



**LME**  
LEARN

GEF LME:LEARN

# LARGE MARINE ECOSYSTEMS

## STRATEGIC APPROACH TOOLKIT



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GEF LME:LEARN, 2018. Large Marine Ecosystems Strategic Approach Toolkit. Paris, France.

## **ACKNOWLEDGEMENTS**

Special thanks goes to Lucy Scott who developed the toolkit on behalf of the GEF LME:LEARN Large Marine Ecosystem Ecosystem-Based Management Working Group.

Graphic Design: Kevin Turpeau

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# List of Acronyms

|        |  |           |   |
|--------|--|-----------|---|
| ABNJ   | Areas Beyond National Jurisdiction                         | ICM       | Integrated Coastal Management   |
| APFIC  | Asia Pacific Fishery Commission                            | ICAM      | Integrated Coastal Area Management  |
| ASCLME | Agulhas and Somali Current Large Marine Ecosystems Project | ICES      | International Council for the Exploration of the Seas   |
| ATSEA  | Indonesian Seas LME  | ICZM      | Integrated Coastal Zone Management  |
| AU     | African Union  | ICZMC     | Integrated Coastal Zone Management Committee  |
| BCC    | Benguela Current Commission                                | IMC       | Inter Ministerial Committee   |
| BCLME  | Benguela Current Large Marine Ecosystem                    | IMO       | International Maritime Organisation   |
| BoBLME | Bay of Bengal LME  | IOC       | Intergovernmental Oceanographic Commission  |
| CAMP   | Coastal Area Management Programme                          | IOI       | International Ocean Institute   |
| CBD    | Convention on Biological Diversity                         | IUCN      | International Union for Conservation of Nature  |
| CCA    | Causal Chain Analysis                                      | IW        | International Waters  |
| CCLME  | Canary Current LME   | IWCAM     | Integrating Watershed and Coastal Area Management in Caribbean Small Island Developing States (GEF Project) |
| CCRF   | Code of Conduct for Responsible Fisheries                  | IWRM      | Integrated Water Resources Management   |
| CD     | Capacity Development                                       | IW: LEARN | International Waters Learning Exchange and Resource Network   |
| CI     | Conservation International                                 | LBSA      | Land Based Sources and Activities   |
| CLME   | Caribbean LME  | LDC       | Least Developed Country   |
| COI    | Indian Ocean Commission (Commission de l'Océan Indien)     | LED       | Local Economic Development  |
| COMESA | Common Market for Eastern and Southern Africa              | LME       | Large Marine Ecosystem  |
| COP    | Conference of the Parties                                  | LME:Learn | Large Marine Ecosystems Learning Exchange and Resource Network  |
| CRM    | Coastal Resources Management                               | LMMA      | Locally Managed Marine Area   |
| CTI    | Coral Triangle Initiative                                  | MAP       | Mediterranean Action Plan   |
| CTSP   | Coral Triangle Support Partnership                         | MCSD      | Mediterranean Commission on Sustainable Development   |
| DNA    | Deoxyribonucleic acid                                      | MEDA      | National Marine Ecosystem Diagnostic Analysis   |
| EAF    | Ecosystem (Based) Approach to Fisheries                    | MEDLME    | Mediterranean LME   |
| EBD    | UNDP Ecosystems and Biodiversity Programme                 | METAP     | Mediterranean Environmental Technical Assistance Program  |
| EBFM   | Ecosystem Based Fisheries Management                       | MoU       | Memorandum of Understanding   |
| EBM    | Ecosystem based Management                                 | MPA       | Marine Protected Area   |
| EEA    | Experimental Ecosystem Accounts                            | MSP       | Marine Spatial Planning   |
| EEZ    | Exclusive Economic Zone                                    | MSSD      | Mediterranean Strategy for Sustainable Development  |
| EIA    | Environmental Impact Assessment                            | NAP       | National Action Plan  |
| EC     | European Commission  | NC        | Nairobi Convention  |
| EPA    | US Environmental Protection Agency                         | NCAP      | National Caspian Action Plans   |
| ERA    | Ecological Risk Assessment                                 | NDA       | National Diagnostic Analysis  |
| EU     | European Union   | NEPAD     | New Partnership for Africa's Development  |
| FAO    | Food and Agriculture Organization                          | NFP       | National Focal Point  |
| GCLME  | Guinea Current Large Marine Ecosystem                      |           |   |
| GDP    | Gross Domestic Product                                     |           |   |
| GEF    | Global Environment Facility                                |           |   |
| GIS    | Geographic Information System                              |           |   |
| GPA    | Global Programme of Action                                 |           |   |
| HAB    | Harmful Algal Bloom  |           |   |

|          |   |         |  |
|----------|---|---------|--|
| NGO      | Non-governmental organisation   | SEEA    | System of Environmental-Economic Accounting                      |
| NIC      | National Interministerial Committee   | SID     | Small Island Developing State                                    |
| NICZMC   | National ICZM Committee   | SPREP   | South Pacific Regional Environment Programme                     |
| NMFS     | National Marine Fisheries Service   | SST     | Sea Surface Temperature  |
| NPA      | National Plan of Action (including ICZM aspects in most countries)  | STAP    | Science and Technical Advisory Panel of the GEF                  |
| NOAA     | National Oceanic and Atmospheric Administration   | TDA     | Transboundary Diagnostic Analysis                                |
| NOS      | National Ocean Service of NOAA  | TEEB    | The Economics of Ecosystems and Biodiversity                     |
| NSA      | Non-State Actor   | TWAP    | Transboundary Waters Assessment Programme                        |
| NWS      | National Weather Service of NOAA  | UNCLOS  | United Nations Convention on the Law of the Sea                  |
| OAR      | Oceanic and Atmospheric Research of NOAA  | UNDP    | United Nations Development Programme                             |
| OAS      | Organisation of American States   | UNEP    | United Nations Environment Programme                             |
| OBIS     | Ocean Biogeographic Information System  | UNESCO  | United Nations Educational, Scientific and Cultural Organization |
| OHI      | Ocean Health Index  | UNIDO   | United Nations Industrial Development Organization               |
| PA       | Protected Area  | WCMC    | World Conservation Monitoring Centre                             |
| PAP/RAC  | Priority Actions Programme Regional Activity Centre   | WCPFC   | Western and Central Pacific Fisheries Commission                 |
| PCU      | Project Coordination Unit   | WIO     | Western Indian Ocean   |
| PEMSEA   | Partnerships in Environmental Management for the Seas of East Asia  | WIO-LAB | Addressing Land-Based Activities in the West Indian Ocean        |
| PERSGA   | Programme for the Environment of the Red Sea and Gulf of Aden   | WIOMSA  | Western Indian Ocean Marine Science Association                  |
| PES      | Payment for Ecosystem Services  | WIOSAP  | Western Indian Ocean Strategic Action Programme                  |
| PICES    | North Pacific Marine Science Organization   | WRI     | World Resources Institute  |
| PMU      | Project Management Unit   | WWF     | Worldwide Fund for Nature  |
| POP      | Persistent Organic Pollutants   | YSLME   | Yellow Sea LME   |
| ProDoc   | Project Document  |         |  |
| PSSA     | Particularly Sensitive Sea Areas  |         |  |
| PSC      | Project Steering Committee  |         |  |
| RAC      | Regional activity centre  |         |  |
| ReCoMaP  | Regional Programme for the Sustainable Management of the Coastal Zone of the Countries of the Indian Ocean  |         |  |
| REMPEC   | Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea   |         |  |
| RFMO     | Regional Fisheries Management Organisation  |         |  |
| ROPME    | Regional Conference of Plenipotentiaries on the Protection and Development of the Marine Environment and the Coastal Areas (of Bahrain, I.R.Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) |         |  |
| SADC     | Southern African Development Community  |         |  |
| SAP      | Strategic Action Programme  |         |  |
| SAPPHIRE | Strategic Action Programme Policy Harmonisation and Reform  |         |  |
| SCS      | South China Sea   |         |  |
| SDGs     | Sustainable Development Goals   |         |  |
| SEAFDEC  | Southeast Asian Fisheries Development Center  |         |  |



# 1. Introduction

A strategy may be defined as "a plan of action designed to achieve a long-term or overall aim".

➞ <https://en.oxforddictionaries.com/definition/strategy>

Large Marine Ecosystem (LME) Projects are, by definition, "strategic" projects because they cover large territorial areas, involve many stakeholders at different levels and deal with the multiplicity of thematic subjects. Projects that have been executed to date have usually followed the well-established procedural steps starting with the development of a Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP), implementation of SAP through various forms of partnerships and specific priority projects. However, even if all the LME projects have been quite complex in nature, sometimes they have lacked a "strategic" approach that should bring convergence of projects' objectives, activities and results and, ultimately, would deliver a strong message to those benefiting from projects' results, together with complementary management and governance tools to achieve the improved ecosystem health of LMEs.

An integrated, strategic approach to the assessment and management of LMEs was first adopted by the GEF Operational Strategy in 1995, recognizing the need to assist states in collectively managing their transboundary water systems. LMEs represent ecosystem-based management units that are defined ecologically and not politically. The geographical approach to defining management units puts the emphasis on ecosystem functioning. It operationalises an area which is large enough to include Global Environment Facility (GEF) transboundary considerations and assemblages of marine living resources. Within these place-based LMEs, stakeholder support for integrating national and multi-country reforms and international agency programmes can be mobilized in a cost-effective response (Sherman 2005). LMEs are estimated to provide direct services close to \$US 3 trillion annually, with a possible yearly non-market value of between \$US 22 and 25 trillion (Duda 2016, IOC/UNESCO and UNEP 2016).

Approximately 80% of the global fish catch comes from the 64 LMEs, which are also characterised by most of the world's pollution, overexploitation and habitat alteration (UNESCO 2008). The concept of LMEs was included as a means to foster ecosystem-based transboundary management of coastal and marine resources.

The GEF has used the Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP) development approach successfully over the past two decades, to identify and implement improved management and governance processes in International Waters areas.

As of 2014, 112 GEF recipient countries (and 21 non-recipient countries) have collaborated on strategic GEF projects for 22 LMEs in order to catalyse joint commitment to action (Duda 2016). The use of the 5-module ecosystem approach in the TDA/SAP process has promoted the multidisciplinary, multi-sectoral ecosystem approach, and has led to innovative advances in international oceans management (Wang 2004).

The development of the LME approach encouraged a shift from single-species management to ecosystem-based management of coastal and marine ecosystems and their linked river systems as an integrated ecosystem. The link to terrestrial systems and incorporation of land-based inputs into marine and coastal systems was also significant. The shift in emphasis was from: (i) individual species to ecosystems; (ii) small spatial scale to multiple scales; (iii) short-term perspective to long-term perspective; (iv) humans as independent of ecosystems to humans an integral part of ecosystems; (v) management divorced from research to adaptive management driven by best available science; and (vi) managing commodities to sustaining production potential for goods and services (Duda and Sherman 2002, Sherman 2005).

