PROGRAMME

Proposal of Mediterranean conceptual framework for coastal observation

GEF MedProgramme Child Project 2.1 - Mediterranean Coastal Zones Climate Resilience, Water Security and Habitat Protection

February 2024

gef | UN environment programme | Mediterranean Action Plan Barcelona Convention

PAP/RAC | Plan Bleu | unesco | Global Water Partnership Mediterranean

2.1 Mediterranean Coastal Zones Climate Resilience Water Security and Habitat Protection"

AUTHORS

Samir GRIMES, Frédérick HERPERS, Michele COLAVITO

REVIEWER

Plan Bleu/RAC and PAP/RAC

This report has been elaborated in the framework of the GEF Mediterranean Sea Programme (MedProgramme).

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List of acronyms

APAL	Agence Nationale de Protection et d'Aménagement du Littoral (Tunisian Coastal Protection and Development Agency)
BiH	Bosnia and Herzegovina
CNL	Algerian Commissariat National du Littoral
CoRI	Egyptian Coastal Research Institute
CRTS	Moroccan Royal Centre for Remote Sensing
EcAp	Ecosystem Approach
EGA	Environment General Authority of Libya
EO	Environmental Objective
EIA	Environment Impact Assessments
EPA	Environmental Protection Agency of Montenegro
GEF	Global Environment Facility
GES	Good Environmental Status
ICZM	Integrated Coastal Zone Management
IMAP	Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast
IPA	Instrument for Pre-accession Assistance
MSSD	Mediterranean Strategy for Sustainable Development
MedProgramme	Mediterranean Sea Programme: Enhancing Environmental Security
MTS	2022-2027 UNEP/MAP Mid Term Strategy
NCRS	Lebanese National Centre for Remote Sensing
NCSM	Lebanese National Centre for Marine Science
NEA	Albanese National Environmental Agency
NWRC	Egyptian National Water Research Center
ONEDD	Observatoire National de l'Environnement et du Développement Durable (Algerian National Observatory for the Environment and Sustainable Development)
PAP/RAC	Priority Actions Programme / Regional Activity Centre
REAs	Regional Environmental Agencies
SDG	Sustainable Development Goal
SNGIZC	Stratégie Nationale pour la gestion intégrée des zones côtières (for Algeria) "National Integrated Zone Management Strategy"
SoER	State of the Environment

Introduction

As a transitional space between sea and land, directly exposed to human activities and subject to climate change diverse negative effects, the nearshore area is subject to multiple and cumulative forcing at various spatial and temporal scales. The monitoring and assessment of this area needs to be addressed by an integrated observation system as mentioned by the article 16 of the Protocol on ICZM to the Barcelona Convention (UNEP/MAP/PAP, 2008) which recognizes that monitoring and observation mechanisms and networks are crucial for the preservation of the Mediterranean Sea and Coasts.

For this purpose and in the framework of the Mediterranean Sea Programme: Enhancing Environmental Security (MedProgramme) 2020-2024, funded by the Global Environment Facility (GEF), the activity 1.1.5 of Child Project n° 2.1 entitled "Mediterranean Coastal Zones Climate Resilience, Water Security and Habitat Protection" is specifically focused on the identification of a core set of indicators to monitor the coastal zones , in particular on the land part in the perspective of the development of a regional conceptual framework for coastal zone observation.

This regional conceptual framework proposes guidelines on how to frame the harvesting and identification of data providers regarding "coastal zone" in order to follow and measure the status and the evolution of coastal zones at regional level. As a consequence, the definition of the framework must consider the existence of the existing systems managed by the UNEP/MAP RACs in order to gather socio-economic and environmental information for the coastal zone indicators but also to use their respective indicators in a synergic approach. For instance, for the environment of the coastal zones, the Integrated Monitoring and Assessment Programme of the Mediterranean Sea (IMAP) and Coast and Related Assessment Criteria (COP 19 Decision IG.22/7) sets out all the required elements to cover in an integrated manner monitoring and assessment of biodiversity and fisheries, pollution and marine litter, and coast and hydrography. At the core of IMAP are the 23 regionally agreed common indicators, currently covering 9 out of 11 Ecological Objectives (EOs). In this perspective, the 2022-2027 UNEP/MAP Mid Term Strategy (MTS) is targeting the progress towards the Good Environmental Status (GES) achievement/maintenance on coast and hydrography cluster at the commonly agreed assessment scale, through the Programme 4 "Towards the sustainable use of coastal and marine resources including circular and blue economy". The Mediterranean Strategy for Sustainable Development (MSSD 2016-2025) is also targeting this topic in its Goal 5: "Transition to a green and blue economy".

The activity, implemented in close cooperation with the UN/Environment/MAP Priority Actions Programme Regional Activity Centre (PAP/RAC) in particular for the ICZM protocol implementation and reporting, complements the work undertaken by the Contracting Parties of the Barcelona Convention to implement the Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast (IMAP), with the land part at the national level, in the framework of the UN Environment/MAP's Ecosystem Approach (EcAp) and IMAP Process, by identifying the necessary monitoring parameters/indicators to measure the progress towards the recovery of GES of the coastal waters. In this perspective, and as stressed by different decisions of Barcelona Convention during the development of the national integrated monitoring programmes' coastal component, Contracting Parties, first need to assess the length of coastline affected by artificialization in the current state, in line with the IMAP Guidance, noting that the length of coastline subject to physical disturbance due to the influence of manmade infrastructures is an impact indicator, which assumes that the coastlines occupied by human infrastructures are potentially impacted areas at the land-sea interface.

Contracting Parties need to achieve better monitoring, coupled with a better structured observation system, including the state of marine and coastal environment and its interactions with human activities. This need is correlated with the growing interest of the decision makers on the **sustainable blue economy** as an opportunity for job and added value creation. Nevertheless, its development can only be defined as sustainable if minimum impact on the environment occurs, in particular on the coastal zones where the land and sea interactions/pressures are focused.

Under the scope of this study, the first activity intended to identify a core set of indicators to monitor the coastal zones with an extensive list covering the needs to report as much as possible on the ICZM protocol.

The approach used in the selection of the indicators is in accordance with the principles of ICZM (Article 6 of the Protocol) reflecting the relationships between Integrated Coastal Zone Management and the Ecosystem Approach. The selected

indicators were evaluated by using the RACER methodology[1] to identify the most appropriate indicators regarding the study objectives.

As a first deliverable (D1), a proposal of parameters was established in October 2022 and is available online on Plan Bleu website. D1 presents the link between the proposed indicators and EOs, SDGs and MSSD as shown in Table 1. Establishing the various connections between IMAP and SDGs indicators should facilitate the reporting processes on environment, climate and sustainable development dashboard at Country level but also at regional level for reporting on the Barcelona Convention progress under the United Nations system.

Table 1. Link between the proposed indicators and the EOs and SDGs[2]

Relation with the Maritime and coastal capital	Proposed Indicator title	Status	Related EcAp EO	Link with related SDG's indicators
Natural capital Marine and coastal space	Measurement of size, density of the population living in the coastal zone	Conventional	EO 7. Hydrography	11.3.1, 15.3.1.
	Percentage of industrial lands on the coastal zones (established)	Conventional		
	Area converted from the non-converted to developed land use (innovative)	Innovative		14.3.2
	Percentage of length of the coastline urbanized	Conventional	EO 1 (Biodiversity) EO7	12.2.1
	Percentage of built-up land by distance from the coastline	Conventional		12.2.1
	Proportion of the coastline affected by coastal erosion. Percentage of length of the coastline urbanized	Innovative	EO 1. EO6 (Ecosystem integrity). EO7	11.5.3.12.2.1; 12.2.1; 13.1.2; 14.3.3
	Level of permanent occupation of the sea by maritime activities	Innovative	EOs 1. 6. 7	14.4.1; 12.2.1
	Percentage of agricultural land farmed intensively	Innovative	EO 1. EO 3 (Commercial species). EO5 (Eutrophication)	14.1.1 a) ; 15.1.2
Technical capital (Infrastructures and services)	Volume of traffic on the motorways and major roads	Innovative	EO 7	12.2.1
	Number of berths, mooring and dry-stack storage capacity for recreational boating	Innovative	EO 1. EO2 (non-indigenous species). EO5. EO10 (Coastal and marine wastes).	12.2.1; 12.b.1 13.1.3
Institutional capital	Percentage of environmental taxes collected	Innovative	EO 1 to 11	12.5.1; 12.4.2 b) ; 12.2.1
	Existence of dedicated governance structure for ICZM and MSP at national or subnational level	Conventional	EO 1 to 11	13.3.1. ; 14.b.1; 15. a.1.
	Surface of protected areas in waters under jurisdiction or on the coast	Conventional	EO 1	14.4.1; 14.5.1; 14.6.1
	Existence of related Plans/frames	Conventional	EO 1 to 11	13.3.1. ; 14.b.1; 15. a.1.
	Percentage of the marine zone covered by MSP legal tools	Conventional	EO 1 to 11	13.3.1. ; 14.b.1; 15. a.1.
	Number of non-applications of environmental legislation	Innovative	EO 1 to 11	13.1.2; 14.2.1; 12.2.1
	Financing coastal protection and adaptation	Innovative	EO 1 to 11	13.a.1; 13.1.3; 13.1.2; 17.1.2; 17.7.1

[1] European Commission. *Better Regulation Toolbox*; European Commission: Brussels, Belgium, 2017; Available online: http://www.emcdda.europa.eu/system/files/attachments/7908/better-regulation-toolbox_1.pdf

[2] For more details cf. D1

Also, under the scope of this study, but in a second step, a regional conceptual framework for coastal observation is proposed and presented within this document. The conceptual framework has been proposed on the basis of the outcomes of the first activity and the proposed core set of indicators, but also through the analysis of existing observatories and their potential relation to the proposed indicators with the perspective for this conceptual framework to be potentially implemented at national level in order to report and be able to at regional level in accordance with ICZM protocol Article 16 "*Monitoring and observation mechanisms and networks"* needs.

Before proposing a regional conceptual framework and considering the fact that the core contribution for the regional observation of the coastal zones is based on Contracting parties reporting, several options are suggested for the eligible countries in order to set their national organization so as to be able to report at national level and regional level.

EXAMPLES OF OBSERVATORIES

For the purpose of the study, a general review of some observatories was performed, looking at their fitness for adaptation to the proposed regional conceptual framework. Table 2 presents first of all a panel of observatories covering different fields, but linked to coasts and hydrography, for parameters and indicators on climate change, coastal risks or blue economy and then some key elements which are relevant for the coastal zone observatory such as the data collection process but also the data display with geoportal.

On a first glimpse from the analysis carried out in this sample of regional observatories, it can be seen that various management mechanisms have been put in place to ensure the data governance and for the reporting processes, which can take several forms, either through the transmission of raw observation data, through maps or quite simply each party is itself responsible for entering the data on a geoportal and a mechanism for checking and validating the data transmitted is put in place by the entity in charge of managing the geoportal and the database from the observatory's member countries.

