitoring implementation plans) and sub-regional and regional policy-development.	**Gaps** 1. Lack of knowledge. Scientists are not in all areas currently able to provide necessary knowledge to policymakers to support the goal of achieving GES. 2. Heterogeneous spatial distribution of knowledge availability Generally, a gap between Northern and Southern Mediterranean countries can impact the robustness of regional Mediterranean models and knowledge. 3. Monitoring versus obtaining new knowledge. There is a relevant difference between routine activity with the purpose of monitoring and scientific activities for obtaining new original knowledge. Furthermore, if new knowledge is considered GES relevant, a sustainable monitoring process should be developed. 4. Scientific results to inform different processes. Scientific research results need to be suitable to cater different purposes integrated in IMAP: (i) monitoring, (ii) integrated environmental assessment and (iii) IMAP further revisions. 5. “Ecosystem functioning” approach. Currently available knowledge on the functioning of Mediterranean marine and coastal ecosystems is still lacking, although the mobilization around EcAp and the MSFD has so far succeeded in developing new knowledge.
Question 5. Are there additional needs and gaps that you		

think are missing from this list?	
SPI structure and processes	
SPIs can occur in very different forms; they can include formal structures or informal networks, series of meetings and workshops, initiatives aimed at targeted publications (e.g. summary for policy makers, policy briefs, etc.) and/or IT services (web sites, IT platforms, data portals). Question 6A. What do you think would be the best way to structure an SPI for IMAP? Question 6B. What would be the key components? Question 6C. Which role should each component have?	
SPI can include human components (e.g. committees, networks, working groups - formally and/or informally established) and IT components (e.g. Information systems, web sites). It is important to define the way components interact. Question 7. How the components of the SPI should be interlinked? How they should communicate?	
Question 8. How do SPIs at different scales (regional vs. national) interplay?	
Question 9. What is your view on the process of designing and creating an SPI? Should this be e.g. top-down vs bottom-up approach, co-design and co-creation, project or institutionally driven?	
SPI actors	
Question 10. Who are the main actors to be involved in the SPI creation and maintenance?	
SPI management	
Question 11. What are the resources needed to create and maintain an SPI (at the national and regional level)? Question 12. What type of resources, how many persons, with what capacity and competences?	

Question 13. How can the demand for resources be kept low? e.g. synergies with other initiatives, clear definition of benefits for actors involved in the SPI (in case of scientists), include SPI within the ordinary responsibilities (in case of managers/policy makers), etc.	
Other issues	
Question 14. Would you like to add any other considerations about SPI?	

French version

Les Interfaces Sciences-Politiques (ISP) peuvent être définies comme des initiatives qui englobent les relations entre scientifiques et autres acteurs impliqués dans la chaine de décision (décideurs, gestionnaires et praticiens), et qui permettent un dialogue, des échanges et une construction commune des connaissances dans le but d'enrichir les politiques et la prise de décision.

Dans notre cas, les ISP fournissent aux scientifiques, aux décideurs et aux autres acteurs concernés des moyens de coopérer afin de créer ensemble les connaissances nécessaires à la conception et à la mise en œuvre de politiques environnementales pour la **mise en œuvre de la feuille de route EcAp**, y compris la surveillance côtière et marine répondant aux exigences du programme intégré de surveillance et d'évaluation : **IMAP**).

Par conséquent, les questions ci-dessous visent à identifier les caractéristiques que les ISP - aux niveaux régional, infrarégional et national - devraient avoir pour promouvoir et soutenir la surveillance et la protection de l'environnement côtier et marin. Veuillez examiner les questions dans le contexte d'une ISP pour soutenir l'IMAP au niveau national.