LMEs are impacted by the human influences of overexploitation of fisheries and other resources, coastal habitat damage, watershed runoff (including sediments and pollutants), dumping of waste and the introduction of alien and invasive species. Fisheries yields are also impacted by unsustainable practices, changes in climate and ocean currents, as well as pollution. Mitigating these stresses on ocean systems is necessary to ensure long term sustainability of LMEs and the services they yield (UNESCO 2008).

Despite the best efforts of nation states, coastal and marine systems continue to be degraded in developed and developing countries, even after 20 years of GEF investment, 30 years since UNCLOS was adopted and 40 years since Regional Seas programmes were adopted (Duda 2014). This necessitates further urgent and better coordinated action on the behalf of governments to maintain and restore the ecosystem services that LMEs provide ecologically, socially and economically. An improved use of Integrated Oceans Management tools within a more strategic LME approach must be employed to make the best use of capacities and resources.

The management processes and goals of the LME process with respect to the Sustainable Development Goal 14 (SDG14) objectives have recently been reviewed (UNDP 2017), and while overall conclusions were that the process has evolved good practice after 20 years of trial and improvements, there are still some important areas that need to be strengthened and improved. It is well recognised that good practices from SAPs that have been implemented need to be replicated and scaled up for greater impact in the International Waters (IW) portfolio.

Evolving methods and approaches to management of international waters require a revision and refresh of the traditional LME approach. In addition to the LME projects, several separate Integrated Coastal Management (ICM) and Marine Protected Areas (MPA) projects have been requested of the GEF by countries and approved for implementation (Duda 2016).

Examples of MPA projects that have been approved include:

- CBPF: Demonstration of Estuarine Biodiversity Conservation, Restoration, and Protected Area Networking (China 2010-2017)
- Long-term Financial Mechanism to Enhance Mediterranean MPA Management Effectiveness (Mediterranean 2018 - in progress)
- Hon Mun Marine Protected Area Pilot Project (Vietnam 2000-2005)
- Strengthening Fiji's Network of Locally Managed Marine Areas (LMMAs) to Support Globally Significant Marine Biodiversity (2018 - concept approved)



- Mitigating Key Sector Pressures on Marine and Coastal Biodiversity and Further Strengthening the National System of Marine Protected Areas in Djibouti (2016 - concept approved)
- Managing the Human-Biodiversity Interface in the Southern Marine Protected Areas of Haiti - MHBI (2017 - project approved)
- Caribbean Archipelago Biosphere Reserve: Regional Marine Protected Area System (Caribbean 2000-2005)

Examples of ICM and/or Integrated Coastal Zone Management (ICZM) projects that have been approved include:

- MED: Integration of Climatic Variability and Change into National Strategies to Implement the ICZM Protocol in the Mediterranean (Mediterranean 2012-2015)
- MED: Integrated Coastal Zone Management-Mediterranean Coast (Mediterranean 2012-2017)
- Integrated Coastal Management Project (Georgia 1998-2006)
- Strategic Partnership for the Mediterranean Large Marine Ecosystem-Regional Component: Implementation of Agreed Actions for the Protection of the Environmental Resources of the Mediterranean Sea and Its Coastal Areas (Mediterranean 2008-2015)
- (Mediterranean 2008-2015)

The need for the revision of the LME approach has become evident, both in the need for the strengthening of the 5-module ecosystem approach, but also to strengthen the overall TDA/SAP/National Action Plan (NAP) process and incorporate complementary ecosystem management instruments that will assist to strengthen the overall assessments and management of LMEs. Approaches such as Ecosystem Based Management, the Ecosystem Approach to Fisheries, the use of fisheries refugia as management tools, the integration of climate change concerns in long term planning, and the mainstreaming of biodiversity concerns into marine and coastal management are all complementary to the LME approach. While the scales of intervention vary, and regional needs will be different, it is important for these tools to be incorporated into the LME framework where appropriate.

## 1.1 The LME Strategic Approach Toolkit in the context of GEF LME:LEARN

LME: Learn is a GEF-UNDP-IOC/UNESCO project designed to improve global ecosystem-based governance of LMEs and their coasts by generating knowledge, building capacity, harnessing public and private partners and supporting south-to-south learning and north-to-south learning. A key element of this improved governance is mainstreaming cooperation between LME, MPA, and ICM projects in overlapping areas, both for GEF projects and for non-GEF projects. This full-scale project plans to achieve a multiplier effect using demonstrations of learning tools and toolboxes, to aid practitioners and other key stakeholders, in conducting and learning from GEF projects.

Component 2 of the Project aims to synthesise and incorporate knowledge into policy-making, capture of best LME governance practices, and development of new methods and tools to enhance the management effectiveness of LMEs and to incorporate ICM, MPAs and climate variability and change including the 5 LME modules.

## 1.2 Relationship between toolkits

The seven toolkits developed by LME: Learn are the following:

- **>> Environmental Economics toolkit**

This online toolkit will be covering the following issues: design of environmental policies: strategies (standards, taxes, incentives and subsidies); cost/effect analysis; cost/benefit analysis; risk analysis; economic impact assessment; environmental impact assessment; environmental economics accounting; valuation of ecosystem services; and climate change economics.

- **>> The LME assessment toolkit (scorecard)**

A standardized set of questions is being developed, which will provide a rapid, practical snapshot of the strengths and weaknesses of management across large-scale marine management areas such as LMEs. The tool will assess the basic elements of a functional large-scale management program, within the initial planning process and in subsequent years. Questions cover a wide range of management topics, such as social and political support, ecosystem-based management, and governance structure, plus observational socioeconomic and ecological outcomes within focal regions. (🔗 [www.iwlearn.net/marine](http://www.iwlearn.net/marine))

- **>> The GEF LME Project toolkit**

The LME project toolkit (that includes project sustainability) aims to utilize the accumulated knowledge into creating a practical approach to the preparation of future LME projects. The toolkit will be of use for the preparation of complementary ICM, MPA, MSP and coastal adaptation projects. (🔗 [www.iwlearn.net/marine](http://www.iwlearn.net/marine))

- **>> Marine Spatial Planning toolkit**

This toolkit will provide an overview and practical tools to support MSP in LMEs, and focus particularly on MSP across management boundaries.

- **>> Governance toolkit**

The governance toolkit will provide an overview of management and assessment options for governance in LMEs.

- **>> Stakeholder participation toolkit**

This toolkit aims to organize and share approaches that can be effectively applied across a range of disciplines and for a wide array of purposes. It will be focused on multiple audiences, acting at multiple scales, from stakeholders acting at the smallest relevant unit of decision-making, including the community or local level, to stakeholders influencing national or subnational decision making. Topics may include conflict resolution and negotiation, community participation, stakeholder engagement, and the impacts of climate change on social aspects of environmental policy (🔗 [www.iwlearn.net/marine](http://www.iwlearn.net/marine)).

- >> LME strategic approach toolkit

The main objective of the activity: Developing a LME Strategic Approach Toolkit (Component 2.1.3), is to utilize the accumulated knowledge to create a strategic approach for future LME projects that will assist decision makers, project developers and managers in implementing new projects in new LMEs, as well as improving the management of old ones, both within and outside of the aegis of GEF. The toolkit re-evaluates and strengthens the ecosystem-based, 5-module approach for assessment and management of LMEs. (GEF LME:LEARN ProDoc).

The sister project, GEF UNDP IW:LEARN has funded two other projects that support the entire IW Portfolio of projects (surface freshwater, groundwater and Large Marine Ecosystems):

- An analysis of existing Strategic Action Programs, highlighting good practices with regard to the SAPs that have been mainstreamed at the local, national and regional levels. The activity will consider follow-up of provisions in existing SAPs and NAPs (what elements have been implemented effectively, and what have not).
- An update to the GEF TDA/SAP Manual to provide recommendations for improvement in incorporating and mainstreaming cross-sectoral, participatory, integrated, ecosystem-based approaches.

## 1.3 LME Strategic Approach Toolkit: purpose, audience, and users

The toolkit is intended to create a legacy impact for the GEF International Waters LME Portfolio as well as other international partners, maximizing the effectiveness of the GEF IW investments and increasing the use of ecosystem-based management approaches in marine and coastal environments around the world.

The toolkit for the LME Strategic Approach has been developed for LME practitioners, large-scale marine and coastal management project specialists, LME technical advisors and others developing GEF or non-GEF national or multinational marine and coastal projects. It provides a practical approach for the development planning of large scale projects in LMEs.

The purpose of the toolkit is to describe the strategic approach to designing an LME project, incorporating an updated 5-module ecosystem approach, and the TDA/SAP process, as well as complementary tools such as ICM, MSP, the Ecosystem Based Approach to Fisheries across multiple scales, the development of MPA networks and fisheries refugia as well as climate change concerns.

The toolkit has been developed based on lessons learned from many LME regions and projects, and provides practical strategies and concrete examples of best practices and recent recommendations on how to strengthen and expand the LME Approach to incorporate new tools, and contribute towards sustaining ecosystem processes in the long term.

This report is divided into five chapters and two annexes.

- **Chapter One**, the introduction, explains the relevance and the purpose of the LME Strategic Approach Toolkit.
- **Chapter Two** reviews the traditional 5-module approach and looks at recommendations for strengthening the approach, particularly the socio-economic and governance elements.
- **Chapter Three** reviews the strategic importance of TDAs, SAPs and NAPs, and recommendations for areas where they can be strengthened.
- **Chapter Four** addresses good practice in SAP and NAP implementation
- **Chapter Five** reviews best practice in the use of ICM, MPAs, MSP and Fisheries refugia, and recommendations for their inclusion into the strategic approach
- **Chapter Six** presents the revised 5-module approach



## 2. The ecosystem-based 5-module approach and recommendations for strengthening the approach

The ecosystem-based five-module approach to management and assessment of LMEs was described by Sherman (2005), and has proved to be a useful tool to guide the Ecosystem Based Management (EBM) approach for many LME Projects. As every LME is different, and every LME project or programme is guided by unique goals and objectives, the five modules have been adopted and used to a greater or lesser degree.

Figure 1 depicts the five modules used to support the concept of ecosystem-based management, based on the five pillars of understanding the Fish and Fisheries, Productivity, Pollution & Ecosystem Health, Socio-economics and Governance of a System.