Table 2. Analysis of some illustrative observatories or structure and programmes acting or ensuring functions which are requested for an observatory

Name	Geographical scope	Thematics/ indicator	Reporting system	Link – added value	Source
European Climate and Health Observatory	EU	Climate and Health		The Observatory aims to support Europe in preparing for and adapting to the impacts of climate change on human health by providing access to relevant information and tools and fostering information exchange and cooperation between relevant actors.	https://climate-adapt.eea.europa.eu/en/observatory
West African Regional Coastal Observatory (ORLOA)	*West Africa*[3]	Coastal hazards and climate change	Under building	Production and sharing of reliable and homogeneous data using harmonized data collection protocols. The implementation of a sustainable and integrated coastal policy by supporting new local observatories, the consolidation of existing observatories or local initiatives working on coastal monitoring. To provide a supportive and sharing tool for the understanding, knowledge and management of coastal hazards by pooling skills and resources to facilitate the emergence of joint actions.	https://ocean-climate.org/en/west-african-regional-coastal-observatory-orloa/
Eastern Consortium of Coastal Ocean Observatories		Ocean		Ocean research institutions on the U.S. East Coast are collaborating to turn their individual observatories into a wider network.	
Hydrometeorological Observatory for West Africa (AMMA-CATCH)	Mali, Niger et Bénin	Ecology and climate change		To document the West African eco-climatic gradient. The observations are made on a nested system, from the mesoscale	https://data.oreme.org/observation/amma-catch
European Environment Information and Observation Network (Eionet)	32 member countries[4]	Since January 1st 2023 seven European Topic Centres working with EEA and the national Eionet	Reportnet is Eionet's infrastructure for supporting and	A partnership network of the European Environment Agency (EEA) and its 38 member and cooperating countries. EEA and Eionet gather and develop data, knowledge, and advice to policy makers about Europe's environment.	https://www.eionet.europa.eu https://www.eionet.europa.eu/reportnet/docs/reportnet-introduction-to-environmental-reporting-using-reportnet.pdf https://www.eionet.europa.eu/reportnet/docs/reportnet-architecture-v4.pdf

[3] Benin, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Mauritania, Liberia, Sao Tome and Principe, Senegal, Sierra Leone, Togo

[4] (27 European Union Member States, together with Iceland, Liechtenstein, Norway, Switzerland and Türkiye) and six cooperating countries. (Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia)

		partners: the ETCs, working together with Eionet countries, facilitate the provision of data and information from the countries and deliver reports and other services to the EEA and Eionet[5]	improving data and information flows.	Reportnet is based on a set of inter-related tools and processes which all build on the active use of the World Wide Web which could be considered for the regional observatory	
EU Blue economy observatory[6]	European Union (27 European Union Member States)	Blue economy[7] Expansion of data collection on the EU blue economy with a view to fill in the current data gaps, particularly for emerging sectors and contribute to the future creation of the EU Ocean Satellite Account (EU OSA):	Annual report edition Online dashboards of indicators and maps	The Blue economy observatory is managed by the joint Research Centre – Ispra The purpose of the EU Blue Economy Observatory is to support with science-based evidence the sustainable transformation of the EU blue economy, alongside the transition agenda. The overall objective is to assist decision making, governance and policies by gathering, analysing and disseminating economic knowledge and data for a better understanding of the EU blue economy along the value chain and the EU coastal regions. The general objectives are assured by the Commission services (DG MARE and DG JRC). The data collection is based on essential data supplied by European Commission services (DG MARE, DG JRC, DG TAXUD, EUROSTAT), Member States, and miscellaneous national bodies or organisations (such as institutes and governmental organisations).	https://blue-economy-observatory.ec.europa.eu/index_en indicators https://blue-economy-observatory.ec.europa.eu/blue-economy-indicators_en in depth indicators https://blue-economy-observatory.ec.europa.eu/depth-analytical-tool_en maps https://blue-economy-observatory.ec.europa.eu/eu-blue-economy-maps_en
Coastal Observatory Research Arrays		Geological forcing		This program is an interagency effort (National Science Foundation, NOAA, and Office of Naval Research) to conduct large-	https://www.whoi.edu/what-we-do/explore/ocean-observatories/about-ocean-observatories/types-of-observatories/coastal/

[5] (biodiversity and ecosystems, circular economy and resource use, climate change adaptation, climate change mitigation, data integration and digitalisationhuman health and the environment, sustainability transitions)

[6] The EU Blue Economy observatory is led by JRC but it is supported by a contracted company in Data acquisition, collection and processing; Conduction of studies and ad-hoc analyses, and reports drafting and Dissemination and communication of findings.

[7] Coastal Tourism, Marine living resources, Marine non-living resources, Port activities, Shipbuilding and repair and Maritime transport

The Coastal Ocean Processes (CoOP)				scale, interdisciplinary research to improve understanding of the processes related to geological important matter in the coastal zone and along the continental margin. This program ensures a transversal function contributing in observation synergies between agencies in order to set a shared capacity	
PORTODIMARE geoPORtal of TOols & Data for sustaInable Management of coAstal and maRine Environment	Adriatic Sea (pilot sites, Croatia, Greece, Italy, and Slovenia)	environmental protection and sustainable development of sea/cost uses	Geoportal of Adriatic-Ionian Region (GAIR)	Full compliance with the UNEP/MAP Integrated Coastal Zone Management (ICZM) Protocol in the Mediterranean and the EU Directive on Maritime Spatial Planning (MSP) GAIR is a community-based, open source portal based on GeoNode (http://geonode.org/), a web-based Content Management System (CMS) for developing geospatial information systems (GIS) and for deploying spatial data infrastructure (SDI). GAIR provides access to numerous datasets related to coastal and marine areas and to several modules for Integrated Coastal Zone Management (ICZM) and Maritime Spatial Planning (MSP) analysis and risk assessment. Interesting for interoperability with METADATA (ISO) This portal ensures requested functions of an observatory in data display and gathering	https://www.portodimare.eu https://portodimare.adrioninterreg.eu/wp-content/uploads/2020/12/Geoportal-Practical-Guide-Final_DT2.8.2_compressed.pdf https://portodimare.adrioninterreg.eu/wp-content/uploads/2020/12/T2.8.1-GAIR-Maintenance-and-Transferability-Pan.pdf
OECD-Eurostat Entrepreneurship Indicators Programme	Global/ EU	Entrepreneurship	No specific one But common basis for reporting	Definition of common indicators Interesting to illustrate cooperation between organisations with different geographical scopes which acts respectively like an observatory. Thanks to the set of indicators shared between OECD and Eurostat ensure consistency and data sharing	https://www.oecd.org/sdd/business-stats/theentrepreneurshipindicatorsprogrammeeipbackgroundinformation.htm https://ec.europa.eu/eurostat/documents/3859598/5923225/KS-RA-12-023-EN.PDF.pdf/e2755b1b-68a5-4dad-86f5-6327c76da14d?t=1414781881000

I. Methodology to develop the conceptual framework for coastal and hydrographic indicators

In 2021, Plan Bleu coordinated a targeted analysis on the "Mapping of observatories, observation systems and monitoring programs for the environment, sustainable development and marine and coastal activities in the Mediterranean". A specific focus was done on the list of proposed indicators which were the outcome of the first part of this study.

For the purpose of this study, the analysis was focused on the capacities for the observation and the surveillance which could exist or contribute to answer the proposed core set of indicators (D1) for hydrography and coast, in relation with the beneficiaries countries of the activity: Albania, Egypt Lebanon, Montenegro, Morocco, Bosnia-Herzegovina, Tunisia, Libya, Algeria but in the perspective to be extended for the purpose of a regional framework. The detailed analysis for the beneficiary countries is available in the annex 1.

The conceptual framework is designed to identify the necessary monitoring indicators for the sustainable development of coastal zones in accordance with the ICZM protocol and to measure the progress towards GES of the coastal zone, in addition to/as a complement of the monitoring framework undertaken by Contracting Parties to implement the Integrated Assessment Programme of the Mediterranean Sea and Coast (IMAP) at the national level.

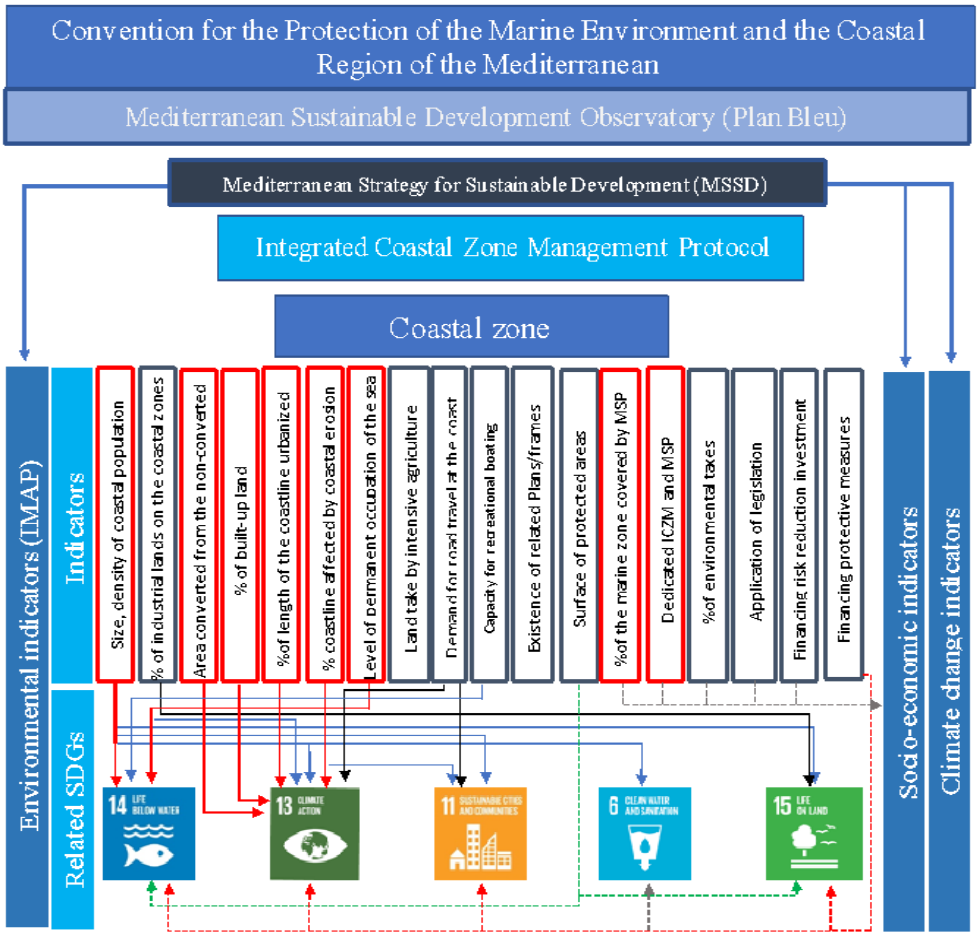
The Figure 1 presents the links between the proposed indicators to monitor the coastal zones. The monitoring is based on the implementation of UNEP/MAP protocols, data was collected via ad hoc protocol process and SDGs reporting. This framework establishes the links between the Barcelona Convention's framework and the first links between the protocols that have direct and structuring relations with the dynamics of the coastal zones, in particular the "Land based sources" protocol and above all the "Integrated coastal zone management" protocol. These indicators must be considered to contribute to the Coastal zone chapter to MSSD and therefore be used by the Mediterranean Sustainable Observatory.

The 18 indicators allow for the direct implementation of at least five sustainable development goals such the ones relating to marine life (SDG14), climate change (SDG12) and cities resilience (SDG11) which are sensitive on the coastal zones for the environment and its peoples.