Coordonnées *(ces données resteront confidentielles et ne seront pas utilisées pour l'élaboration du rapport final)*	
Date de l'interview	
Nom de l'interviewé	
Affiliation	
E-mail	
Votre expérience	
Question 1A. Avez-vous de l'expérience en matière de dialogue / échange « science-politique » ? Question 1B. Etes-vous au courant de l'expérience existante dans votre pays ou au sein d'une région ? Question 1C. Sur quoi portent-elles ? Quels secteurs / thèmes sont concernés ?	
Buts	
Question 2. Quels sont les objectifs d'une ISP ? Veuillez hiérarchiser (de 1 à 4, avec 1 = peu important et	*1.* Souligner le rôle essentiel de la science dans l'élaboration d'une politique environnementale pertinente et adaptée. En veillant à ce que la politique environnementale repose sur de

4=très important) les objectifs identifiés lors des ateliers ISP organisés en 2016-2017 par le Plan Bleu dans le cadre du projet EcAp Med II.	solides connaissances scientifiques relatives à l'environnement et aux changements, cette politique est plus efficace et légitime. 2. Rendre la recherche scientifique plus « orientée vers l'action » en ciblant plus précisément les besoins sociaux et politiques, en dépassant les obstacles structurels tels que les incompréhensions sémantiques ou idéologiques susceptibles de limiter l'efficacité du dialogue entre décideurs et scientifiques. 3. Renforcer la « gouvernance marine et côtière » dans un contexte impliquant de multiples parties prenantes et le Marché, en travaillant sur des thèmes davantage sociaux ou économiques. 4. Coordonner la coopération entre les communautés scientifiques et la collaboration entre les scientifiques et les décideurs publics nationaux ou régionaux afin de les guider vers des besoins concrets en matière de gestion.	
Question 3. Y a-t-il des objectifs supplémentaires d'une ISP que vous suggéreriez ?		
Question 4. Veuillez noter ces besoins opérationnels et ces lacunes, identifiés par le projet EcAp Med II, dans le contexte de l'ISP. Merci de noter chacun des points entre 1 et 5 (avec 1 = peu pertinent et 5 = très pertinent)	**Besoins** 1. Développer de nouveaux projets de recherche qui incluraient spécifiquement une composante ISP et qui orienteraient la recherche vers des mesures ou des paramètres importants pour l'élaboration des politiques. 2. Impliquer les décideurs publics dans les projets dès le départ. 3. Inclure des spécialistes en sciences sociales dans des projets de recherche pour faciliter la communication entre les scientifiques et les décideurs. Renforcer l'expertise technique dans les ISP en incluant des étudiants en doctorat et de jeunes professionnels spécialisés en politique et en formulation de politiques. Réaliser des projets pilotes en ISP regroupant des scientifiques et des décideurs	**Lacunes** 1. Manque de connaissances. *Les scientifiques ne sont actuellement pas en mesure de fournir aux décideurs les connaissances nécessaires dans tous les domaines pour soutenir l'objectif de réalisation du BEE.* 2. Distribution spatiale hétérogène de la disponibilité des connaissances. *De manière générale, un fossé entre les pays du nord et du sud de la Méditerranée peut avoir une incidence sur la robustesse des modèles régionaux et des connaissances méditerranéennes.* 3. "Suivi" versus "obtention de nouvelles connaissances". *Il existe une différence importante entre les activités de routine visant à assurer la surveillance et les activités scientifiques permettant d'obtenir de*

	politiques à différentes échelles et sur différents sujets. 4. Refléter les recommandations scientifiques pertinentes et les résultats dans les documents préparés par le PNUE / PAM (par exemple dans le rapport sur l'état de la qualité de la Méditerranée 2023). 5. Suivre à l'aide de matériel de communication ciblé, assurant un partage accru des connaissances et une contribution scientifique spécifique à la fois pour le développement du travail national (le suivi de la mise en œuvre des programmes et plans de surveillance) et pour l'élaboration de politiques infrarégionales et régionales. **4.**	*nouvelles connaissances originales. En outre, si les nouvelles connaissances sont considérées comme pertinentes pour le BEE, un processus de surveillance durable devrait être mis en place*. 4. Des résultats scientifiques pour informer différents processus. *Les résultats de la recherche scientifique doivent être adaptés à différentes finalités intégrées dans IMAP : (i) la surveillance, (ii) l'évaluation environnementale intégrée et (iii) les révisions ultérieures de l'IMAP.* 5. L'approche par « fonctionnement écosystémique ». B*ien que la mobilisation autour de l'EcAp et de la MSFD ait jusqu'à présent permis de développer de nouvelles connaissances, les connaissances actuellement disponibles sur le fonctionnement des écosystèmes marins et côtiers de la Méditerranée font encore défaut.*
Question 5. Y a-t-il des besoins et des lacunes supplémentaires qui, selon vous, sont absents de cette liste ?		
Structure et processus des ISP		
Les ISP peuvent se présenter sous des formes très différentes. Elles peuvent inclure des structures formelles ou des réseaux informels, une série de réunions et d'ateliers, des initiatives visant des publications ciblées		