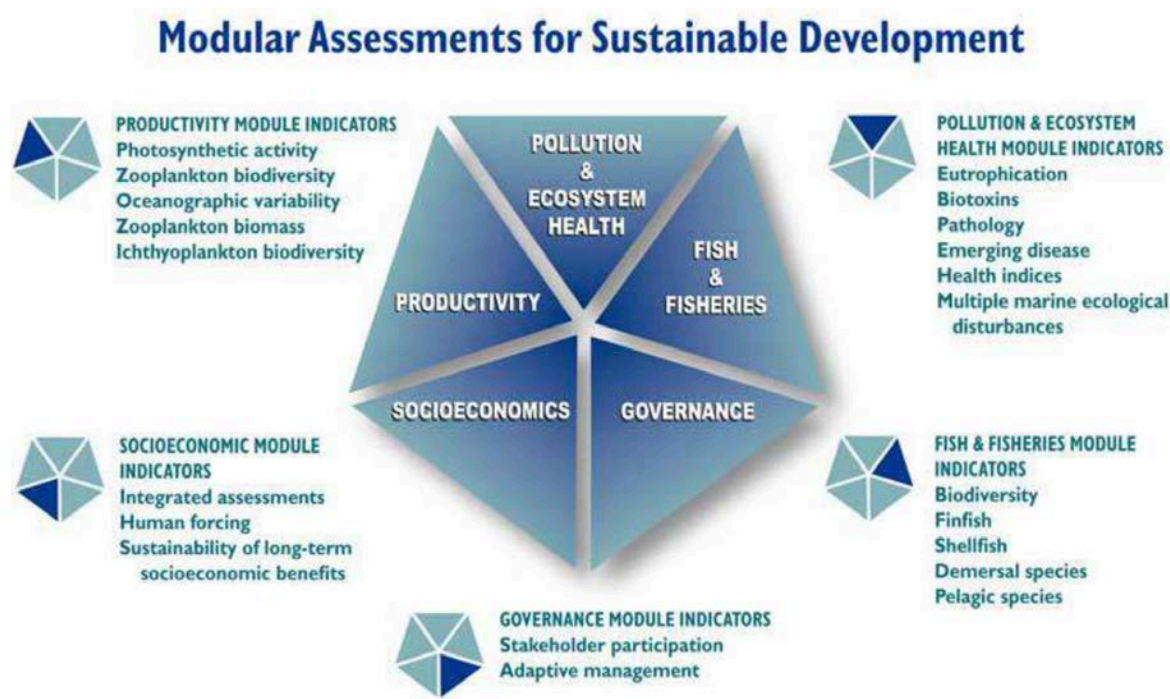


Figure 1. Ecosystem-based 5-module approach (from Sherman 2005)

The development of the approach began with the recognition of the interaction between productivity, fish stocks and fisheries, and the interrelationships between the trophic system. The role of pollution and invasive species was recognised later, and the dimensions of socio-economics and governance even more recently (UNESCO 2008).

The first four modules (Productivity, Fish & Fisheries, Pollution & Ecosystem Health and Socio-Economics) are traditionally intended to frame the Transboundary Diagnostic Analysis Assessments, while the Governance module is central to guiding the reforms and interventions set out in the SAP as needed for sustainable management of the LME. The Productivity, Fish & Fisheries, Pollution & Ecosystem Health modules are concerned with assessing and sustaining or improving the resource base, while the socio-economics module is also concerned with the sustainable utilization and benefits to be derived from good ecosystem-based management practices.

The five modules are clearly closely interrelated, and the inclusion of all modules in the TDA/SAP process integrates the science with socio-economic and governance aspects of the LME approach, but also provides a framework for multiple sectors to facilitate the comprehensive assessment and integrated management of LMEs (Wang 2004). The five modules have been used in the TDA/SAP process in some LMEs but not all. They serve to support the shift to an EBM approach by specifying the components of the ecosystem that need to be addressed. The modules provide categories of measurement and indicators to assist in quantifying the state, or measuring the changing state of ecosystems. The Gulf of Mexico LME and the Humboldt Current LME are good examples of those that did use the 5-module categorization (GEF UNIDO 2011, GEF LME:LEARN 2017).

Limitations have been identified in the governance and socio-economic modules in several reports and reviews, including Duda (2014 and 2016), which point out that the emphasis has traditionally been on the biophysical modules. The governance and socio-economic modules need to be most urgently revised and updated in order to reflect the importance of these components to the whole LME approach.

Concerns around anthropogenically driven environmental changes, including

- climate changes,
- ocean warming
- ocean acidification, and
- sea level changes

leading to

- coral bleaching, and
- coastal erosion and other impacts,

have sometimes not been explicitly included in the 5-module approach. LME practitioners should be aware that these issues are crosscutting and need to be reflected in the assessments of every module.

Many TDAs include environmental change and climate mitigation as issues that have a serious impact on LMEs, but they often fall outside of the scope of GEF International Waters funding and thus of SAPs.

## The Transboundary Waters Assessment Programme (TWAP)

The Transboundary Waters Assessment Programme arose out of a need for the development of a set of systematic and standardized methods and arrangements for assessing the changing state of transboundary waters systems. The GEF-supported TWAP was initiated in 2009 to establish a methodology for a globally comparative assessment of LMEs as well as other transboundary waters systems (Open Ocean, River Basins, Groundwater Aquifers, and Lakes and Reservoirs), that would help GEF, policy makers and the international community to set priorities for the management of transboundary waters systems. The intention was also to provide a baseline for the monitoring of future changes to the condition of these systems. The ultimate goal was to allow GEF, governments and the international community to set science-based priorities for financial and project resource allocation in international waters, and to effectively monitor and evaluate the impacts of these interventions over time.

The first TWAP project (2009-2010) focused on the development of scientifically robust, indicator based methodologies for assessment of the five transboundary waters systems. TWAP methodology is available at

➞ [www.geftwap.org/publications](http://www.geftwap.org/publications).

The second TWAP project (2013-2015) had two major objectives:

- To conduct a global baseline comparative assessment of the status and changing condition of transboundary water systems, which would allow science-based priorities for financial resource allocation to be set.
- To establish the institutional arrangements for conducting future assessments and thus to track results of interventions.

An indicator scoring system was used to identify patterns of risk among LMEs, which is useful for comparative purposes, although some indicators are not clearly good or clearly bad, in terms of providing increased risk to the ecosystem. Aside from providing a baseline and a means of tracking change in global LMEs, the TWAP LME assessment can provide data and input into other studies such as the TDAs for individual LMEs, the Ocean Health Index (OHI) for countries of regions, the UN World Ocean Assessment, and for monitoring with respect to the Sustainable Development Goals (SDGs) (Barbiere and Heileman 2016). Indicators were selected for all five of the LME modules, and this became the first global, indicator-based global comparative assessment of all 66 LMEs.

The TWAP outputs can assist TDA/SAP projects with multiple aspects, including by providing:

- Identification and delineation of water bodies. A key output of the TWAP has been to update and improve the delineation of transboundary water bodies. In particular, the identification and delineation of transboundary aquifers has been greatly improved through the TWAP.
- Background data and information on the relevant transboundary aquifers, lakes, rivers and LMEs, such as biophysical, geographic, socioeconomic, and governance information (analysis of arrangements and effectiveness).
- Indicator results which can be used as a starting point, particularly in the TDA, to identify some of the key issues in the relevant water bodies, as well as an initial assessment of their severity and potential priority. Indicator results include both a baseline assessment, as well as projected scenarios for the 2030s and 2050s.

- Indicator frameworks, and underlying indicator methodologies and data sources, which can be used as starting points for undertaking assessments during a TDA and providing baseline for the subsequent implementation of the SAP to complement national and regional indicators specific to the TDA/SAP region.
- Access to data partners and stakeholders. Partners involved in TWAP may be able to assist with filling data gaps. Though much of the data used was primarily assessed at a global resolution, a significant amount of data is likely to be available at a resolution that is applicable at the individual water body level. In some cases, partners may have updated datasets to a finer resolution since the completion of the TWAP baseline (2015). In some cases, TWAP assessments involved local stakeholders who could contribute to the TDA/SAP processes. This was particularly true in the case of transboundary aquifers and lakes.

#### ➔ TDA/SAP Manual

The TWAP web portal provide information and contact details of significant value to projects undertaking TDA/SAPs in providing waterbody-type specific guidance and potential indicators that can be utilised. Further brief details on TWAP and all waterbody reports and guidance can be found on ➔ [www.geftwap.org](http://www.geftwap.org).

The TWAP LME assessment provides an up-to-date robust, tested and harmonized assessment methodology for all modules, and as such, at least the minimum set of core indicators should be tracked as far as possible by LME Projects or partners in all LME regions.

The modules are presented below, with specific recommendations for strengthening the approach in general, and socio-economic and governance modules in particular, using the TWAP assessment recommendations as a minimum set of indicators which should be collected consistently, within every LME, where possible, and with additional recommendations and tools from other sources.

## 2.1 Productivity module

The productivity module addresses the LME carrying capacity for supporting fisheries. It is surmised that the maximum global level of productivity for supporting the worlds fisheries has been reached, and that large scale increases in biomass yields are likely to be from fisheries changing their target species and trophic level to fish further down the food web, at trophic levels below fishes (Pauly *et. al.* 2002). In several regions, nutrient runoff into coastal ecosystems has been related to harmful algal blooms and the spread of pathogens such as vibrio, cholera and shellfish toxins (Epstein 1993).



### 2.1.1 Parameters measured

The parameters that are usually measured include photosynthetic activity, zooplankton biodiversity and oceanographic variability. Measurements are made to assess the status and temporal changes of these elements, which also incorporates anthropogenic influences by indicating coastal eutrophication, for example ([Wang 2004](#)).

### 2.1.2 Core indicators

The core indicators recommended by the Transboundary Waters Assessment Programme ([IOC-UNESCO 2011](#)) are:

- Primary productivity
- Chlorophyll a
- Sea surface temperature (SST)

### 2.1.3 Other indicators

Other ecosystem indicators used to measure the changing state of productivity include zooplankton and species composition, zooplankton biomass, water-column structure, photosynthetically active radiation (PAR), transparency, chlorophyll a, nitrite, nitrate, and primary production. Plankton can be measured over long time scales by deploying continuous plankton recorder systems monthly across ecosystems from commercial vessels of opportunity ([Batten and Burkill 2010](#)), and accessing archived data in the World Ocean Atlas. Additional data on physical state such as Sea Surface Temperature (SST), fluorescence, salinity, oxygen, nitrate and zooplankton biomass and diversity are also useful ([IOC UNESCO 2011](#)).