As mentioned in the decision IG.22/7 and Related Assessment Criteria[8]: "one particularity of the IMAP (compared to other regional/RSC monitoring and assessment programmes) is the inclusion of an Ecological Objective focusing on the terrestrial part of the coastal zone. This reflects the importance of the coastal zones in the Barcelona Convention, in line with the ICZM Protocol".

[8] Integrated Monitoring and Assessment Programme of the Mediterranean Sea and Coast.

Figure 1. Proposed indicators related to Coast and Hydrography targeting (achieving) the best marine and coastal governance and their links with relevant SDGs for the coastal zones. Red colour underlines the main indicators and the main links related to coastal zones



II. Main findings

The assessment of the current GEF Med Programme Mediterranean countries' legal framework, identifying the key stakeholders, and in a larger sense assessing the **observation and monitoring system of hydrography and coastal indicators and parameters** highlights the following elements:

- Marine and coastal observation systems remain patchy, and responsibilities are dispersed among different institutional and academic actors. There are very few institutions fully dedicated to the observation and monitoring of hydrography and coast. In almost all countries, monitoring of these indicators falls under the responsibilities of coastal protection agencies, environmental or coastal observatories, and often scientific research laboratories run either by universities, research centers or technical structures operating for the environment or other ministries.
- In many cases, the actors leading the observation, and those processing the data for final decisions are not the same.
- In all the countries analyzed, there is no legislation in the strict sense relating to the monitoring of 'Hydrography and coast' indicators even if there is an endorsement of the ICZM protocol. Instead, in all cases these are legal provisions described in the environment law, the coastal law, or the legal texts governing environmental impact studies.
- The observation and monitoring of the two hydrographic and coastal indicators is not automatically, nor periodically ensured at any of the analyzed steps. Moreover, the administrative observation scales, including that adopted within the IMAP monitoring framework, are often inconsistent with the scales of observation performed within the framework of scientific and academic research projects.
- Despite the existence and adoption of the IMAP monitoring system, the protocols used by countries are still not fully standardized.
- None of the analyzed countries fully cover their entire area for monitoring the indicators related to coast and hydrography. Indeed, the countries focus either on hotspots or on “at risk” and exposed to particular events areas. In the range of analyzed Mediterranean countries, this approach is often associated with major risks or climate change.
- The implemented reporting systems are frequently unstained, as these systems are included in project processes, such as international support projects or implemented within the framework of multilateral action (i.e. Supporting Barcelona Convention and its protocols). These systems barely survive these programs and projects.
- In many cases monitoring and surveillance arrangements are put in place as part of national or local scientific research projects, including PhD theses, which once again do not outlast these scientific research projects.
- Scientific data is not systematically requested by the administration responsible for monitoring.
- Few countries have a specific budget to monitor "Hydrography and coast" indicators.
- The level of reporting at UNEP/MAP (RAC/INFO) is limited when it is done and not easily exploitable.

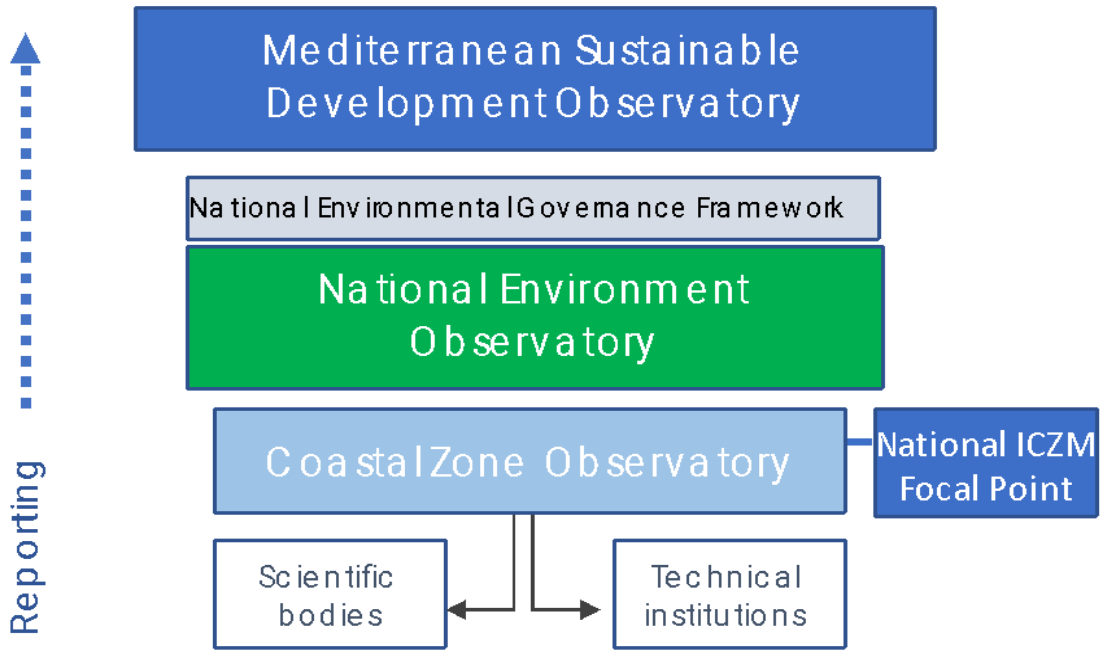
III. Main recommendations

Regarding the observation system for the hydrography and coastal indicators and in the perspective to set a regional framework which is to be managed by existing RACs, there is a need to set in each country a national capacity to collect, gather, qualify data in order to report but also be in line with ICZM protocol requirements. The proposed observation system could be based on a national institution/entity that will be in charge of collecting, organizing and validating the monitoring and observation data related to coast and hydrography. It will also be in charge of the reporting and sharing the observation results. This entity could be part of the national environment observatory or part of the coastal zones observatory or agency. It could also be exclusively dedicated to observing and monitoring hydrography and coast. Based on the national scoping, three options are possible.

These national options are based on the institutional and scientific organization in the country and the configuration of the existing observation system in the country relating to the environment, the coastal zone and the hydrography and coastline indicators (complete, with or without regional agencies, with or without local agencies or entities).

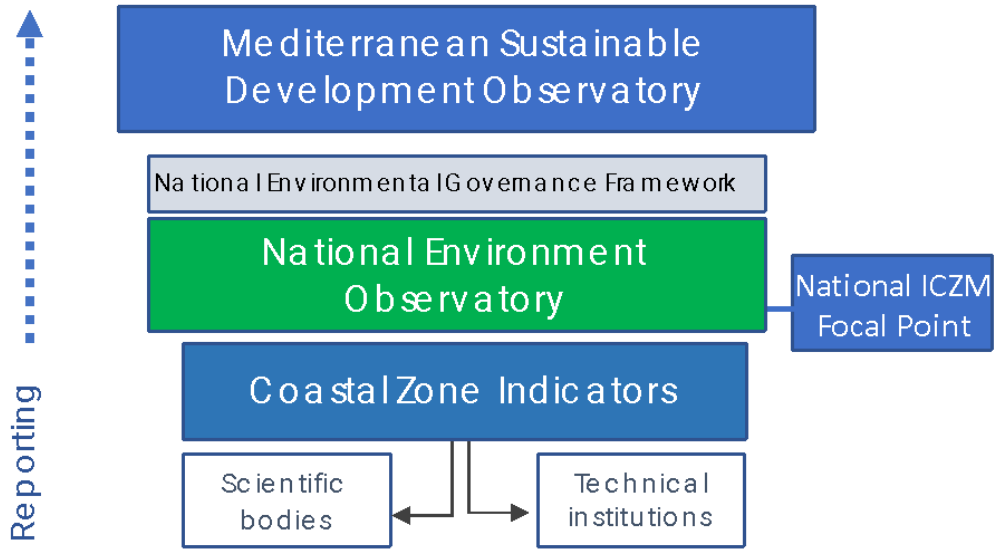
Presented on the Figure 2, Option 1 is complete and applies to countries that have fully organized their coastal observation, monitoring and assessment frameworks with the three components, i.e. a national environment observatory, a dedicated coast observatory (mainly composed in a network approach along the coasts or on specific or hots), and a set of hydrographic and coastal indicators.

Figure 2. Organization for coastal zones observatory (Option 1 embedding coastal observation in the global environmental observation)



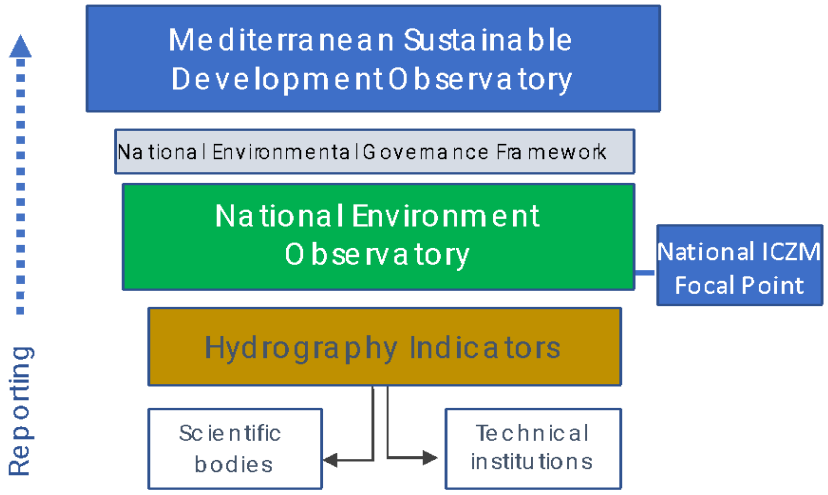
Presented on Figure 3, the Option 2 is dedicated for countries which have only a national environmental observatory dealing with a set of coastal indicators without a dedicated coastal agency. It meets the demand of the ICZM protocol in matters of collecting and reporting. Nevertheless, it does not ensure any integration in a wider approach for national environmental matters. Option 2 can be found in Algeria, Egypt, Morocco or Tunisia or (cf. Annex1)

Figure 3. Organization for coastal zones observatory (Option 2 – only dedicated to coastal observation)



Presented on Figure 4, the Option 3 is dedicated for countries which have only a national agency or entity for environment observation at national level. It can be found in Bosnia Herzegovina or Montenegro (cf. Annex 1).

Figure 4. Organization for coastal zones observatory (Option 3 – only national observation to environment



For all the options, the national organization is to report to Plan Bleu in order to ensure its role as Mediterranean Observatory which will relay/transfer to UNEP/MAP dedicated RACs regarding their respective duties regarding the Barcelona Convention. For the three options, the national ICZM Protocol focal point is included in the process of data validation taking advantage of his link with PAP/RAC.

Hereafter are presented the process for the reporting and the validation of data observation and monitoring and its related proposed indicators for each option.