(par exemple un résumé pour les décideurs, des notes de synthèse, etc.) et / ou des services informatiques (sites Web, plates-formes informatiques, portails de données). Question 6A. Selon vous, quel serait le meilleur moyen de structurer une ISP pour IMAP ? Question 6B. Quels seraient ses composants clés ? Question 6C. Quel rôle doit avoir chaque composante ?	
L'ISP peut inclure des composants humains (par exemple, des comités, des réseaux, des groupes de travail - établis de manière formelle et / ou informelle) et des composants informatiques (par exemple, des systèmes d'information, des sites Web). Il est important de définir la manière dont les composants interagissent. Question 7. Comment les composants d'une ISP doivent-ils être liés ? Comment devraient-ils communiquer ?	
Question 8. Comment les ISP interagissent-elles à différentes échelles (régionale ou nationale) ?	
Question 9. Quel est votre avis sur le processus de conception et de création d'une ISP ? Cela devrait-il être, par exemple, une approche descendante ou ascendante ? Une co-conception et co-création ? Ou issu d'un projet ou encore piloté par une institution ?	
Les acteurs d'une ISP	
Question 10. Quels sont les principaux acteurs à impliquer dans la création et la maintenance de ISP ?	

Question 11. Quelles sont les ressources nécessaires (au niveau national et régional) pour créer et maintenir une ISP ? Question 12. Quel type de ressources, combien de personnes, avec quelles capacités et compétences ?	
Question 13. Comment limiter le besoin en ressources ? *Par exemple :* - *en trouvant des synergies avec d'autres initiatives,* - *en proposant une définition claire des avantages pour les acteurs impliqués dans l'ISP (dans le cas des scientifiques),* - *en incluant l'ISP dans les responsabilités ordinaires (dans le cas des gestionnaires / décideurs), etc.*	
Question 14. Souhaitez-vous ajouter d'autres éléments incontournables concernant les ISP et qui n'auraient pas été traités dans le cadre de ce questionnaire ?	

8.2. SURVEY QUESTIONNAIRE ON NATIONAL SPI EXPERIENCES

8.2.1. Online survey - Science Policy Interface strengthening to support IMAP implementation

The Parties of the Barcelona Convention have agreed to progressively apply the Ecosystem Approach (EcAp) to the management of human activities that may affect the Mediterranean marine and coastal environment for the promotion of sustainable development. Bridging existing gaps between the scientific and policy making spheres, and therefore strengthening the Science Policy Interface (SPI), are crucial to efficiently support EcAp implementation. SPIs can be defined as initiatives joining scientists and other actors involved in the policy process (policy makers, managers and practitioners), which allow for dialogue, exchange, co-evolution, and joint construction of knowledge enabling better inform decision making.