## 2.2 Fish and Fisheries module

The fish and fisheries module seeks to quantify the changes in fisheries biomass and biodiversity, as well as to understand their causes. LMEs are thought to be the source of over 80% of the global fish catch, and are thus a significant source of food, livelihoods and foreign exchange. Biodiversity changes can be due to overexploitation, pollution and habitat destruction as well as environmental shifts related or unrelated to climate change.

### 2.2.1 Parameters measured

Information collected to inform this module includes standardized fisheries independent trawl surveys as well as acoustic biomass surveys. Physical fish specimens provide samples for DNA analysis, identification, stomach content analysis, age and growth studies, and pollution studies.

### 2.2.2 Core Indicators

Core indicators that can be measured to assess and track the fisheries module that are recommended by the Transboundary Waters Assessment Programme are:

- Reported landings
- Value of reported landings
- Marine Trophic Index and Fishing in Balance Index
- Ecological footprint of fisheries
- Stock- status plots

### 2.2.3 Other indicators

Additional useful indicators include:

- Catch from bottom-impacting gear
- Fishing effort (and cost of fishing)
- Projected catch potential (2005/2055)
- LME carrying capacity in relation to maximum sustainable yield ([IOC UNESCO 2011](#))

## 2.3 Pollution and Ecosystem Health Module

The pollution and ecosystem health module deals with marine and coastal pollution, a major impact on the status and functioning of LMEs. Persistent organic pollutants and substances that move between water and air / aerosols, tend to have the highest transboundary impacts ([Sherman et. al. 2009](#)), and there can be a direct impact on human health via chemical contamination or spread of disease. Monitoring of water quality and biological indicator species are used to measure the impacts of pollution on ecosystems.

### 2.3.1 Parameters measured

The state of health of ecosystems can be measured on the basis of measurements of biodiversity, stability, yields, productivity and resilience. In order to be considered healthy, an ecosystem should maintain its structure, organization, and be resistant to external stress ([Costanza 1992](#)). Monitoring programmes might look at water analysis, fish tissue analysis, and substrate analysis. Bioaccumulation of toxins can also be assessed to determine impacts on species and populations. The incidence and frequency of harmful algal blooms, and evidence of disease can also inform this module ([Sherman et. al. 2009](#)).

### 2.3.2 Core indicators

The TWAP recommends at the very least, the active monitoring of indicator chemicals currently earmarked for monitoring under existing legislation (eg the Stockholm Convention on Persistent Organic Pollutants (POPs)).

Inshore marine habitats provide a vast range of provisioning and non-provisioning services to coastal populations, including food, livelihoods, coastal protection, water filtration, carbon sequestration, recreation and tourism ([Nellemann, et. al. 2009](#)). Coastal ecosystems include corals reefs, mangrove stands, salt marshes, sandy beaches, rocky shores, estuaries, lagoons and seagrass beds, all of which are highly productive ecosystems. The Convention on Biological Diversity (CBD) is particularly concerned with the protection of critical habitats, which have since been proposed as indicators for the TWAP LME assessment. These core indicators include:

- Seamounts at risk
- Change in protected area coverage
- Change in extent of mangrove habitat
- Percentage extent of saltmarsh habitat
- Extent of seagrass habitat
- Reefs at risk index
- Deltas at risk index

### 2.3.3 Other indicators

The presence and change in abundance and distribution of invasive species has not, thus far, been explicitly included in the 5-module approach. Although invasive species are generally considered to be a threat to ecosystem health, and would be identified through the causal chain analysis if they posed a problem, the quantification of their presence should be assessed as part of the Ecosystem Health module. The Global Invasive Species Programme has prepared a toolkit for the economic analysis of invasive species ([Emerton and Howard 2008](#)).

#### ➔ A Toolkit for the Economic Analysis of Invasive Species

The US Environmental Protection Agency (EPA) has developed a suite of five coastal condition indices: water quality, sediment quality, benthic communities, coastal habitat, and fish tissue contaminants, as part of a collaborative effort with the US National Oceanic and Atmospheric Administration (NOAA), the US Fish and Wildlife Service, the US Geological Survey, and other agencies.

TWAP recommends the monitoring of mercury and other nutrients, and also that shipping density is monitored as one of the indicators of ecosystem health and risk of pollution ([IOC-UNESCO 2011](#)).

Other indicator tools may predict cumulative impact from a number of stressors, and be a useful tool for LMEs. The indicator *cumulative human impacts on marine ecosystems* predicts the impact on marine biodiversity and ecosystems from multiple anthropogenic stressors. An increase in the cumulative impact score indicates that a stressor or suite of stressors is having an increased impact on biodiversity. ([Halpern et. al. 2015](#))

Additionally there are other indicator frameworks that might be used by LMEs, or to which participating countries or LMEs might consider contributing data; for example the Ocean Health Index (OHI).

## 2.4 Socioeconomics Module

The socioeconomics module addresses the human dimensions of LMEs. It assesses the social and economic state of human populations and communities depending on LMEs. Costanza *et. al.* (1997) calculated that coastal waters of LMEs contributed US\$12.6 trillion to the global economy in 1997 and US\$28 trillion by 2016 ([IOC/UNESCO and UNEP 2016](#)). Socioeconomic analyses integrate social and economic indicators to identify and evaluate management options that are beneficial to coastal communities.

### The Blue Economy

Modern ocean policy in many countries is focused on the Blue Economy, a relatively new concept framing the intent to maximise the sustainable benefit from ocean, coastal and marine economic activity. The blue economy is expected to play a major role in the sustainable economic growth of many developing countries, from sectors such as tourism, fisheries, aquaculture, transport, ports, mining and energy generation.



In Africa, for example, the African Union (AU) Commission champions the Blue Economy concept in the AU's 2050 Africa's Integrated Maritime Strategy (AU 2012). In addition, Regional Economic Communities and Intergovernmental Organizations are also developing strategies, for example the Indian Ocean Commission is developing a Blue Economy Action Plan for its members. At national level, Blue Economy strategies are being pursued in Mauritius, Seychelles and South Africa.

South Africa has begun Operation Phakisa which was conceptualized as a fast delivery programme to support the National Development Plan. One of the seven themes of Operation Phakisa is the Oceans Economy, under which four areas that are expected to provide the most sustainable benefit are:

- Marine Transport and Manufacturing,
- Offshore Oil and Gas Exploration,
- Aquaculture, and
- Marine Protection Services and Ocean Governance.

A policy handbook has been developed, particularly for African States, to enable them to mainstream the Blue Economy into national development plans, strategies and laws. This is a useful general reference tool and contains guidelines on social geopolitical and climate considerations as well as a step-by-step guide to developing blue economic policy (UNECA 2016).

➞ [Africa's Blue Economy: A policy handbook](#)

### The blue economy and Marine Spatial Planning (MSP)

With the increased demands on ocean space, and the recognition of the need for improved spatial planning in the coastal and marine space, MSP activities have often commenced alongside blue economy policy. In strengthening the 5-module approach, the socio-economics module must address blue economy policy as well as evaluate any MSP activities in the LME of concern. [➤ Marine Spatial Planning Toolkit.](#)

Approximately 90% of TDA-SAP processes have identified the need for cost-benefit analyses or value chain analyses to justify political support for management and policy reform (UNDP 2017). The completion of a rigorous socio-economics assessment is thus critical to the assessment process, and for guiding and informing the interventions agreed to in the SAP. Environmental valuations should be built into the TDA-SAP process design from the outset.

Susan and Interwies (2017) developed a guidance document on Economic Valuation of Ecosystem services in International Waters Projects. Although not confined to LMEs, useful tools and methodologies are presented.

➞ [Economic Valuation of Ecosystem services in International Waters Projects](#)

The Union for the Mediterranean has recently published a summary of the Blue Economy in the Mediterranean. It presents a current state of the blue economy, highlighting challenges, opportunities and trends as well as the potential areas for sustainable development. Main sectors are tourism, fisheries and aquaculture, maritime transport, shipbuilding and recycling, and blue energy. The Blue Economy report is notable in that it takes into account the ICZM Protocol of the Barcelona Convention as well as the EU directive (adopted in 2014) to create a common framework for Maritime Spatial Planning (MSP) in Europe (Anon 2017).

The TEEB report on [Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation](#) is also very relevant to ecosystem valuations in LMEs, with some of the following recommendations (De Groot et al. 2010):

- Ecological functioning and economic values are context, space and temporally variable. Ecosystem assessments should be spatially and temporally explicit at scales meaningful for policy formulation.
- Assessments should first quantify service delivery in biophysical terms to provide a solid underpinning to the assessment.
- Clear distinctions must be made between functions, services and benefits
- Valuation studies must properly represent the 'costs' including societal costs and missed opportunities, and not just focus on the benefits, in order to be properly representative.
- Ecosystem assessments should integrate an analysis of risks and uncertainties to acknowledge the limitations of data/knowledge.

### 2.4.1 Parameters monitored

The Department of Environmental and Natural Resource Economics at the University of Rhode Island has developed a framework for monitoring and assessment of the human dimension of LMEs and for incorporating socioeconomic considerations into an adaptive management approach for LMEs (Sutinen 2000).

Tools and parameters chosen would be LME-specific, but the [Environmental Economics Toolkit](#) provides an overview of the tools that are useful for LME practitioners. These include:

- Economic impact assessment
- Risk analysis/vulnerability assessment
- Climate change economics (damage assessment, adaptation planning, ecosystem-based adaptation and blue carbon)
- Valuation of ecosystem services (JNCC valuation toolkit, WRI (World Resources Institute) guidance manual on coastal capital, VALUES method for integrating ecosystem services, UNEP guidance manual on value transfer, Ecosystem services valuation database, TEEB – the Economics of Ecosystems and Biodiversity, and the UNEP Guidance manual for the valuation of regulating services).
- Natural capital accounting (SEEA - system of environmental-economic accounting, EEA – Experimental Ecosystem Accounts, and the UNEP guidance manual for Small Island Developing States (SIDS)).
- Natural Capital Protocol to engage the private sector, and
- Economic appraisal frameworks (Cost-effectiveness analysis, Cost-benefit analysis and multi-criteria analysis).

## 2.4.2 Core indicators

The TWPA recommends the monitoring of the following core indicators:

- GDP fisheries,
- % GDP international tourism,
- Urban and rural populations living within 10 m coastal elevation,
- Human Development Index (HDI), and
- Deaths per 100,000 caused by climate related natural disasters.

IUCN (2007) presents a useful [👉 set of tools for the Economic Valuation of LMEs, as well as case studies.](#)  
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## 2.5 Governance module

Traditionally, governance arrangements have been along sectoral lines, without consideration for integrated ecosystem-wide perspectives (Sutinen 2005). Ecosystem based governance needs to consider multiple sectors (for example fisheries, tourism, mining, oil & gas, conservation, transport, recreation) and scales (local, national, regional, global). If the fragmented approach to global oceans governance was working, we would not see the continued degradation that is very evident today (Duda 2016).