Figure 5. Process for reporting and validation on coastal zones indicators at national level (option 1)

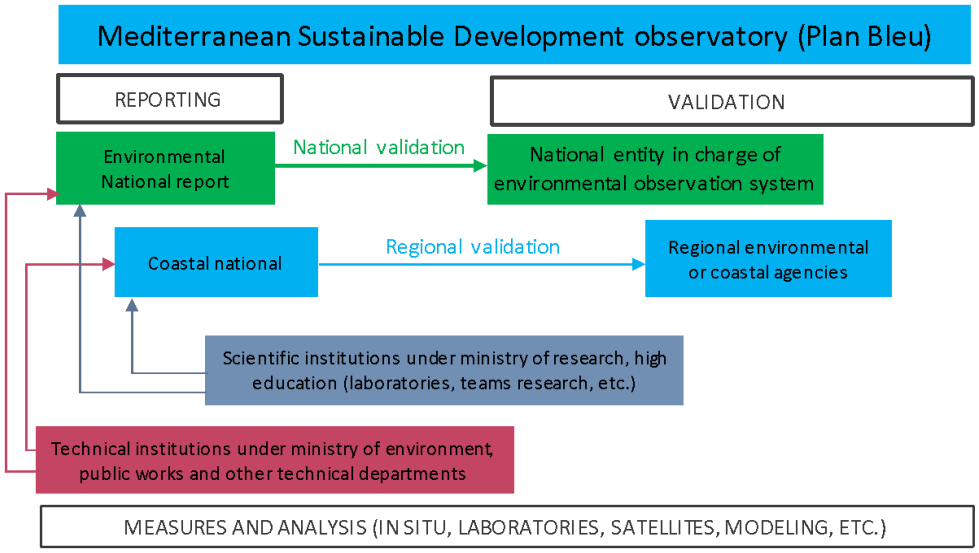


Figure 6. Process for reporting and validation on coastal zones indicators at national level (option 2)

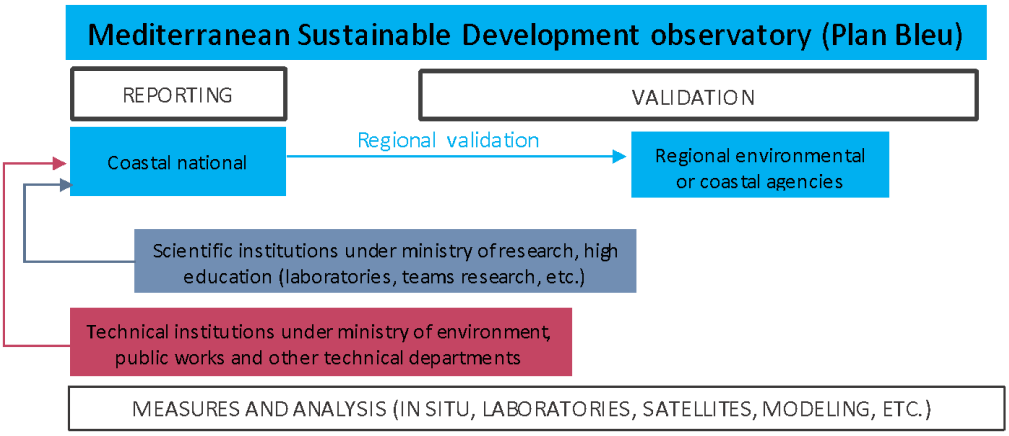
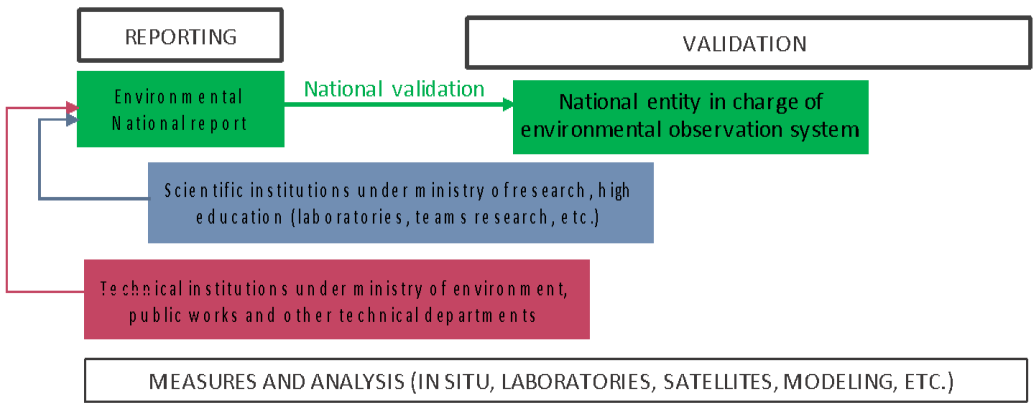


Figure 7. Process for reporting and validation on coastal zones indicators at national level (option 3)



In order to test the proposed set of indicators in the first report, the level of preparation of the general framework in Algeria and the possibility of implementing monitoring of the governance of indicators relating to the coast and

hydrography along the Algerian coast, was evaluated. In the case of Algeria, seven indicators are fully monitored, eight partially covered, and only three are in an emerging process or still unknown (cf. Annex 3).

It can be considered that Mediterranean countries which will have to reinforce their set of IMAP indicators with those proposed can operate by targeting the existing levers that allow them to rapidly initiate such a process, while ensuring that the minimum required material, logistical and human resources exist at the country level. The availability of monitoring actors to take action/get involved/get mobilized around these indicators and the quality control procedures about monitoring protocols and produced data quality must be the subject of strict attention.

In the perspective of operational and relevant observation and reporting system on coastal zones, **five main recommendations are proposed at a national level** in order for them to be able to report with the core set of indicators proposed in D1 in order to fulfil ICZM protocol commitment to report at UNEP/MAP level:

1) **Connect the institutional entities and scientific data providers (research laboratories, R&D centers, Programmes and projects, technical bodies) dealing with coast and hydrography in a structured way.**

Establish an organized and binding framework for the integration of scientists who monitor coast and hydrography indicators into the existing institutional mechanisms for monitoring these indicators.

2) **Harmonize and connect in an effective and efficient manner the three levels of monitoring and observation (national, sub national and local).** The national level is the gateway to report to dedicated RACs (i.e. PAP/RAC – RAC/INFO).
3) **Establish a reporting system that clearly defines the responsibilities of the parties involved in the data production, processing and validation chain and the associated transparency system.**
4) **Set a scientific platform (SP) and science-policy interface (SPI) focusing on two objectives**

- Scientific platforms to promote the creation of a scientific hydrography and coast community (harmonization with methodologies, sharing data, dealing with relevant scales from local to regional, etc.)
- Scientists are supposed to convey timely warnings and inform policymaking. The SPI aims to simplify scientific tools and methodologies in order to support the adapted decision.

Data production through in situ observation or by remote sensing does not guarantee a global understanding of the «Hydrography and coastal system», nor does it ensure their consideration by institutional processes. Therefore, it is crucial to establish, formalize and validate the entire data reporting and validation system and ensure the conditions of transparency allowing the entire data chain's reliability verification (scale, protocol, periodicity, exchange, etc.).

5) **Proceed with a stepwise approach**

Considering:

- Scientific data is not systematically requested by the administration responsible for monitoring;
- The inadequacy noted in the organization of the indicators monitoring system relating to hydrography and coasts and, more generally, to the monitoring of coastal areas;
- The non-adapted mobilization actors of financial capacities by institutional, which are enable to cover all the required and essential parameters for monitoring hydrographic and coastal zone indicators;
- The lack of human capacity;
- The absence of a verification and reporting system that meets international standards and the random periodicity in the communication of monitoring products.

6) **Consistency with recognized IMAP reporting frameworks and standards**

A stepwise approach is recommended to progressively organize the necessary framework for a structured, strategic and integrated monitoring and evaluation of hydrographic and coastal indicators.

Step 1: Short term

Select among the institutions responsible for the observation, monitoring and surveillance of elements, parameters and/or indicators relating to hydrography and coastlines, the most legally valid institution (entity) in each beneficiary country with the necessary expertise, and preferably, experience in this field. Accordingly, this institution could be mandated by the

national authorities to structure the observation and monitoring of indicators identified in D1[9] and organize the monitoring system, within the framework of the national legal provisions and the country's commitments to report to the Barcelona Convention. Transparency, validation and reporting systems are organized and operating and covering the main hot spots of hydrography and coastlines. Full conventional indicators could be then endorsed and ready to be fed on the basis of the national capacities and in a consistent approach to contribute to the regional observation system.

Step 2: Mid term

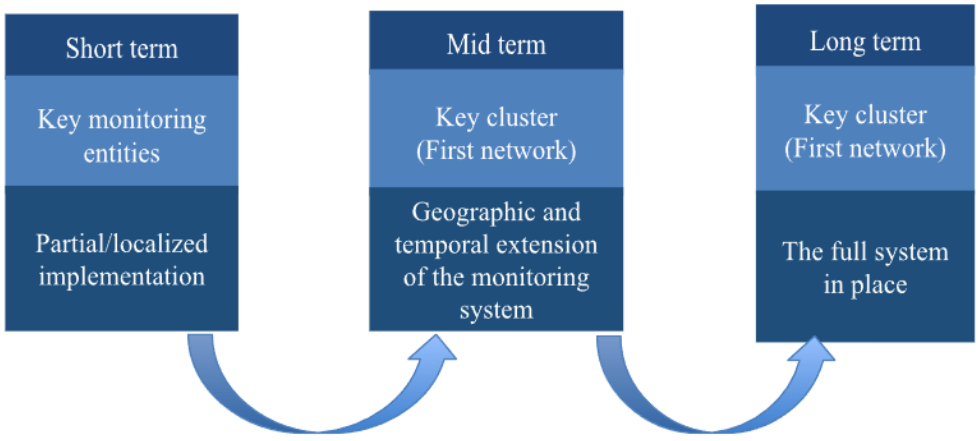
In a second stage, bring together around the key institution identified a cluster of national stakeholders (institutional and non-institutional) and implement data exchange and validation mechanisms, taking into consideration the regional (subnational) and local observation system if it exists. Transparency, validation and reporting systems are operating and covering all the hot spots of hydrography and coastlines. Observation system could be dealing with the total conventional indicators and part of the non-conventional indicators.

Step 3: Long term (beyond 2030)

The whole system is fully organized, operating, and implemented with the necessary funding and human resources, taking into consideration the regional (subnational) and local observation system if it exists. Transparency, validation and reporting system is operating in covering the total coastlines. Observation system is dealing with the total conventional and non-conventional indicators.

The gradual approach could be summed up as illustrated in the Figure 8 below.

Figure 8. Main steps for the implementation of the monitoring system



Based on the analysis, the coastal zone observation system in the Mediterranean suffers not only from a lack of willingness to share observation data between the countries and the bodies mandated by the Barcelona Convention, but also from a lack of funding to produce all the observation data, including coastal and hydrographic data, on a periodic and systematic manner. It is therefore necessary to try to find a mechanism that combines national and MAP funding sources in order to create the conditions needed to supply the board of monitors of the Barcelona Convention. To this end, we could imagine an UNEP/MAP Mediterranean fund which would contribute to the financing of conservation at national level and at the same time ensure the sustainability of the system.

Proposal of national mechanism for the monitoring and reporting of indicators related to coastal zones

Six scenarios are expected to occur for the implementation of the steps regarding the availability to downscale the observation capacities of the countries (existence/non – existence of regional or local agencies). These scenarios are to be considered for each beneficiary country for the implementation of the steps and the objectives which could be met. By default, it is needed for all of them to have at least one entity in charge of environmental observation and related scientific and technical institutions.