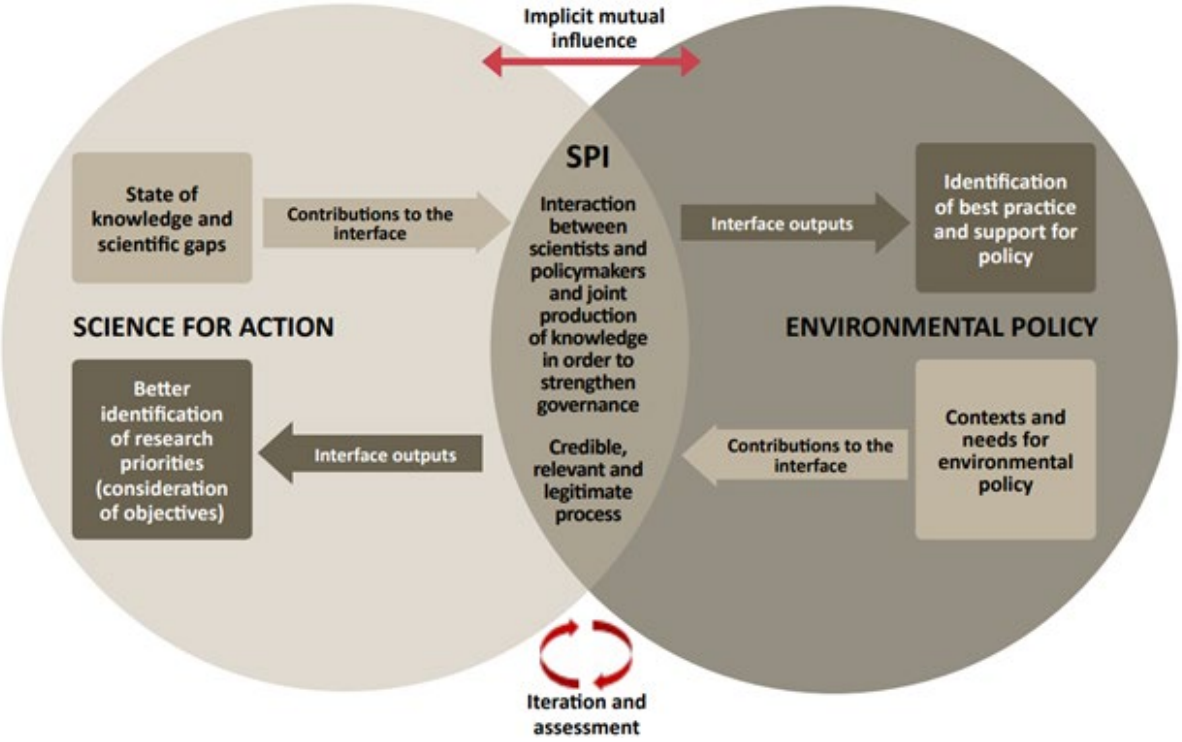
In the case of EcAp MED II project, SPI provides ways in which scientists, policy makers and other relevant actors can cooperate to co-create the knowledge needed to design and implement environmental policies for the protection of the Mediterranean Sea.

SPIs can occur in very different forms; they can include formal or informal networks, series of meetings and workshops, joint initiatives aimed at targeted publications, institutional or ad hoc consultation processes (e.g. consultation of scientists in local or national planning exercises, consultation of policy makers in the definition of research programs, etc.) and/or IT services (web sites, IT platforms, data portals).

This survey aims at identifying examples of SPI experiences at the national and local level, supporting the implementation of with the ultimate objective of achieving the Good Environmental Status (GES) of coastal and/or marine waters and habitats.

Whereas the intention of the study is to focus on EcAp implementation, you are welcome to refer to SPIs developed in other contexts if their experience is particularly insightful, and can help design SPIs serving EcAp's objectives. SPIs that have proven to be sustainable (permanent rather than project-based) and mutually beneficial are of particular interest to the study. Please respond to the following questions.

Designing optimal SPI



IDENTIFICATION OF SPI INITIATIVES AND EXPERIENCES

1. Are you aware of examples of permanent SPIs at national and/or local level on coastal and/or marine environmental monitoring and/or protection in your country? Please provide the name of the known SPIs, a short description (about 5 lines) and reference to more detailed information (e.g. web-site, publication, report, etc.) if available.
2. What fields/sectors do the identified SPIs focus on? For each of the identified SPI examples, please specify the fields/sectors they focus on, e.g. monitoring of pollution, biodiversity conservation, costal degradation, sustainable management of resources, land use planning, etc. (these are just examples, please feel free to list SPIs from other relevant fields/sectors).
3. Are you aware of initiatives (projects, pilot cases, institutional or non-institutional experiences, etc.) aimed at developing SPI on coastal and/or marine environmental monitoring and/or protection at the national and/or local level in your country? Please provide the name of the known initiatives, a short description (about 5 lines) and reference to more detailed information (e.g. web-site, publication, report, etc.) if available.