Investments in LME management must consider and include innovative tools and complementary approaches to coastal and ocean management, such as the ICM, MSP, MPA and fisheries reserve networks. These should be included in a suite of tools for the strengthening of LME management and governance.

### 2.5.1 Parameters measured

The governance module assesses the current state of management and governance of LMEs (local, national, regional and global agreements) as well as addressing the reforms recommended in the Strategic Action Programmes, in response to the issues identified in the first four modules.

## 2.5.2 Core indicators

The TWAP methodology recommends two stages of assessment. Stage 1 consists of a preliminary assessment of the extent to which a transboundary governance framework is in place to address the key issues relevant to the LME. This allows analysis of the arrangements and issues and the extent to which existing arrangements are appropriate, given the status quo. The stage 2 assessment assesses the performance and functionality of governance arrangements in terms of a broad range of criteria that include effectiveness, inclusivity, efficiency and equitability (IOC-UNESCO 2011).

The **>> Governance Toolkit** provides an overview of LME-relevant tools for good governance, including:

- LME governance frameworks / Evaluating principles of good governance,
- Values and ethics,
- Stakeholder engagement,
- Policy and legal frameworks for LMEs,
- Regional ocean governance (scales of governance, with case studies), and
- Best practice for effective governance.

The **>> LME scorecard** also provides tools for measuring and evaluating the effective governance of LMEs.





### 3. The strategic importance of TDAs, SAPs and NAPs and recommendations for areas where these can be strengthened

LME projects aim to safeguard and restore ecosystems, ensuring the sustenance of living resources, ecosystem processes and habitats in balance with human needs. The original GEF Operational Strategy of 1995 recommended a series of processes to help countries begin to work together on their shared transboundary concerns. These included the TDA and SAP development approaches. These are tools and mechanisms to help countries work together and build trust on a multi-country scale (Duda 2016).

GEF IW:LEARN has developed tools for Project Managers including the GEF [TDA/SAP Manual](#) which has recently been updated. There has been a good exchange of information between the manual and this toolkit, and the intention is for them to cross-reference each other where appropriate.

#### 3.1 The Transboundary Diagnostic Analysis (TDA)

A TDA is a factual report addressing the scientific and technical assessment of an international waters area. The TDA aims to assess the nature and severity of transboundary environmental issues and threats, causes and impacts in the socio-economic, political and institutional context of the region in question. The identification of direct, indirect and root causes of water-related issues is essential in the TDA process (Duda *et. al* 2002), and is usually achieved through a causal chain analysis. The TDA provides information related to the changing state of LMEs and the causes of environmental degradation. The goal is to provide a comprehensive factual basis on which to develop options for mitigation or remediation of threats through actions that can be designed into the SAP (Wang 2004). The TDA is intended to be updated periodically and can thus also be considered a diagnostic tool for measuring the effectiveness of SAP implementation (Duda 2014).

Transboundary issues may be defined as national or regional issues affecting more than one country, issues that have a source in one country and an impact in another, issues with a source in the high seas that impact national waters, or issues with a source in one or more EEZs that impact the high seas. To date, 17 of the 18 LMEs that have received GEF LME Project investment have completed TDAs.

As defined by GEF International Waters: "The purpose of conducting a TDA is to scale the relative importance of sources and causes, both immediate and root, of transboundary 'waters' problems, and to identify potential preventive and remedial actions. The TDA provides the technical basis for development of a Strategic Action Programme (SAP) in the area of international waters of the GEF." (IW resources guide, terms and definitions).

The TDA is often the first opportunity for countries to compile data and information on a multi-country ecosystem. The joint exercise of assimilating information allows the participating countries to contribute national information, to discuss and to understand the state of the environment in neighbouring regions. This process of compiling information in a shared process builds trust and working relationships across the countries, fills information gaps in the functioning of the larger ecosystem, and builds a shared regional perspective of the LME.

The GEF considers five priority areas for prevention and control and gives priority to holistic rather than sectoral approaches to addressing these threats:

- 1 Land-based sources of pollution, especially persistent toxic substances, heavy metals, and common contaminants such as nutrients, biological contaminants, or sediments,
- 2 Land degradation where transboundary marine environmental concerns result from desertification or deforestation,
- 3 Degradation and modification of critical habitats,
- 4 Unsustainable use of marine resources, and
- 5 Ship-based sources of chemicals and alien species.

The TDA process is divided into three parts:

- Assessing current status. The fact-finding process of assessing the current status, issues and threats to the ecosystem. The TDA for each LME needs to address the scale of problems, whether localized to a hotspot, national, or regional in nature. It is good practice to also identify emerging threats, which might either not be well understood or well quantified, but which might have a rapid and significant impact. An example would be the recent discovery of significant oil and gas reserves in the Mozambique channel. This was flagged in the ASCLME National Marine Ecosystem Diagnostic Analyses (MEDAs) and TDA as a significant emerging issue ([ASCLME/SWIOFP 2012](#)).
- Causal Chain Analysis (CCA). The analysis of the issues and threats facing the ecosystem, their proximal, indirect and root causes (in the socio-economic, political, legal and cultural domains). In the past, actions often focused on removing the symptoms of coastal and marine degradation. The identification of direct/proximal, indirect and root causes focuses action at the appropriate level and has a much greater chance of long term success. The causal chain analysis makes the link between the natural systems and human impacts, benefits and well-being. ➞ [TDA/SAP Manual-Causal Chain Analysis section](#)

- Presenting options for action. The process of formulating options for mitigation or remediation of issues and threats. This should be informed by the governance analysis, socio-economic studies, and be supported by cost-benefit analyses. Costs and benefits to be considered must include financial as well as environmental effects. In most LME TDAs, options for action are presented in the TDA, but in some cases the options for action are presented only in the SAP. Either way, the optimal interventions are presented in the SAP, and a programme of action is then developed for their implementation.

As described in the [TDA/SAP Manual](#), the key steps in the TDA development process are:

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- 1** Definition of system boundaries,
- 2** Collection and analysis of data/information including reference to global/regional needs for data and indicators and linkages to the GEF TWAP, Indicators,
- 3** Identification and prioritisation of the transboundary problems and the potential for climate change and variability to impact these problems,
- 4** Determination of the environmental and socio-economic impacts,
- 5** Analysis of the immediate, underlying, and root causes,
- 6** Development of thematic reports (e.g. stakeholder, governance analysis, ecosystem status and pressures, etc.),
- 7** Identification of leverage points, and
- 8** Drafting the TDA.

The TDA/SAP process has been designed in order to build consensus in a step-wise manner, beginning with the evidence-based, factual, scientific TDA, which describes the LME itself and analyses the transboundary system itself, transboundary concerns, direct and root causes thereof. The analysis of causal chains is essential for identifying the underlying/root causes of transboundary concerns in order for appropriate reforms in governance regimes to be identified and recommended.

Root causes tend to be similar across many of the LMEs, including for example, overfishing, climate change shifts, pollution and eutrophication, deficiencies in law or implementation of policies and management plans. In the Benguela Current Large Marine Ecosystem (BCLME), for example, causes are identified as poor legal frameworks, inadequate implementation of existing legislation, inadequate capacity development (human and infrastructure) and training, inadequate planning at all levels, insufficient public involvement, and inadequate financial mechanisms and support ([Wang 2004](#)).

Key principles of the TDA/SAP approach include:

- Adaptive management,
- The Ecosystem Approach,
- Sustainable Development,
- Poverty Reduction,
- Gender Mainstreaming,
- Climate Variability and Change,
- Collaboration with Other Approaches (ICM, MSP etc),
- Stakeholder Consultation and Participation,
- Stepwise consensus building,
- Transparency,
- Accountability,
- Inter-sectoral policy building,
- Donor partnerships, and
- Government commitment.

Projects have approached TDA development in different ways. Some LMEs have followed the approach of developing regional thematic reports, others have developed multidisciplinary National Diagnostic Analyses, and yet others have done both. The national component ensures that national information feeds into the regional process, and the regional multilateral process is important to achieve a shared understanding of the status of the shared water body. The discussion of proposed options for intervention should also take place at regional level, since regional actions should have a multinational impact.

TDA challenges are :

- The process of engaging appropriate stakeholders is very time consuming,
- The time required for compiling and reviewing a TDA is usually underestimated,
- All relevant sectors must be engaged to ensure the TDA addresses all components of the ecosystem,
- Levels of knowledge, access to information and writing skills will differ between countries in the LME, but a fair platform must be provided for all partners to engage as equals.,
- Information provided for the purposes of compilation in a TDA might be inconsistent or even contradictory,
- Stakeholders might be reluctant to contribute information,

- Since the TDA can take several years to finalise, emerging issues might become apparent during or near the end of the process,
- Participating countries will have different legal and institutional frameworks as well as socio-economic and cultural differences, and
- International disputes (over EEZ boundaries, for example) might have an impact on TDA discussions.

Recommendations to improve TDA are:

- Make sure that adequate time is given to the TDA planning process,
- Engage stakeholders early and often [» Stakeholder Toolkit \(chapter 4. Stakeholder engagement processes\)](#),
- Keep the process transparent,
- Employ a peer review process,
- To build national ownership for the TDA development process, an interministerial committee (IMC) or coordination mechanism should be established in every participating country in order to facilitate communication between ministries responsible for marine sectors, and to set up mechanisms for the technical tasks of collecting information that feeds into the TDA, as well as to make the link between the SAP and NAP,
- In countries where national ICM or MSP committees already exist at high level, the same structure could be used for the TDA/SAP process. This would encourage even better coordination of different management approaches and tools in-country,
- Make sure that space is provided for the rapid inclusion of emerging issues,
- Even though they might be beyond the scope of GEF eligible financing, make sure that crosscutting issues such as population growth in coastal areas, ocean warming, ocean acidification, emerging upstream issues and sea-level changes are mentioned in the TDA,
- During the early stages of the TDA process, the identification of issues should not be limited to those resolvable with GEF assistance. All issues facing the LME should be properly documented as the question of what should be taken forward into the SAP is a separate step,
- Transparency, adequate financial resources, timing and keeping momentum are all critical elements to keeping the process going, and
- Within the TDA process, there is room for standardizing methodological elements such as the terms used in the causal chain analysis. There is currently considerable variation between causal chains, which makes it difficult to compare them across LMEs ([UNDP 2017](#)).

## 3.2 The Strategic Action Programme (SAP)

A Strategic Action Programme (SAP) in the context of the LME approach, is an agreed, multinational framework for strategic actions to protect the coastal and marine environment. The SAP contains a series of policy, legislative, socio-economic, and other actions to be undertaken at regional level, with the aim of enhancing the management of the ecosystems concerned. Actions that also need to be implemented at national level (in order to contribute to the regional outcome) are usually incorporated into a National Action Plan (NAP), which is the "nationalized" version of the regional SAP.