[9] Proposed in step 1 report https://planbleu.org/en/publications/proposal-of-parameters-to-be-monitored-to-reach-good-environmental-status-on-coastal-zone/

Table 3. Expected five scenarios at national level

Conditions related to the national capacities related to coastal and hydrography observation	Scenarios				
	IMAP Compliance	Total observation for coastal zone	Partial observation for coastal zone	Low observation for coastal zone	inadequate observation for coastal zone
	All the requirements of IMAP and Barcelona Convention are fully met, with dedicated operational system at different relevant scales	Observation is under national environmental and coastal observation systems	Observation is under the national environmental observatory in the absence of coastal observatory	Observation is directly conducted by national environmental observatory	Observation is directly conducted by national environmental observatory without local agencies
Existence of national entity in charge of environmental observation system	X	X	X	X	X
Existence of national entity in charge of environmental Coastal observation system	X	X			
Existence of national entity in charge of Coast and hydrography observation	X				
Existence of regional agencies	X	X	X		
Existence of local agencies	X	X	X		
Existence scientific institutions under ministry of research, high education	X	X	X	X	X
Existence of technical institutions under other technical departments	X	X	X	X	
Advantages	Optimized coordination and potentially covering the total length of the coastal zone with a reporting system on different scales. The integration of EO is fully supported by the organized framework. Relevance for Regional IMAP	Relevant coordination between coastal environmental observatories Relevant coordination between national, regional and local scales	Existence of regional and local agencies (environmental and/or coastal)	Existence of scientific observation Existence of national observatory	Existence of scientific observation Existence of national observatory
Inconvenient/constraints	Costly	Non-dedicated hydrography observatory may reduce the relevance of technical observation	Lack of observation Lack of coordination Hydrography and coastal could be considered less important compared with other descriptors of the GES.	Deficiency in coordination Week spatial coverage of observation Week integration of Hydrography and coast with other IMAP descriptors	Strong deficiency in coordination Strong weak spatial coverage of observation String week integration of Hydrography and coast with other IMAP descriptors

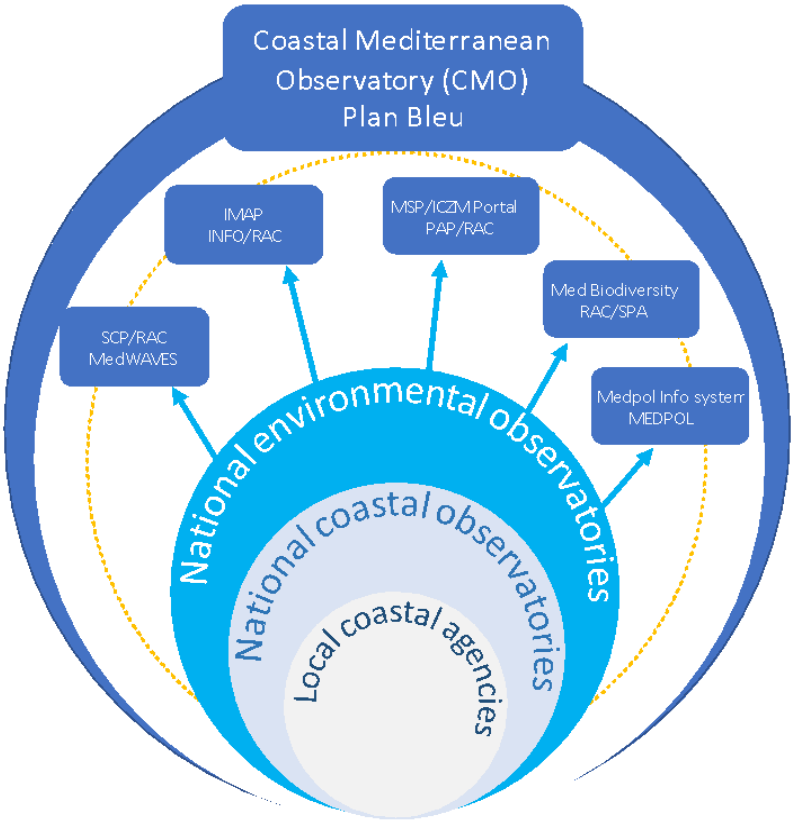
On the basis of the system, all the entities are potential scientific and technical providers of data monitoring. A hierarchy from local to national level must be set to collect, gather, and consolidate the information.

Even if ideally a full coverage with local agencies can be expected to have the most accurate observation, local agencies can be only located on the hotspots where observation is first needed. By doing so, the system can be a multiscale system aggregating existing capacities wherever it is relevant. In the Annex 1, a table with the main information, per beneficiary Country, related to the national strategic and legislative framework and to the observatory are reported.

These recommendations are to set for each country a national capacity for national observations. It is to be considered for national perspective and international one to steer national policies/strategies related to the coastal zones and the sea in particular for the national blue economy (cf. UfM Blue Economy roadmap) with strong link with the potential maritime spatial planning with land and sea interactions (ICZM) but also to contribute on IMAP and implement the Mediterranean Strategy for Sustainable Development (MSSD).

Ideally at the end of the process, all countries could have the same schema to report.

Figure 9. Reporting system -from national to regional



In parallel at regional level (UNEP/MAP), it is proposed to confirm the technical position of Plan Bleu like Mediterranean observatory for environment and sustainable development gathering the collected informed agreed indicators in order to ensure the data quality needed for MSSD assessment. The Mediterranean observatory managed by Plan Bleu RAC will be collecting the data on the agreed indicators a, compiling for display on the Mediterranean marine and coastal portal. For this purpose, it will be necessary for Plan Bleu, in close connection with the other RACs, to set a procedure for validating the indicators data transmitted before displaying the informed dashboard. Once validated by Plan bleu, national reports based on indicators shared with the RACs for their respective duties namely PAP/RAC (ICZM, MSP), RAC/SPA (MPA) and RCA/INFO (capitalization) as proposed on the Figure 9 above.

It is important to note that the regional schema proposed below has been designed to report on coastal zones. Nevertheless, once the national capacities are set as proposed above, it could be able to report in an extensive approach if agreed indicators like proposed in D1 are agreed at UNEP/MAP level. In the case of RAC/SPA, it is important

to note that indicators of coastal zones should be understood with all the links related to loss of biodiversity and marine and coastal key habitats (EO) due to physical disturbance.

Finally, this report was technically validated during a final workshop which was organised by Plan Bleu on November 8th 2023.

Annex 1 - Main information regarding coastal observation system per country

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
Albania	Length of the coast: 362 km Type of the coast: The Albanian coast is divided into two distinct areas: the Adriatic and the Ionian. The Adriatic coast in the north is characterized by shallow waters and long sandy beaches (up to 5 km). Much of the coast is accompanied by characteristic pine forests. The Ionian coast, to the south, has a rocky and rugged coastline with steep seabeds. The Ionian beaches are more intimate and rockier than the	Barcelona Convention	The National Strategy for Development and approved by DCM No. 342 of 12/03/2008; The Environmental Cross-cutting Strategy approved by DCM No. 847 of 29/11/2007; Official Journal: No. 174, Page 5349; Publication date 22/12/2007. DCM no 13 dated 4.1.2013 "On the rules, responsibilities and timeframe for the procedures of EIA";	Council of Ministers Decision No. 1189 dated 18.11.2009, "On rules and procedures for the design and implementation of national environmental monitoring programme". The Decision defines the methods of measurement, sampling, frequency and unit of measurement, method of processing and presentation of data.	Water, Hazardous substances, authorizations and concessions on water uses	National	The MoEFWA and EFA report regularly on the monitored data, via the State of Environment Report. This report is published on the official MoEFWA website and is open to all interested members of the public.

[10] This information is referred to: length of the coast, main type of the coast, dominant marine and coastal activities (fisheries, coastal tourism, …) the main 2 emerging marine and coastal activities (desalination, marine energy, MPA's and conservation etc.)

[11] These information are referred to: European legislation, International commitments, Mediterranean protocols, State of the art of the ratification of the ICZM protocol. Also, Barcelona Convention and related protocols to Hydrography and coast and Paris Climate agreement will be checked.

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
	Adriatic ones, and the water is deep even close to the shore.						
Algeria	Length of the coast: 998 km Type of the coast: The coastal strip on the Mediterranean Sea has short flat stretches, while in other areas the relief comes right up to the sea; in the Mediterranean there are only a handful of islands, all of small size.	Barcelona Convention	Environmental law Coastal law (02-02 du au 5 février 2002) National master plan of planning (SNAT) and its coastal sub-plans Coastal plans	National Observatory of Environment and Sustainable Development (ONEDD) National Agency of Littoral (CNL) National Agency of Climate Change (ANCC) National School of Marine Sciences and Coastal Planning (ENSSMAL) National Institute of Cartography and remote sensing (INCT)	Environmental and socio-economic Coastal Indicators Climate change indicators Marine and coastal environment Fisheries, aquaculture, climate change, Urbanisation and coastal risks Cartography, land monitoring	National Coastal zone National National marine and coastal zones National	Ministry of Environment and Renewable Energy in link with Ministry of High Education and Scientific Research
Bosnia-Herzegovina	Length of the coast: 20 km Type of the coast: urbanized and artificialized with Neum City which is the unique access to the sea for the country	Barcelona Convention	none				
Egypt	Length of the coast: 2450 km Type of the coast: Egypt faces both the	Barcelona Convention	Environmental Protection Law : Law 4/1994 for the Protection of the	Egyptian Environmental Affairs	Socio-economic, environmental, climate, full domains	National, subnational, local	**Ministry of Environment**

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
	Mediterranean (to the north) and the Red Sea (to the east); the Mediterranean coast is more regular, while the narrow coastal strip on the Red Sea is rougher, mainly due to the presence of the Sinai Peninsula.		Environment Amended by Law 9/2009 and in 2015. This Executive regulation introduced further details for the enforcement of Law number 4 of 1994. Regarding monitoring it stipulated in its article 8 that the resources of the Environment Protection Fund established within the framework of EEAA may be used for the creation and functioning of the Environmental Monitoring Networks.	Agency (EEAA)[12], National Council of Climate Change[13] Coastal Research Institute (CoRI) The National Institution responsible for the monitoring of the marine environment in Egypt is EEAA. For the monitoring along the country's Mediterranean coasts, EEAA is collaborating with the IGSR located in Alexandria[14]. Other Universities and research institutes are undertaking monitoring activities for the marine environment. However, these are not regular monitoring, but undertaken within the framework of projects or academic works limited in time.			

[12] The EEAA was established in 1994 by Law no.4 of the year 1994. It replaced the Agency established in the year 1982, in all its rights and obligations. In accordance with the provisions of the Law no.4 of the year 1994, EEAA has among its mandates the formulation of the general policy and the laying down of the necessary plans for the protection and promotion of the environment and follow up the implementation of such plans in coordination with the competent administrative authorities.

[13] Which plays a supervisory role for steering climate change activities and integrating climate change into national development planning and is headed by the prime minister.

[14] The research topics of this department cover mainly Coastal Processes (Current and Wave Measurements along the Egyptian coastline, Sediment Transport and Erosion) and environmental Modelling (Numerical Modelling of the Eastern Mediterranean Sea, Dispersion Models of Major Pollutants, Pollutants, Biogeochemical Modelling).