LESSONS LEARNED AND SPI MAIN CHARACTERISTICS

4. According to your lesson learned, what are the main strengths and weaknesses of the SPIs mentioned in response to question 1?
5. In your opinion, what would be the best way to structure an SPI on coastal and marine environmental monitoring and/or protection at the national and/or local level? As described in the introductory text to this survey, SPIs can occur in very different forms. Please provide a short description (about 5 lines) of the typology and general structure that you consider more indicated to develop an SPI on coastal and marine environmental monitoring and/or protection at the national and/or local level.
6. What are the key factors to ensure long-term sustainability of an SPI on coastal and marine environmental monitoring and/or protection at the national and/or local level? Please identify and shortly describe key factors for long-terms sustainability, e.g.: availability of funds, definition of clear roles and responsibilities, identification of mutual benefits, etc. (these are just examples, please feel free to describe any other factors you consider relevant)
7. What are the main actors who should be involved in an SPI at national and/or local level dealing with costal and marine environmental monitoring and/or protection?
8. In your opinion, SPI for coastal and marine monitoring are important:

	Very important	Important	Less important	Not important
to support sustainable management of coastal and marine zones	○	○	○	○
to assess in appropriate manner coastal and marine zones	○	○	○	○
to reduce the gap between scientists and other actors involved in coastal and marine zones management	○	○	○	○
to anticipate new developments in coastal and marine zones	○	○	○	○

OTHER INFORMATION

9. Please provide any additional suggestions and recommendations you might consider relevant for developing or strengthening SPI on coastal and marine environmental monitoring and/or protection.

8.3. SLOVENIAN'S EXPERIENCE ON GREEN INFRASTRUCTURE AND CORRIDORS FOR SUSTAINABLE DEVELOPMENT WITH REGARDS TO TRANSBOUNDARY AND MULTI-LEVEL DIMENSIONS: FOCUS ON SPI

The series of Questions & Answers below provide more precise information about SPI regarding the green and blue corridors experience.

- *SPI structure and processes: in the example you provided it seems to be specific structures rather than informal networks?*

In some activities/examples yes (e.g. Council for Vipava/Vipacco river works in very formal network) in some activities more informal networks. In the example we provided the Contracting authority is Ministry for Environment and spatial planning. Clear interest for the GI development was expressed also by relevant local communities. So, the structure is quiet formal with clear need, that is a support for efficient green infrastructure and corridors development. But for efficient planning of GI also other competent (decision making) stakeholders must take a part in the process, e.g. sector for nature conservation. But more stakeholders are involved higher discrepancies occur in the common understanding what a GI and GC are, what can lead to no effective decision making. So, although the objective is clear (protection of recognized GI and corridors and its further development) the activities (education for common understanding of GI and GC, awareness rising for its need and development of methodologies for spatial analysis) were organized in informal way.

- *Did the series of meetings and workshops end up with summary for policy makers, policy briefs?*

The project is still going on (2019), but one of the activities is an overview of policy, especially in spatial planning and existing legal regimes, which support or hinder green infrastructure and corridors. This will support decision makers to properly amend the policy if needed.

Another example: In the case of project BeWater (http://www.bewaterproject.eu/case-studies/vipava-river-basin-slovenia) a common River basin adaptation plan had been elaborated and gives the briefs for policy makers for better

harmonized preparation of sectoral plans (irrigation, fishery, water ecological status management, management of Natura 2000 sites, flood protection).

- *Regarding the IT components, in the example you cited, do you have Information systems, web sites? Are they linked?*

This is still a weak point. The projects and activities usually establish their IT systems and web sites, and when the project is finished, they are not interconnected or further developed with next projects or activities. There is a need for establishment of such an IT system (or at least clear interconnectivity with data and results), which will provide the common data base management. This weak point must be addressed within ongoing and future activities and projects.