The SAP is based on the output of the TDA, and specifically on the priority issues, direct and root causes, which underpin the regional consensus for action ([Wang 2004](#)). The SAP is usually compiled by a very high level multinational committee, the members of which have sufficient national standing in order for them to obtain national endorsement at Ministerial level.

As described in the [TDA/SAP Manual](#) the strategic component of the SAP process has 2 key phases:

Strategic Thinking:

- Defining the vision,
- Setting goals or status statements,
- Brainstorming new ideas/opportunities for innovation, and
- Identifying options or alternatives.

Strategic Planning:

- National and regional consultation processes,
- Setting strategies for implementation,
- Action planning - Setting actions, timescales, priorities and indicators,
- Drafting the SAP, and
- Steps towards SAP implementation.

The SAP for an LME is the commitment of the governments concerned to accept joint or harmonized management principles and to implement agreed policy actions, institutional reforms and investments in order to reach the shared objective of a healthier and more resilient transboundary waters system. Although based on the TDA, the SAP must also be guided by socio-economic and governance analyses as well as cost-benefit studies that will suggest appropriate interventions that have the maximum benefit for the region. The SAP should also facilitate adaptive management to provide for the periodic review of the environmental status of an LME, and to identify new issues as and when they arise.



SAP actions may also include policies and principles relevant to existing international law, thereby harmonizing the regional objectives in line with international best practice.

The development of the SAP is a negotiated, cooperative process which is useful to scope the level of trust and confidence in the region, to see whether countries could reach consensus and agree on joint action before the GEF commits to expensive management reforms. The SAP should ultimately be signed at Ministerial level. After approval by each of the participating countries, investment projects (SAP implementation projects) may be developed to implement technical assistance, capacity building, management and policy reform measures that contribute to resolving the shared transboundary issues of concern.

SAP challenges are:

- Participants in the process might limit themselves to thinking about issues and challenges that are eligible for GEF funding in the SAP.
- Countries will have different resource use goals. One country might be very resource driven and another conservation driven.

Recommendations to improve SAP are:

- Within the TDA-SAP process, there is an urgent need to streamline the science to policy process, so that time is not lost between the identification of a critical or emerging issue, and an appropriate policy response. The science-to-policy mechanism should not be entirely reliant on the TDA-SAP process which, while comprehensive, takes a long time to implement. Additional measures are needed to ensure that new issues are validated, quantified, and receive an appropriate, rapid, management response ([UNDP 2017](#)),
- While keeping the SAP focused and pragmatic, it should be remembered that the GEF is not the only funder of SAP actions, and efficient partnerships with other funders can be used to leverage additional investment in joint action,
- A vast collection of information (manuals and guides) is available in the [GEF IW:LEARN portal](#) on the TDA and SAP process, project experiences and evaluations. This material should be accessed and used widely as a reference,
- SAPs should include consideration of long term climate changes and potential effects on LMEs, both ecologically and socio-economically, and
- Consider SAP implementation options from the start of the TDA planning process, and make sure that all relevant stakeholders and implementation partners are involved in the process as early as possible.

## 3.3 National Action Plans (NAP)

NAPs (sometimes called National Action Programmes) are strategically important for the nationalisation of SAP actions. The process of NAP development could be driven from national level through the initial identification of national-level priorities which are then used to craft the regional SAP. An example of this approach is in the South China Sea (SCS) preliminary National Programme of Action used in the development of the regional TDA (Wang 2004).

As an example, the NAPs for the SCS member states each have the following structure:

- 1** Constraints to action, which analyses barriers to the member state's national action on issues. Common constraints include lack of information, scientific uncertainty, lack of public awareness and involvement, economic shortages, legal and management deficiencies, lack of political will to apply sustainable development principles,
- 2** Ongoing and planned activities that are relevant to the SCS / SAP issues and activities,
- 3** Specific actions proposed for each identified issue, including rationale, description, responsible agency, cost and source of funding, and
- 4** Implications for the actions by sector. This illustrates the effects of actions on various sectors, as well as the proposed role of each sector in implementation.

The NAPs for the SCS region are fairly diverse, and actions differ although some issues are similar (Wang 2004). This is to be expected as each national context is different, and the strength of the NAPs is in facilitating a specific and appropriate national response to a regional priority.

As a parallel activity to the development of national Marine Ecosystem Diagnostic Analyses and the TDA for the Agulhas and Somali LMEs, the ASCLME Project supported the analysis of the local economies in demonstration sites in each of the participating countries, and then supported the community-led development of Local Economic Development Plans (LEDs). The SAP implementation project SAPPHIRE intends to update these and implement them with National Action Plans.

Wang (2004) uses the National Caspian Action Plans (NCAPs) as an example, formulated by the Caspian riparian states, although this is not an LME. The NCAPs are self-contained, and contribute to the Caspian Environment Programme. The example of the Azerbaijani NCAP is used, and consists of the following sections:

- 1** The introduction describes the objectives of the NCAP, the connection to the TDA and SAP, links to other related investments in the region, methods for developing the NCAP, national status (endorsement to implementation) and the process for revision and amendment.
- 2** National conditions describes the current national political, institutional, legislative and socio-economic situation and the country's social, institutional and financial capacity for the protection of the Caspian environment.

- 3** The importance of the Caspian Sea for the country defines the national geographical and economic areas where the human activities and environment interact, identifies potentials for the contribution of the Sea to the national economic development, and shows the environmental, economic and social significance of the sea in the national context.
- 4** Main problems and their root causes identifies and prioritises existing and emerging transboundary issues and problems of the environment from a national perspective, and provides a causal analysis that links them to immediate and root causes.
- 5** The strategy and measures section identifies criteria for the ranking of causes and determination of primary strategies and measures that need to be taken.
- 6** Potential Obstacles and Ways of Overcoming identifies and examines a range of issues (political, institutional, socio-economic, technology and financial) that might hinder successful solution of the problems and propose solutions.
- 7** The resources attraction strategy identifies the main financial resources for the implementation of the NCAP, including national and external resources.
- 8** The mechanisms of action identifies and establishes the organisational structure for implementing and evaluating the NCAP. It also includes public awareness and communication actions.

Main NAP challenges lie in the fact that national priority setting and design of NAPs can vary substantially across a region because of different economic needs, capacities and priorities across countries. This can potentially lead to a gap in priority setting between the SAP and the NAPs. Poverty alleviation and community livelihood development are often national priorities but are not often highly rated as priority regional actions ([Wang 2004](#)).

The main recommendation to improve NAPs is that each nation state should design its NAP to respond to the regional needs of the SAP, but put into the institutional and legal context of the country. Specific national activities, measures and funding are required to carry out the NAP.

### 3.4 The spatial variability of transboundary concerns and SAP reforms

While the scope of the TDA should cover the entire LME area, it should also explicitly define or update the management boundary, based on the LME criteria, and including Areas Beyond National Jurisdiction (ABNJ) where appropriate.

Within the broader scope regional scope of a TDA, LMEs will often identify hotspots of concern or narrower geographical issues or features which are deserving of specific attention. It is also essential to consider upstream impacts from watersheds (agricultural practices) as well as potential impacts from the high seas.

## A question of scale

GEF interventions have been made at varying spatial scales (1) global, (2) regional groupings of LMEs, (3) LMEs (4) geographic sub-sets of an LME (5) national sector, and (6) local cities, communities and site-specific ecosystems (Duda 2016). Within LMEs, smaller management units are also used for specific management purposes. Examples of these include SIDS and hotspots of conservation concern (habitats or species) (IOC/UNESCO 2011). GEF's strategy has been to implement projects at various scales, depending on regional needs. The [Governance toolkit \(4.1 Scale of Governance section\)](#) explains the different scales of governance in LMEs in detail.

Vietnam in the South China Sea LME provides a good example of GEF IW interventions at different scales (Duda 2016).

### *Sub-national scale*

Marine realms, seascapes, hotspots, world heritage sites, Marine Protected Areas (MPAs), Locally Managed Marine Areas (LMMAs) and ICM models are usually applied at the sub-national scale. The regional enabling environment is often at national level, with sub-national site level jurisdiction as well. LMEs may rarely also be sub-national in scale such as those within Australia's EEZ, and the Bird's Head Seascape.

### *National scale*

EEZs are by definition, at national scale. MPA networks and ICM policies usually have some management at national level, and Marine Spatial Planning activities are often initiated at national scale with one or more sub-national pilot or demonstration sites. LMEs rarely map exactly to the national EEZ of one country, with an exception being the New Zealand LME.

### *Transboundary scale*

Transboundary management instruments may cover two countries, or multiple countries. The LME approach was specifically designed to be able to operate at this scale, across countries.

Other examples of transboundary-scale instruments for marine management and governance are Seascapes as defined by Conservation International and Marine Ecoregions as defined by the World Wildlife Fund (WWF) and The Nature Conservancy. In these cases, integrated management is usually led by different organisations at national level, with national and sub-national scale partners engaged in the process. At regional level, important organisations are the LME organizing body, international treaties, associations and other organisations that are stakeholders in marine and coastal management (for example:

- the Southern African Development Community (SADC) and the African Union (AU) to the BCLME,
- the Western Indian Ocean Marine Science Association (WIOMSA), Indian Ocean Commission (COI) and AU to the ASCLME, and
- The EU to the MEDLME region as well as other policy instruments including MAP's Strategic Action Programme (SAP) to address pollution from land-based activities (SAP MED); the Mediterranean Strategy for Sustainable Development (MSSD), launched by the Mediterranean Commission for Sustainable Development (MCSD) established under the United Nations Environment Programme Mediterranean Action Plan (UNEP/MAP).

## 3.5 Areas Beyond National Jurisdiction (ABNJs)

ABNJs make up over 64% of the surface area of the oceans, and almost 90% of its volume. Lying beyond national jurisdiction, and far from the coasts, ABNJs need specific instruments to ensure their management and protection. They are not protected from negative impacts such as marine pollution, and overexploitation of resources even though they might be further from land. Support from The GEF has led to the establishment of the Western and Central Pacific Fisheries Commission and the convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean, which has responsibility for the sustainable use of tuna resources worth approximately USD \$ 4 billion a year across an area of approximately 100 million km<sup>2</sup> surrounding the waters of the Pacific Small Island Developing States (➔ [www.thegef.org](http://www.thegef.org)).