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
Lebanon	<u>Length of the coast:</u> 225 km <u>Type of the coast:</u> The Lebanese Mediterranean coastline is quite varied, with gulfs, promontories and islands, all of small size.	Barcelona Convention	none	Environmental Resources Monitoring in Lebanon (ERML) but no more active. The National Centre for Marine Sciences (NCMS)[15]	Socio-economic, environmental, climate change,	National,	none
			CNRS was created by Law of 14/09/1962 and extension with law No.576 of 11 February 2004 CNRS component established in 1996. The Environmental Law (Law 444/2002) constitutes the most important framework of environmental legislation in Lebanon. It defines the principles of environmental action and the broad outlines of the provisions concerning the preservation of	National Centre for Remote Sensing (NCRS)	Environmental products derived from remote sensing and GIS	National	CNRS reports to Prime Minister

[15] is part of the National Council for Scientific Research in Lebanon. It was established in 1977 following the Stockholm Conference of 1972. Its mandate is to maintain a permanent watch on the country's coastal zone and marine environment, notably through a national observation network. This concerns the monitoring of water and sediment quality as well as the study of species and habitats. The CNSM has laboratories in Jounieh and Batroun as well as a research vessel (CANA-CNRS) acquired in the framework of bilateral cooperation with Italy. This vessel is equipped for sampling in the water column and in the sediment and also for carrying out surveys (diving, ROV, multibeam, dual beam, side scan sonar, sediment sounder). The Centre has just acquired (2016) a new boat (CADMOS-CNRS, Catamaran, twin-engine 7 m).
In terms of human resources, the Centre's permanent staff consists of 9 scientists and 3 administrative staff. This staff is supported by contract researchers and PhD students. The scientific disciplines covered include oceanography and coastal hydrodynamics.

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
			the various environments Decree 8633 of 16/08/2012 on Environmental Impact Studies[16].				
			CNRS component established in 1977	National Centre for Marine Sciences (CNSM)	Environmental (water and sediment quality, species, and habitats)	National	CNRS reports to Prime Minister
Libya	Length of the coast:1770 km Type of the coast: The coasts are generally low and sandy	Barcelona Convention	Established in 1972	General Authority for Water Resources (GAWR)	Water resources	national	Environmental General Authority of Libya (EGA):
			Decree no. 159/2007	General Authority for Marine Wealth (GAMW)	fisheries	national	Ministry of Agriculture, Animal and Marine Wealth
			Law no. 1582/1981	Marine Biology Research Centre (MBRC)	marine organisms, habitats, and resources	national	Ministry of Agriculture, Animal and Marine Wealth
			Cabinet Resolution No. (138) in 2012	National Centre of Statistics	Socio-economic but also some environmental: water resources and water quality, biodiversity and waste	national	/
Montenegro	Length of the coast: 199 km Type of the coast: The coast is very indented, with numerous bays.	Barcelona Convention	none				

[16] This decree does not include in its main text provisions explicitly related to environmental monitoring, but in its annex 7, it is requested that the environmental monitoring programme as well as the evaluation of its cost must be included in the impact study of any project subject to this procedure.

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
Morocco	Length of the coast: 3 500 km coastline, shared on the Atlantic and Mediterranean (540 km Mediterranean, 2 960 km Atlantic) Type of the coast: 2130 kilometres of cliffs,- 957 kilometres of beaches,- 255 kilometres of lagoons and- 68 kilometres of mouths	Barcelona Convention	Law n° 11-03 of 12 May 2003 relating to the protection and enhancement of the environment Law n°12-03 of 12 May 2003 relating to environmental impact studies Law 81-12 relating to the littoral	National Observatory of Environment and Sustainable Development (ONEDD)[17], Regional Observatories for the Environment and Sustainable Development (OREDD) The main mission of the National Observatory of Environment and Sustainable Development (ONEDD)[18] is environmental monitoring (collection, processing, data exchange, dissemination of information and data analyses). The ONEM has set up regional observatories.	Socio-economic, environmental, climate, full domains	National, subnational, local	Minister for Energy Transition and Sustainable Development (in charge of environment) The regional (coastal) branches of the ONEDD are an ideal framework to ensure the observation of the marine and coastal components. More connection with the specialized university laboratories would make it possible to significantly optimize the system already in place.
Tunisia	Length of the coast: 1148 km Type of the coast:		- Law No. 95-72 of 24 July 1995 creating an agency for the protection and	Tunisian Observatory[19] of the Environment and Sustainable	Socio-economic, environmental, climate, full domains, coastal governance	National, subnational, local	Lack of resources and human resources. In addition, the lack of certain technical

[17] Several other institutional and academic entities are involved in the collection and production of coastal monitoring data. The observation is also shared with many other technical structures and departments of several sectors (high education and scientific research, environment, fisheries, statistics, socio-economic sectors).
[18] Law No. 11-03 of 12 May 2003 on the protection and enhancement of the environment.
[19] Many other actors in the national system of coastal observation (Observatory of the sea and its surveillance networks of the INSTM, INM, CHOMN, CNCT, INS, Urban Observatory of Great Tunis, Observatory of Land, ONAS Industrial Cadastre, Water Quality Monitoring Network, Waste Information System).

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
	Tunisia is gifted with a long and diverse coastline. Facing toward many directions, with rocky coasts and sandy bays, vast shallow water areas, it is adapted to numerous human activities		development of the coastline. - Law n° 95-73 of 24 July 1995, relating to the maritime public domain as modified by law n° 2005-33 of 4 April 2005. - Law n° 88-91 of 2 August 1988, creating the national agency for the protection of the environment as modified by law n° 92-115 of 30 November 1992.	Development (OTEDD) National Institute of Meteorology (INM) National Observatory of New and Emerging Diseases (ONMNE), National Agency for Energy Management (ANME) Designated National Authority (AND) National Agency for Environmental Protection (ANPE)[20] controls and monitors the quality of the environment. The ANPE hosts the Tunisian Observation of the Environment and Sustainable Development (OTEDD), which oversees the development and monitoring of indicators. Coastal Protection and Management Agency (APAL) is responsible for implementing state policy in the field of			profiles limits the APAL and ANPE Agencies to ensure complete spatial coverage or major coastal hotspots. Major components such as outstanding habitats, coastal zone vulnerability, coastal erosion and marine sub-submersion are not routinely and regularly monitored. The weak connection between the two agencies (ANPE and APAL) and university scientific research laboratories does not allow to optimize the data of the observation and the surveillance of the coastal zones in Tunisia.

[20] Law n ° 88-91 of August 02, 1988, and modified by the law n ° 92-115 of November 30, 1992.

Name	Main features[10]	Main environmental obligation of the country[11]	Main national strategic framework	Main information regarding coastal observation system			
			Legal basis of observation	Observatory	Field of observation	Scale of observation	Authority of observation
				coastal protection and management. Among its missions, the establishment of an observatory of coastal ecosystems.			

Annex 2 – Main information on observation and monitoring systems

In the following paragraphs, the main information on observation and monitoring systems is reported with specific reference to the following countries: Albania, Algeria, Bosnia-Herzegovina, Egypt, Lebanon, Morocco, Montenegro, Libya and Tunisia.

However, it is important to stress that the following analysis focuses on the level of internal preparation in each selected country and that not all the countries analysed report periodically and systematically to the competent bodies of the Barcelona Convention. This is not always a technical issue; it is more a question of the willingness of countries to communicate or not on national observation data to the MAP system. This situation has arisen despite the adoption by the countries of all the decisions relating to the IMAP and Good Ecological Status. This issue needs to be addressed at the political level or through an approach that constrains countries to report in accordance with the requirements of the IMAP and the Barcelona Convention.

ALBANIA

The Albanese National Environmental Agency (NEA)[21] is responsible for the preparation of the national environmental monitoring program[22] and for the monitoring of the state of the environment, developing and publishing the annual report on the state of the environment (SoER), to establish and maintain the environmental information system, and to provide environmental information to the public. Twelve Regional Environmental Agencies (REAs) are part of the NEA structure.

The collection of environmental data is carried out by various institutions led by the Ministry in charge of environment. The data collected includes qualitative and quantitative parameters for air, water, soil, flora, fauna and noise.

The 12 regional agencies have a fundamental role in operationalizing Albania's national coastal zone observation system. The reinforcement in financial means and in adapted human resources made it possible to appreciably improve the spatial coverage but especially thematic (in connection with the 11 EcAp ecological objectives and the IMAP indicators).

Nevertheless, hydrographic, and coastal indicators are not identified as a priority in national reporting.

ALGERIA

The legal framework of coastal and marine monitoring in the country has been strengthened, but still needs to be applied. There is little inter-institutional cooperation in terms of data exchange within the field. As for the issue of data management and the implementation of coastal monitoring systems, the need to strengthen the coordination and participation of parties, especially local communities, and NGOs, is often underlined.

The exchange of data takes place within the framework of agreements, but there is no common platform for data management (MEER, PAP/RAC, 2018). Regarding the monitoring of the state of coastal waters, the assessment suffers from a lack of a standardised methodology used at the national level by the National Observatory for the Environment and Sustainable Development (ONEDD)[23] and its partners. While ONEDD is the main institution responsible for the control of the quality of bathing water, other structures which remain ad hoc and limited in space, carry out studies on this subject.

[21] The National Environment Agency (Albanian: Agjencia Kombëtare e Mjedisit (AKM)) is a government agency in Albania under the supervision of the Ministry of Tourism and Environment. Before 2014 the agency was known as The Environment and Forestry Agency. AKM is dedicated to improving, conserving, and promoting the country's environment and striving for environmentally sustainable development with sound, efficient resource (www.akm.gov.al)

[22] Environmental control through environmental inspection (chief inspector, inspectors in ministries and district inspection units (12 MRAs, and 40 environmental specialists and inspectors).

[23] The National Observatory of the Environment and Sustainable Development (ONEDD) is an element of the system implemented by the Algerian State to assess environmental policy as part of the National Environmental Strategy (NES) and the National Action Plan for the Environment and Sustainable Development (PNAEDD).

Beyond the global environmental reporting ensured by ONEDD, the Commissariat National du Littoral (CNL)[24] has been also developing collaborative technical activities such as scientific monitoring and follow-up of the management of sites, particularly those with high heritage value. The CNL is the leading monitoring institution for the evolution of coastal ecosystems. Its missions are to preserve and enhance the coastline, coastal areas and their ecosystems; implement coastal and coastal zone protection measures; as well as promote public awareness and information programmes on the conservation and sustainable use of coastal areas and their biological diversity.

The new national strategy for coastal zones (SNGIZC)[25] will reinforce the role of ONEDD to federate institutional players, in particular CNL, taking advantage of its settlement in all the coastal regions (wilayas). The ICZM National Strategy gives a strategic orientation to link scientific providers of coast and hydrography data with technical and governance bodies (development of national observation, monitoring, and integrated assessment system for coastal zones).

Currently, coastal zones and IMAP indicators are mainly monitored by scientific bodies, mostly by the national school of marine sciences and coastal planning (ENSSMAL), marine departments of the universities of Oran, USTHB (Algiers), Annaba and Mostaganem and national centre of fisheries and aquaculture which is depending from the ministry in charge of fisheries. These maritime and coastal observation and monitoring research bodies are not organized/ coordinated and do not perform like a national network.

BOSNIA-HERZEGOVINA

Bosnia and Herzegovina's coastline is 24.5 kilometers long and the national sea area has 17.7 km^2. Therefore, monitoring activities regarding coastal and marine environments and activities are limited. In the general field of environmental monitoring, there is no operational database with state-level environmental information. There is no sharing of statistical data relating to biodiversity. The main sources of data on biodiversity come from studies and publications prepared by various institutions or are the result of evaluations carried out within the framework of various projects financed by external donors. Information is generally not accessible to the general public: primary data is dispersed in various private and public databases and stored on local computers, in different formats.

As there is no uniform information system for environmental monitoring at the level of BiH, in some segments the data needed to be obtained by analysis and application of assumptions and assessments. Ensuring availability and quality of data necessary for systematic monitoring of the state of the coastal environment depends on establishing a comprehensive monitoring system.