- *How national and local scales interplay?*

At the meetings and workshops both levels are participating and their objectives are integrated into the process. The experiences and knowledge are exchanged among national and local scales. Objective of the ongoing activities is to improve the recognition of the benefits of GI for both scales and improve top-down and bottom-up communication.

- *In the example you mention: Is the SPI be top-down vs bottom-up approach? co-design and co-creation, project or institutionally driven?*

The example supports GI and GC recognition and development, a co-design is a rule. Namely successful GI and GC planning depends on both, on its integration at the level of local spatial planning and at the level of national policies amending, very important when transboundary point of view is an issue.

- *Who are the main actors involved?*

In this case the main actors are national sectors and agencies competent for spatial planning, nature conservation and water/environment management. At local level they are representatives of local communities (on Slovenian coastline four local communities exist) and relevant regional development agency. From the science part we as Institute, University of Ljubljana (geography, land scape and hydro departments) took a part. Also, previous studies in the field of GI mapping and development were overviewed and presented from our side.

- *What are the resources needed to maintain the SPI (at the national and regional level)?*

It is necessary that a team of experts coordinate the activities, develop a methodological approach, perform spatial analyses, recognize the needs and weak points in communication, capacities and data bases, improve the vocabulary and common understanding and keep the communication through entire process. Since the project is defined in the capacities at the beginning (finances, human resources, time scale), the weak points usually cannot be fully overcoming during the project, so it is crucial that at the end of the project “exit” plan and strategy is prepared. This will efficiently support better preparation of future projects and results, and of course to maintain established SPI.

In the content of resources needed to maintain the SPI after the decision is done, it has to be considered that in the time when action phase is going on, e.g. concrete spatial planning process or policy adoption, a science part of SPI should monitor the process and, in the case, if support is needed also react. To properly react, some human and financial resources for this monitoring and reaction activities must be planned, most appropriate when “exit” plan and future activities are prepared.

- *What type of resources, how many persons are there, with what capacity and competences?*

For this project four persons are actively involved at the Institute, but partly, since other projects and activities are going on at the Institute. The team is consisted of biology and hydro civil engineers and researchers, who are also trained for spatial data analyses, integrated river basin and marine management. In addition, also legal expert will start to collaborate. Our team has no competences in decision making, our goal is to provide support for improved and harmonized decision making to the competent sectors at local and national level. But nevertheless, our contracting authority is the Ministry for the Environment and Spatial Planning, with we have additional meetings where we modify the activities for better continuation of the project and outcomes elaboration.

- *How can the demand for resources be kept?*

If the progress toward the defined goals and improvement in biodiversity and human wellbeing are recognized and results are positive, the future demand for the resources is kept. Usually the benefits of our work cannot be seen immediately but are visible in longer term. So, it is important that the monitoring and indicators of efficiency are planned and established. For example, if planning of a new cycling path is based on strategic decision of local communities to improve their touristic offer, the monitoring of efficiency should be established, e.g. number of cyclers. This gives at first validation data for local community and verification data for researchers/scientists.

- *How? e.g. do you have synergies with other initiatives, a clear definition of benefits for actors involved in the SPI (in case of scientists), include SPI within the ordinary responsibilities (in case of managers/policy makers), etc.*

The approach and outcomes are also transposed to other areas of similar activities. For example, the proposed method for recognition of GI and its development is also tested / validated on another pilot area, Vipava River catchment, where more operational activities of GI development are already going on. Vipava River is also an example where transboundary issues have to be harmonized, between Italy and Slovenia. At the beginning of the project the benefits or outcomes of the projects were defined; elaboration of feasible technical and legal expert basis for recognition of GI and GC and their future development. Of course, SPI is always a challenge that this basis or guidance are clear and defined step by step on one side and also have transparent, repeatable and objective structure with comprehensive argumentation on other side. Also, recognition of weak points (technical, legal, political etc.) and future challenges is required. The latter is a part of exiting strategy and support for future projects and activities.