The Global Sustainable Fisheries Management and Biodiversity Conservation in the Areas Beyond National Jurisdiction Program was approved by the Global Environment Facility (GEF) under the lead of the Food and Agriculture Organization of the United Nations (FAO) in close collaboration with two other GEF agencies, the United Nations Environment Programme (UNEP) and the World Bank, as well as several other partners. The ABNJ Program is currently underway. It focuses on tuna and deep-sea fisheries as well as the conservation of biodiversity, and aims to promote efficient and sustainable management of fisheries resources in ABNJ.

➔ [www.fao.org/in-action/commonoceans/background/en/](http://www.fao.org/in-action/commonoceans/background/en/)

Within the Program, the Western Indian Ocean (WIO) region is a test case for the use of spatial planning tools in Areas Beyond National Jurisdiction (ABNJ), linking up with the efforts of the GEF-funded Western Indian Ocean Strategic Action Programme (WIOSAP) and Strategic Action Programme Policy Harmonisation and Reform (SAPPHIRE) SAP-implementation projects. This region might produce some very useful lessons for the implementation of MSP in both LMEs and ABNJs, through a partnership of two SAP-implementation projects as well as FAO and UNEP-WCMC.

During both the TDA and SAP process, specific reference must be made to Areas Beyond National Jurisdiction (ABNJ) if they are included in the LME management area, and particularly with respect to biodiversity in ABNJs as guided by the proposed UNCLOS instrument (UNDP 2017).

## 3.6 Additional recommendations for strengthening the TDA/ SAP/NAP process

- At the project design phase, appropriate measures must be taken to ensure the viability of organizational structures beyond the term of GEF intervention, to ensure institutional sustainability into the future. Implementing and executing organisations must be carefully selected and considerations for sustainability built into the project design (Duda *et. al.* 2002).

- Starting the TDA-SAP process at national level with the formation of national inter-ministerial committees and the development of National Marine Ecosystem Diagnostic Analyses is a valuable tool for building ownership of the process in every participating country. It has the additional benefit to countries of improving inter-ministerial coordination at country level, but also for supporting the SAP and NAP processes and ecosystem monitoring in the longer term.
- Similarly, the establishment of activity centres or thematic centres can assist participating countries in building national ownership. In the Guinea current region, the GCLME Project established Regional Activity Centres of Capacity for Productivity, Fisheries, Environment, Information Management and Pollution Monitoring. These effectively connected international development goals with implementation efforts on the ground at local scales (Abe *et. al.* 2016).

The Benguela Current Large Marine Ecosystem Project established three activity centres in the three participating countries:

- in Namibia, the activity centre for Living Marine Resources
- in Angola, the activity centre for Biodiversity, Ecosystem Health & Pollution
- in South Africa, the Activity Centre for Environmental Variability

It is good practice to make use of or base national inter-ministerial committees on existing national ICM committees or MSP committees where they already exist, as they tend to already include sectors such as environment, oceans, fisheries, spatial planning, marine transport and mining. Additional sectors can be added as required. This approach will avoid duplicating structures, putting additional burdens of time on few people who may have many diverse responsibilities, and will also benefit from co-financing. This point is also clearly addressed in the LME Project Toolkit (Chapter 3. Preparation of TDA Projects).

LME projects must ensure that they address river input and adjacent coasts, either within their remit or in partnership with other projects, to avoid the case of addressing only the marine realm.

The [TDA/SAP manual](#) points out that most TDA and SAP processes are run separately, with poor linkages between the technical TDA and the negotiated SAP. This can lead to a situation where SAP recommendations do not clearly meet TDA priorities, and the logical link between the two is not robust. The link might be even weaker in the case where the TDA was developed via one LME Project and the SAP via another.

Each LME has its own unique ecological, socio-economic and political characteristics, so the LME process must be tailored appropriately. However, the content, objectives and effectiveness of existing TDAs and SAPs vary considerably at present. Standardised TDA requirements and SAP structures will help to allow for better comparison between TDAs and between SAPs at a global scale (UNDP 2017). The [TDA/SAP Manual](#) should be used as a guiding document at the planning stage.

Sufficient emphasis needs to be placed on developing a comprehensive and sound TDA, including the best available data and information, comprehensive causal chain analysis, cost-benefit analyses, governance and institutional assessments. This will ensure that the SAP is based on a solid foundation.



The cost-benefit analyses in particular can provide the facts and tools to justify policy reform (UNDP 2017)

## >> Environmental Economics for Large Marine Ecosystem management Toolkit (Chapter 6. Economic policy instruments)

LME projects should develop a data and information management plan to ensure that policies and procedures are in place, and that they are agreed by all partners. New data that are collected during the TDA process at national or regional level must be properly described, and appropriately archived. It is recommended to use the internationally recognised IOC/UNESCO supported National Oceanographic Data Centres where appropriate, as well as other global repositories such as OceanDocs, OBIS, HAB system, [GEF IW:LEARN marine domain](#), Regional Seas Conventions where appropriate, and the World Ocean Database. While some datasets owned by countries are only released at their discretion, new data collection funded by the GEF must be made publicly available (after a short delay to allow for publication, if necessary). ([IOC/IODE](#), [ASCLME D&I plan](#), [ASCLME policy](#))

The use of short, descriptive TDA and SAP briefs for the communication of core principles to a wide audience, can be very effective. They can be especially effective for raising awareness at senior government level. A sound communication strategy would help to raise awareness of the importance of the SAP, and the need for the LME approach. It should include mechanisms for dissemination of information to a range of people, from scholars and students, to communities, civil society and the commercial sector (UNDP 2017).

A frequently-raised concern is the drawn-out time interval between the SAP negotiation/adoption at the end of one project phase, and SAP implementation at the beginning of the next project phase (UNDP 2017). This interval can run to several years in certain cases and has created problems for efficient LME management around the world. Much of the momentum, goodwill and sense of ownership that is built up during the TDA/SAP development project has dissipated by the time the SAP implementation project begins; many of the IMC and TDA team members have moved on or changed jobs, and much time and expense has to be expended to regenerate or build new teams of people from participating countries, many who will not have been involved in the TDA/SAP process. GEF should seek to identify mechanisms to bridge this transition period or to try to reduce its duration.

Where non-GEF-eligible countries are part of an LME, every effort should be made to include those countries in the TDA/SAP process, so as not to leave them out of the regional decision-making process. Finding national funding for their involvement, or funding from another source, would ensure that those countries are fully a part of the TDA/SAP process, contribute effort and information to the process and are also engaged and in agreement to take responsibility for SAP actions.

The SAP endorsement process should not be rushed; some SAPs that have had quick endorsement have lacked sufficient detail, whereas a slower process might deliver more realistic management objectives and more commitment in the long term.

The identification of regional and local partnerships for the TDA/SAP process is key, and it is recommended that these partnerships be formalized early on, through a series of MoUs or similar, as well as through close project interaction via the PMU or Steering Committee. That way, partners become properly engaged in the process, can more easily articulate their contributions to the SAP implementation process, and there is greater likelihood of the sustainability of the partnership/s into the future.

## >> Stakeholder Engagement toolkit (Section 4.2 A four-phase model for stakeholder engagement )

There is a critical need for ongoing support for strengthening institutional capacity in the ocean sciences, integrated oceans management and to support coordination in-country with regard to coordination among ministries and departments in many developing countries, SIDS, Least Developed Countries (LDCs) and coastal African countries. Opportunities exist for sharing of lessons learned, twinning between LME projects, and capacity development via South-South cooperation as well as the traditional North-South pattern ([UNDP 2017](#)).



## 4. Good practice in SAP and NAP implementation

Some recommendations are presented here for good practice in SAP and NAP implementation. This chapter links closely to the information in the [Governance Toolkit \(Chapter 4. Regional Ocean Governance\)](#).

### 4.1 Good practice in SAP implementation

The LME approach has promoted multidisciplinary research and assessment, and has led to the development of networks of LME practitioners and cooperation among countries, institutions, and individual scientists, resource managers and decision-makers (UNESCO 2008). SAPs should be based on agreed principles (the precautionary principle), a shared vision for the state of the LME desired by the countries, and LME-wide revised governance mechanisms (Duda 2014). SAPs must include an adaptive management mechanism which should describe a highly dynamic and responsive science to management flow, to allow for the rapid response of decision makers to a new or emerging issue.

A standardized logical results framework would be a useful tool for a SAP with clear targets and indicators to show progress, targets, partners and roles. This would also assist with more pragmatic goals for SAPs (UNDP 2017). With the results framework standardized across SAPs, it would allow for the tracking of progress and comparisons of approaches and achievements across LME regions.

The use of SAP implementation demonstration projects can be useful for testing and refining SAP tools, and can provide good results that can be used for replication and scaling up to national or regional levels. The selection of demonstration sites must be carried out carefully, to be distributed fairly across the region and to keep a close link to SAP objectives.

#### Legal arrangements

Attempting to fully harmonise laws between countries during the SAP implementation phase may be overly ambitious, and can risk losing political support for the process. A more acceptable approach would be to obtain broad agreement on collaboration and cooperation, which would lead to gradual convergence of legislation over a longer period of time.

## Institutional arrangements

In many LMEs, there is still an urgent need for more formal and better coordination and agreement on roles and responsibilities between mandated bodies that deal with various aspects of ecosystem-based management of living marine resources (UNDP 2017).

The SAP process itself has no pre-determined legal and institutional basis, so it is up to the participating countries to select the institutional arrangements and designate the entity under which the SAP implementation is anchored. There is very rarely one body that already has a formal mandate that covers most or all of the LME management requirements as LME management and governance is still very fragmented (indeed, the very justification for introducing the LME approach). As a consequence, joint management is usually through strengthening and improving the use of legal regional entities that already exist, or through the creation of new Commissions.

The five general models of GEF experiences with governance changes as stated in SAPs are the following:

- adopting numerical targets/deadlines in the UNEP regional seas programs with reporting to give commitment to action,
- adding a protocol or new legally binding component to an existing legally-binding convention arrangement,
- chasing a new legally binding agreement/mechanism for the LME, to be negotiated,
- establishing a new non-binding intergovernmental institution/commission with numerical targets/deadlines/ other features, and
- several variants of non-binding actions using the existing fragmented governance arrangements, with the hope that coordination/science/capacity building will lead to the adoption of ecosystem based approaches (Duda 2016).

Where an existing regional seas body is used, it is important for the LME process to be implemented across regional seas areas (where LMEs overlap across two or more regional seas) or into ABNJ where LMEs extend into the adjacent high seas. In the Agulhas and Somali Current LME region, the original African mainland EEZ LME boundary was extended to include the Mascarene Plateau and the surrounding high seas.