Efforts are underway for the development and expansion of spatial monitoring and planning to improve understanding of flood plains, and more detailed hydrography risk mapping. Additionally, monitoring and surveillance systems need to be improved to provide information on the associations between critical hazards, climate, and coastal zones. Regarding research gap, strengthen capacity in meteorological and climatological skills for improved monitoring and predictive capabilities; this includes the installation of more weather stations, climate bases and early notification systems.

EGYPT

This diversity of resources and environmental characteristics of each of the Mediterranean Sea, the Red Sea and the different environmental conditions and characteristics of each of them, and the coastal region suffering from severe and increasing pressure are from the challenges facing integrated coastal management.

By issuing Law No. (4) of 1994 for the protection of environment, amended by Law No. (9) of 2009 and its executive regulations No. 1095 of 2011, the Ministry of the Environment – Egyptian Environmental Affairs Agency engaged in developing a national strategy for integrated coastal management, through a comprehensive review of coastal management systems, making use of projects implemented in the field of integrated coastal management, this strategy included the analysis of the current situation and setting priorities and drawing a road map and setting criteria for measuring the implementation of the strategy[26].

[24] The main mission of the CNL is to implement the national strategy for the protection, preservation and enhancement of the coastline and coastal areas, including: Preserve and enhance the coastline, coastal areas and their ecosystems; Implementing measures to protect the coastline and coastal areas; Provide local authorities with any assistance relating to its fields of intervention; Maintain, restore and rehabilitate remarkable land and marine areas or areas necessary to maintain natural balances with a view to their conservation; To promote public awareness and information programmes on the conservation and sustainable use of coastal areas and their biological diversity (http://commissariatlittoral.dz/)

[25] https://andp.unescwa.org/sites/default/files/2021-10/Strat%C3%A9gie-nationale-de-gestion-int%C3%A9gr%C3%A9e-des-zones-c%C3%B4ti%C3%A8res.pdf

[26] https://www.eeaa.gov.eg/en-us/topics/management/iczm.aspx

The national strategy for integrated coastal management is based on three main axes: (i) strengthening the integrated coastal management policy, (ii) the sustainable planning for coastal resources uses and (iii) raising and promoting awareness among stakeholders. This strategy is a key frame for the national reporting on coastal zones.

Established in 1972, the Coastal Research Institute (CoRI) is one of the twelve institutes of the National Water Research Center (NWRC)[27]. CORI could be a leader actor at national level for the purpose of the study for observation as it is in particular involved in research and investigation activities to protect and to develop the coastal zones of Egypt through the objectives: (i) Monitoring the evolution of the Mediterranean coast in order to determine the near shore zone changes of the Nile delta and its neighborhood and (ii) Collecting and analyzing dynamical, coastal and marine data for the determination of the erosion and accretion pattern and their driving forces (ii) Providing expert advice to the Egyptian Government on problems associated with coastal instability, (iv) Integrated coastal zone management studies considering current and future changes.

LEBANON

Most of the activities in Lebanon have mainly and always been driven within projects funded by foreign donors (i.e.. State, UNEP). It was in particular the case during the process of designing IMAP Lebanon with EcAP-MEDII. It is difficult to identify sustainable organisations which could fully ensure the State commitments in matters of reporting. To illustrate, the Environmental Resources Monitoring in Lebanon (ERML) was alive until 2013 for the implementation of an environmental monitoring project in Lebanon.

At the moment, the key data providers for the interest of the study are the National Centre for Marine Science (NCSM)[28] for marine environment and the National Centre for Remote Sensing (NCRS)[29] for monitoring of land use and coastal degradation. Lebanon decided its adhesion to the ICZM protocol on 01 August 2017. It could be an enabler to develop coastal zone monitoring if national funding can be found and sustainable.

MOROCCO

The Moroccan coastal monitoring is under several administrations and institutions responsibilities. However, none of them has the tools and skills, on its own, to carry out a monitoring as comprehensive and complete as suggested in the indicator ''Location and extent of habitats directly impacted by hydrographic alterations'', which requires physical, chemical, geochemical, biological, ecological, etc.

The Law N° 11-03 (12 May 2003) on the protection and enhancement of the environment established in its article 57 the decision that the administration sets up a national observatory for the environment and regional networks for observation, control and continuous monitoring with a regional network for observation of good ecological status. The only department that can take responsibility for the implementation of this monitoring programme is the Department of Sustainable Development[30], which is the Focal Point of the Barcelona Convention and it is, in fact, the only department that can take responsibility for the implementation of this monitoring programme. Organized with national and regional observatories on the environment, its main task is to coordinate the government's environmental policy at the national level and to governmental policy on the environment and sustainable development. It is a department that can coordinate monitoring and gathering the information which are produced by:

- the Royal Centre for Remote Sensing (CRTS)[31] in processing of satellite imagery data, including numerous programmes for mapping coastal areas mapping programmes of coastal areas. The CRTS has a large portfolio of satellite and aerial images to be capitalised on for monitoring.
- the hydrographic service of the Royal Navy, which also has the experience to help in improving surveillance and monitoring of the marine and coastal environment, in particular the bathymetry.
- the Department of Equipment (Ministry)[32], which is responsible for managing the public maritime domain and which, in collaboration with the Department of Sustainable Development, carries out certain monitoring activities.

[27] https://www.nwrc.gov.eg/

[28] The National Center for Marine Sciences-CNRSL was established in 1977. The center is a recognized institute within the Mediterranean network of marine centers and is integrated in several regional and international activities (http://www.cnrs.edu.lb/site/SubPage.aspx?pageid=109)

[29] Established in 1995, the Remote Sensing Center (RSC) results from the wish and will to concentrate efforts and establish a leading agency on most recent insights in remote Sensing and GIS technology. Conceived as support for decision making, the RSC has proven its role as a revolving platform among various ministries. (http://www.cnrs.edu.lb/site/SubPage.aspx?pageid=111)

[30] https://www.environnement.gov.ma/fr/

[31] https://www.crts.gov.ma/Royal%20Centre%20for%20Remote%20Sensing

[32] http://www.equipement.gov.ma/en/Pages/home.aspx

These institutions can greatly contribute to highlighting the impact of hydrographic alterations and artificialization on marine and coastal ecosystems, fauna or flora.

MONTENEGRO

The Environmental Protection Agency (EPA)[33] is the government authority responsible for environmental monitoring and reporting on the state of the environment in Montenegro. Operational since 2009, it is also in charge of the implementation of strategies, programmes and laws related to the environment, and the implementation of international treaties that fall within its competence. Its monitoring programme of the state of the coastal marine ecosystem is implemented in order to assess the state of marine biodiversity and the quality of seawater, based on the analysis of biological and chemical indicators of pollution.

Coastal length is observed on the basis of the analysis of selected indicators for monitoring and assessing the sustainability of spatial development of the coastal area of Montenegro since 2013.

The Environmental Information System was developed in the framework of the IPA programme of the European Union[34] for Montenegro, in support of the Agency for the Protection of the Environment. It gathers data on biodiversity, waste, soil, agriculture, fishing, energy, traffic, and tourism. There is a need for further development and upgrade of this system to ensure gathering of data and reporting to the EEA and other international systems. The existing system of monitoring state and environment trends, urban development, and economic effects of maritime should be improved by ensuring monitoring processes in coastal zone, especially at the level of settlements and municipalities, using simple indicators and GIS technologies. It is important to create functional spatial databases which would generate new knowledge about coastal processes.

LIBYA

Libya does not have its proper Environment Impact Assessments yet (EIA, as required by law 15–2003). Its legal framework on conservation issues is inadequate. It also lacks a comprehensive national study on the status of biodiversity (there is still no list of protected species or habitats, nor any updates of the regulations on hunting and fishing activities).

The main authority responsible for the environment is the Environment General Authority (EGA), which was established in 1998 following issuance of the General People Committee Decision No. replaced the “Technical Centre for Protection of the Environment that was established 263, to 1984”. EGA is responsible for Libya National Monitoring Program for the Mediterranean Sea, which is carried out mainly by the Libya Marine Research Center, EGA, National Agency for Scientific Research and National Universities.

To support this implementation Libya is supported by an EU funded IMAP-MPA project[35] which was launched in 2020. It was decided to establish a National IMAP Steering Committee under the aegis of the Environmental General Authority, covering the three following clusters: (i) Pollution and marine litter, (ii) Biodiversity and fisheries, and (iii) Coast and hydrography. The mission of this National Steering Committee is to coordinate and follow-up all the IMAP activities in Libya.

For the study, the data provider should be the Environment General Authority regarding its central position in environmental assessment and reporting, in particular the decided priorities for IMAP-MAP project among which are coast and hydrography. It is also important to keep in mind that the EU funded IMAP MPA project[36] will be focused the monitoring on two pilot areas: the Farwa Lagoon MPA and the urbanized coastal area of Tripoli. Therefore, the availability of data and associated indicators will be only available for each site if developed.

TUNISIA

Tunisia has been developing various networks and systems for monitoring the environment, such as the bathing water monitoring system, the air quality monitoring network, and a variety of information systems on coastal ecosystems. The coastal erosion is observed and monitored but with a non-periodic frequency.

[33] https://epa.org.me/
[34] The Instrument for Pre-accession Assistance (IPA) is the means by which the EU supports reforms in the 'enlargement countries' with financial and technical help. The IPA funds build up the capacities of the countries throughout the accession process, resulting in progressive, positive developments in the region.
[35] https://rac-spa.org/node/1962
[36] IMAP national clusters of Pollution, Biodiversity and Hydrography (Environmental General Authority (EGA) of Libya).

Created in 1995, the Coastal Observatory of the Coastal Protection and Development Agency (APAL) is under the supervision of the Ministry in charge of the environment. The APAL Coastal Observatory has assembled an important collection of data on various natural aspects of the Tunisian coast. Data is organised through thematic geographic information systems.

Tunisia has designed its national monitoring programme for the state of the marine and coastal environment in the framework of IMAP, covering biodiversity, pollution, and hydrography. The development of the national IMAP integrated monitoring program for Tunisia has been based on the implementation of the three common indicators relating to hydrography (EO7) and coasts (EO8) for monitoring the state of the marine and coastal environment in an approach identifying and assessing the risk and the degree of threat to ecosystems from an alert and decision-making perspective.

The 2 following tables referred to the above analysis of the beneficiary countries and deal with the degree of readiness related to IMAP requirements (Table 4) and the degree of readiness related to coastal observatory and list of conditions/actions required to be ready to set/implement a coastal observation system (Table 5).

Table 4. Degree of readiness related to Coastal zones observation requirements

Legend:

Fully aligned with standards | Not far away from standards | Partially aligned

System to be organized | Very far away from standards | System non-existent

Eligible countries	Readiness	Status
Albania	Not aligned to Barcelona Convention standards, validation system to be designed, observation platform to be established, need to enlarge area of observation to coastal zones hotspots, to establish reporting system including periodic report capacities	
Algeria	Partially aligned to Barcelona Convention standards, validation system to be adjusted, observation platform to be established, need to enlarge area of observation to coastal zones hotspots, to formalize and organize reporting system in order to produce periodic report	
Bosnia-Herzegovina	Partially aligned to Barcelona Convention standards, validation system to be adjusted, observation platform to be established, need to enlarge area of observation to coastal zones hotspots, to formalize reporting system in order to produce periodic report	
Egypt	Partially aligned to Barcelona Convention standards, validation system to be adjusted, observation platform to be established, need to formalize reporting system in order to produce periodic report	
Lebanon	Far from the standards, validation system to be designed, observation platform to be established, need to enlarge area of observation to coastal zones hotspots, to establish reporting system including periodic report capacities.	
Morocco	Partially aligned to Barcelona Convention standards, validation system to be adjusted, observation platform to be established, to enlarge area of observation to coastal zones hotspots in order to produce periodic report	
Montenegro	Partially aligned to Barcelona Convention standards, validation system to be adjusted, observation platform to be established, need to enlarge area of observation to coastal zones hotspots, formalize reporting system should be able to produce periodic report	
Libya	Not aligned to Barcelona Convention standards, validation system to be designed, observation platform to be established, need to enhance observation of coastal zones indicators, to establish reporting system	
Tunisia	Partially in line with Barcelona Convention standards, validation system to be adjusted, observation platform to be established, to enlarge area of observation to coastal zones hotspots, to formalize and organize reporting system in order to produce periodic report	

Table 5. Degree of readiness related to coastal observatory and list of conditions/actions required to be ready to set/implement a coastal observation system

Legend:

Fully ready to set/implement a coastal observation system

Ready to set/implement a coastal observation system

Partially ready to set/implement a coastal observation system

Not ready to set/implement a coastal observation system

Beneficiary country	Status	Conditions/actions required to be ready to set/implement a coastal zones observatory at national level
Albania		Need to enhance the legal framework, by using research laboratories
Algeria		By using ONEDD and CNL capacities and connecting the technical bodies to research laboratories, with a key role of ENSSMAL
Bosnia Herzegovina		Need to federate national capacities before, need for standardization and enlarging the scale of observation
Egypt		With a key role for CORI
Lebanon		Lack of sustainable structure
Libya		Even if EGA is in place and can play a key role
Montenegro		With an improvement of EPA
Morocco		With a key role of ONEDD
Tunisia		With a key role of APAL

Annex 3. Algerian case analysis

Globally, the analysis of the Algerian context in terms of the readiness and preparation of the legal, institutional, and technical framework to ensure the observation and reporting of the proposed set of indicators related to the general integrated monitoring and assessment of the coastline and hydrography shows that it is possible in the current context to proceed with a gradual approach to ensure this monitoring in an appropriate manner. Indeed, even if this framework is not fully organised to carry out monitoring and assessment that covers the whole of the country's coastal zone periodically and over the necessary timeframe, the fact remains that the necessary foundations have already been laid and monitoring is already being carried out in the field.

The monitoring data is not automatically centralised and therefore the data are not necessarily used by all the key institutions, municipalities and other directly interested private operators for their sectoral and land planning or in local development and investment plans and in particular to take measures to mitigate coastal risks linked to hydrography. This centralisation and sharing of data can also be used to make the best adaptation choices in the most or highly vulnerable areas (e.g., areas of erosion, marine submersion and expected sea level rise).

The Algerian case shows clearly that it is possible to observe and monitor the proposed coastline and hydrography indicators, and that this can be done gradually until all the IMAP requirements are met. However, this process requires support, particularly with regards to the governance of these indicators.

More generally for the Algerian case and with regards to the communication of observation data, and in order to implement the Barcelona Convention IMAP decisions and related other decisions adopted by the Conferences of the Parties, we recommend establishing a procedure based on exchange agreements between the country and the MAP. This agreement should clearly define the responsibilities of both parties regarding the sharing, use and display of data.

Indicators	Readiness of legal framework	Readiness of strategic framework	Readiness of institutional framework	Readiness of technical framework	Relevance of financial tools	Current status of implementation of the indicator	Global readiness
Measurement of size and density of the population living in the coastal zone	Existence of relevant legal framework (coastal law[37], land planning law)	Existence of national ICZM strategy 2030, coastal plans (national, sub national, local, and coastal master plan[38]), Adopted national IMAP[39] Adopted national dashboard (statistics system) Local land planning plans	By decade (1977, 1988, 1998, 2008, 2022) through population and housing censuses (national statistics Office), demographic statistics national, subnational, and local). Updated through projections in modeling	Coastal environmental GIS and national database and information system	Public budget	Fully monitored at different spatial levels National, sub national, and local) Measured by decade and projections on demand considering population growth rate	
Percentage of industrial lands on the coastal zones	Existence of relevant legal framework (investment law, national planning law, coastal law[40])	ICZM strategy 2030 Industrial master plan, including coastal industrial zones,	National statistics office (ONS) National and local commission for classified industrial establishments	Coastal GIS hosted by CNL	Public and private finance Dedicated specific fund	Partially monitored by the industrial sectoral body Occasionally monitored by wilayas and ministry of environment	
Area converted from the non-converted to developed land use	National planning law	National and local land planning plans	National spatial agency CNL, National Strategy and Action Plan for Biodiversity (SPANB 2030)	Coastal GIS Through satellites, using remote sensing	Public finance	Feasible, monitored on demand	

[37] Law No. 02-02 of 5 February 2002 on the protection and development of the coastline
[38] Has not been designed yet (SDAL)
[39] Adopted on 2020
[40] Article 15

Indicators	Readiness of legal framework	Readiness of strategic framework	Readiness of institutional framework	Readiness of technical framework	Relevance of financial tools	Current status of implementation of the indicator	Global readiness
Percentage of built-up land by distance from the coastline	Coastal law (articles 12 and 14) Planning law Urbanization law	Coastal planning plan (PAC) Climate change plan (PNC) ICZM national strategy IMAP hydrography and coast	National coastal agency (CNL) and its decentralized entities Universities and dedicated academic entities (ENSSMAL)	Coastal GIS Coastal Wilayas' reliable information systems Academic databases (ENSSMAL) Through satellites, using remote sensing	Public and private finance Dedicated specific fund	Monitored, with a focus on heavily urbanized areas (Algiers, Oran, Annaba) or in emergent coastal wilayas (Skikda, Bejaia, Tipaza, Mostaganem)	
Proportion of the coastline affected by coastal erosion Percentage of the length of the coastline urbanized	Coastal law[41] Environmental law (article 62)	Coastal planning plan (PAC) Climate change plan (PNC) ICZM national strategy Expected local climate plan (PLC) and national adaptation climate plan (PNAC)	National coastal agency (CNL) National Agency of major hazards (risks) DMRM (under ministry in charge of municipalities and land planning)	University laboratories (ENSSMAL, Oran)	Sectoral budget (environment, local collectivities)	Focus on vulnerable and sensitive areas (Algiers, Bejaia, Jijel, Mostaganem, etc.)	
Level of permanent occupation of the sea for maritime activities	Maritime public domain legal framework To be supported by expected MSP Plans and legal framework	Sectoral strategies (fisheries, aquaculture, energy, ports, mining, ICZM National Strategy 2030, Blue economy	Sectoral bodies and dedicated entities	Sectoral development and planning tools (fisheries and aquaculture, maritime transport, MPAs, Offshore mining,	Public and private budget	Covered through academic research laboratories	

[41] The parts of the coastal zones where the soil and the coastal line are fragile or threatened by erosion are classified as critical zones. Therefore, access to these areas may be prohibited, and actions shall be undertaken to ensure their stabilization.

Indicators	Readiness of legal framework	Readiness of strategic framework	Readiness of institutional framework	Readiness of technical framework	Relevance of financial tools	Current status of implementation of the indicator	Global readiness
		national strategy 2030 etc.)		maritime and coastal tourism, maritime extensions of land planning tools			
Proportion of agricultural land farmed intensively	Agriculture law Forest law, Coastal law, Biologic resources law	Sectoral strategies (agriculture, forest, ICZM, tourism, land planning, etc.)	Sectoral bodies	Agriculture GIS, Agriculture statistics system	Public and private budgets	Feasible	
Volume of traffic on the motorways and major roads	Coastal law (art. 16)	Land planning instruments, National master plan of roads and railways	National roads and highways agency	National roads statistics	Public budget	Fully monitored	
Number of berths, mooring, and dry-stack storage capacity for recreational boating	Non-relevant	Blue economy national strategy 2030, National scheme master of ports	Not identified	To be developed	Public budget	Unknown monitoring	
Percentage of environmental taxes collected (innovative)	Environmental law Different finance law since 1998	Governmental directives Classified enterprises committees (national and sub national)	Wastes, water, hydrocarbons, etc.)	Emerging thematic of research	National public and private contribution Existing international financial support (European)	Recovery of taxes is partial (depends on the wilayas and the readiness of the National environmental and sustainable development observatory system)	
Existence of a dedicated governance structure for ICZM and	Coastal law currently under adaptation process to	ICZM national strategy 2030	Existing monitoring Participatory framework,	Dedicated academic training and skills.	Existing international financial	Implemented at different spatial levels and sectors, catalyzed by coastal law	

Indicators	Readiness of legal framework	Readiness of strategic framework	Readiness of institutional framework	Readiness of technical framework	Relevance of financial tools	Current status of implementation of the indicator	Global readiness
MSP at the national or subnational level	introduce and formalize ICZM, MSP, and coastal vulnerability concepts and tools	National blue economy strategy 2030	inter- ministerial ICZM committee National informal bleu economy committee		support (European)	and diverse international partnerships	
Surface of protected areas in waters under the jurisdiction or on the coast	Protected area law[42] Environment law[43]	National Master plan (under Barcelona convention framework- SPA Protocol)	National coastal agency (CNL) National development biodiversity agency (CNDRB), General directorate of forest (DGF) Ministry of fisheries	Scientific and research framework (laboratories, projects and programs, cooperation and international scientific collaborations, Partial database under establishment)	Existing international financial support (Mediterranean action plan)	Still in process or progress (04 MPAs formally established and 04 other under process)	
Existence of related Plans/frames	Fully relevant	ICZM strategy and plans	CNL	University laboratories ENSSMAL	Public budget	Depends on the type (sectoral) plans (environmental land planning, tourism, aquaculture, etc.)	
Percentage of the marine zone covered by MSP legal tools	Not institutionalized yet	ICZM national strategy 2030 National blue economy strategy 2030	Existing tools are partially covering the MSP (Fisheries, coastal guard, ports, energy and mining, tourism, desalination, etc.)	Not yet prepared Expected to be developed, including through international support (EU Support blue economy programs)	Existing international financial support (European)	Emerging process	

[42] Law No. 11-02 of 17 February 2011 on protected areas in the context of sustainable development
[43] Law No 83-03 of 5 February 1983 on environmental protection

Indicators	Readiness of legal framework	Readiness of strategic framework	Readiness of institutional framework	Readiness of technical framework	Relevance of financial tools	Current status of implementation of the indicator	Global readiness
Number of non-applications of environmental legislation	Environmental law (articles 107 to 112) Coastal law (articles 37 to 44)[44]	Classified enterprises committees (national and sub national) Protected area committees (national and sub national), National Climate Committee, National major risks agency	General inspection of environment (under Ministry of environment)	National Observatory of environment and sustainable development to be enhanced. National mechanism of validating and sharing environmental data, including coast and hydrography indicators to be organized	Dedicated environmental and major risks specific funds	Existing and partially working	
Financing coastal protection and adaptation	Finance law Major risks law (under revision) National Climate Plan (PNC)	National Climate Plan (PNC)	National Major risks agency National climate committee General environmental inspection (under Ministry of environment)	Non-clear framework	Public and private finance	Difficult to assess	

[44] Recording of offenses against the provisions of this law and the texts adopted for its application.