Institutional arrangements play a critical role in ensuring the effective implementation of a project, and in contributing to the sustainability of activities and results beyond the project period. The International Waters programme has noted that weaknesses on the part of GEF executing agencies have previously resulted in substantial problems during project implementation. Duda et. al. (2002) recommends that GEF consider a more rigorous assessment of the suitability of proposed executing agencies to ensure competent project execution.

Any decision on the institutional arrangements for anchoring the SAP must be made with full involvement and agreement of participating countries. Since the LME approach does not usually fall naturally to one single body, rivalry and conflict can present challenges to the process.

It is generally considered unproductive to separate the land-based, coastal and offshore and fisheries components of the SAP, as this can lead to competition between agencies and can make it very difficult to implement a single integrated, ecosystem-based SAP. In some cases, where there had been a geographic division between land-based and offshore TDAs, this has resulted in the development of more than one SAP, which is confusing and distracting for participating countries (UNDP 2017).

Reforms that are recommended in the SAP might be at international/regional scale (sometimes an economic organization such as South African Development Community - SADC or the Organisation of American States - OAS), national scale, or sub-national scale at municipality or community level. Involving agencies that have regular programmes might assist the LME reform process, as agencies (such as UNDP) might improve the sustainability by mainstreaming sectoral reforms needed, into their regular development programmes, independent of GEF finance, following the GEF intervention (Duda *et. al.* 2002).

### Management arrangements

The implementation of a SAP should be realistically based on the management resources available while also acknowledging that a system that is currently NOT functioning well, is unlikely to transform itself without a significant revision of mandate, capacity and funding.

Identifying an appropriate institution for SAP implementation should be identified as early as possible during the TDA/SAP process. This assists in creating ownership and to provide a good transition from TDA to SAP and then to SAP implementation. The choice of institution is critical as performance and long-term sustainability will hinge on its capacities and institutional strengths.

### Partners in the LME Strategic Approach

Partnerships for SAP implementation are valuable for sharing activities, as well as for co-financing. Most, if not all LMEs, have entered into partnership arrangements of some kind for SAP implementation. The use of Activity or Thematic Centres supported by host countries can be a very useful tool for the delivery of SAP implementation – for long term monitoring, as well as for supporting communities of practice in LMEs over the long term.

Important partners include the Regional Seas Programmes that deal primarily with coastal and inshore marine environmental issues such as pollution and habitat degradation. A number of these programmes are administered by UN Environment, such as the Nairobi Convention and the Abidjan Convention. Since the launch of the Regional Seas approach in 1974, 18 programs have been established around the world, in which more than 140 countries participate, covering nearly all of the world's marine ecosystems, including open-ocean ecosystems. They are: Antarctic, Arctic, Baltic, Black Sea, Caspian, Eastern Africa, East Asian Seas, Mediterranean, North-East Atlantic, North-East Pacific, North- West Pacific, Pacific, Red Sea and Gulf of Aden, ROPME Sea Area, South Asian Seas, South-East Pacific, Western Africa and the Wider Caribbean. The scope of regional seas programs is geographically vast. While many regional programmes, banks and donor organizations use regional seas programs to manage or channel their investments, implementation is usually at national level (even if the strategic importance is regional) (Bensted-Smith and Kirkman 2010).

➞ <http://www.unep.org/regionalseas>  
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Regional Fisheries bodies are made up of a number of states or organisations that have agreed on a formal fisheries arrangement. The structure could be a multilateral management entity such as Regional Fisheries Management Organisations (RFMO) or Regional Fisheries Management Agreements through which member countries directly establish management measures, an advisory body that provides member with advice and a coordination/development function, or a scientific research organization that only provides scientific advice. Several of these bodies are administered or supported by the FAO.

The Intergovernmental Oceanographic Commission of UNESCO (IOC/UNESCO), whose purpose it is to promote international cooperation and to coordinate programmes in research, services and capacity-building, and to apply knowledge for the improvement of management, sustainable development, the protection of the marine

environment, and the decision-making processes of its Member States. IOC is recognized through the United Nations Convention on the Law of the Sea (UNCLOS) as the competent international organization in the fields of Marine Scientific Research and Transfer of Marine Technology.

The GEF works with a number of implementing partners and other leading marine institutions that include UNDP, UN Environment, United Nations Industrial Development Organisation (UNIDO), International Council for the Exploration of the Sea (ICES), the World Bank, Food and Agriculture Organisation (FAO), International Union for Conservation of Nature (IUCN), NOAA, WWF and IOC/UNESCO. The regional banks are important investment partners for supporting the LME process.

There is thus a wealth of opportunities for partnership activity, co-financing and partnerships for SAP implementation activities; the general weakness has been in the lack of coordination between entities mandated with responsibility for coastal and marine areas, and thus the full potential benefit of partnerships is not realized.

The GEF support to the TDA process has built strong relationships between national institutions and regional partners. There is, however, a problem with sustaining these partnerships beyond the life of LME projects, so there is a need for these to be strengthened through formal agreements in support of the LME management concept in the long term.

Special Areas and Particularly Sensitive Sea Areas (PSSAs) as defined by the MARPOL Convention are administered by the International Maritime Organisation (IMO). Special Areas are areas for which mandatory methods for the prevention of sea pollution are required, while PSSAs are areas that require special protection because of their significance for ecological or socio-economic reasons, and their potential vulnerability to damage by international maritime activities.

➔ <http://pssa.imo.org/#/intro>  
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### Financing strategy

The SAP should include a detailed financing strategy to determine which mechanisms (intergovernmental, governmental, NGO, donor, investment and private) are available for financing the priority activities identified in the SAP. These financial mechanisms should be identified as early as possible in the TDA/SAP process. The involvement of the private sector could be particularly useful in sustaining SAP implementation activities in the long term.

The design of the SAP usually accounts for estimated costs for agreed actions and lays out funding plans. This links closely to the sustainable financing section of the **>> Governance toolkit (Section 2.4 Sustainable financing)** and **>> LME Project toolkit (Section 2.6. Financing, additional cost and co-financing)**.



## 4.2 Good practice in NAP implementation: Elements for formulating NAPS and operationalisation of National Interministerial Committees

A National Action Plan (NAP) or National Action Programme (or sometimes National Strategic Action Programme) is a national document that describes objectives, targets and interventions to be achieved at national level. NAPs provide a very important national basis and a foundation for the agreed regional actions in the Strategic Action Programme, while also standing alone as a commitment to implement national actions

→ TDA/SAP Manual – Chapter 11, section 4.11  
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As of 2014, only 6 Strategic Action Programmes for LMEs had included NAPs for implementation in the regional SAP (Duda 2014). NAPs tend to vary considerably in nature and structure, depending on the country. The process of development of NAPs also differs, with some LMEs developing NAPs alongside the SAP, and others developing NAPs once the regional SAP is agreed.

In one example, the Bay of Bengal LME Project facilitated the development of a regional TDA and SAP. As part of the process, national SAP consultations were used to review and prioritise actions relevant to each country. The SAP was updated to reflect the national prioritization process before it was endorsed and adopted. The SAP included (1) a series of actions to be coordinated through a regional mechanism under a second phase of the BOBLME Project (the SAP Implementation Project) and (2) selected national actions that would be taken up by each country in their own NAP, and recognized as contributing to overall SAP implementation.

The NAP process must be closely linked to the SAP process to ensure that the content of the two are closely related and that they reflect the transboundary priorities identified in the TDA. Without that close link, the NAP may lose its cohesiveness and risks becoming a to-do list of national priorities for policy reform. This requires a strong working relationship between organisations and conventions already working on national-level policy reform, and the institution/s delivering SAP implementation (UNDP 2017).

NAPs provide an opportunity to involve multiple national sector interests, and to incorporate actions for implementation into national budgets. Thus, national inter-ministerial coordination mechanisms need to be closely involved with the development of the NAP.

### Formulating National Interministerial Committees

The objective of the TDA/SAP process is to achieve high level support for the transboundary management of an LME, and as one of the first steps to achieving this, establishing a committee at national level can build a firm base of support in each of the participating countries. The value of establishing an efficient IMC is significant. It is important for IMCs to have a clear mandate, at least endorsed for administrative purposes, but preferably also legally endorsed for purposes of legitimacy and accountability. IMCs at national level serve to facilitate the inter-ministerial dialogue necessary for cooperation. Where possible, committees already established for the purposes of ICM or MSP should be used and expanded to make the most efficient use of resources.

## Representation on Interministerial Committees

Since IMCs can and should play a key role in national and regional ocean governance processes, they should be permanent structures in ocean governance arrangements. They are important for linking regional to national to local levels vertically, as well as connecting sectors within countries, at national level. This is, however, usually not the case, and IMCs will often be constituted for the purposes of a process (ICM, MSP) or project.

IMC should be formed from a range of organisations concerned with marine and coastal management. Ministries or departments that should be considered include at least those responsible for the Environment, Oceans, Fisheries, Tourism, Minerals and Energy, Protected Areas, Foreign Affairs, and Ports/marine transport. Other agencies such as rural development, social welfare, culture, finance, energy and statistics and academic institutions may also have roles relating to the marine environment. The mix of relevant agencies will vary between countries and also within countries over time as activities and issues of concern shift in nature and priority (McConney *et. al.* 2016). Membership should be at Permanent Secretary / Director General level or higher if possible, to ensure a direct line of communication to Ministers.

Comprehensive sector representation is critical. Community level and private sector inclusion in IMCs is also significantly important and should be encouraged. Traditionally, the private sector has been less involved than NGOs and civil society. The presence of a strong civil society (NGO and private sector) representation on IMCs can improve the input of these groups into the LME TDA/SAP process.

Establishing a new IMC takes time, and the process should be given due attention to get the best results.

## Adoption of existing Interministerial Committees

In countries where permanent IMCs do exist, or where they have been constituted for the purposes of another project, it would be good practice for an LME Project to adopt or use these same structures where possible. An example of this is presented by McConney *et. al.* (2016) for St Kitts and Nevis, where an informal National Interministerial Committee (NIC) developed out of an existing Project Steering Committee for a marine EBM project in 2010.

On the inception of the ASCLME Project, the existence of Sustainable Development Committees for the marine and coastal environment that had been established by the EU-funded Regional Programme for the Sustainable Management of Coastal Zones in the Indian Ocean (ReCoMaP) Project were identified. These committees were still functioning effectively in the Seychelles and the Comoros. The ASCLME project adopted these committees and co-funded meetings in certain instances. Once the ReCoMaP project closed, ASCLME continued to use the same committees on an ongoing basis. This took advantage of the national institutional memory of the ICZM process, and helped to link the LME process to the development of an ICZM protocol to the Nairobi Convention for the Western Indian Ocean (WIO) countries.

## Interministerial Committees and GEF IW

The importance of having functional IMCs at national level has long been recognised as an important tool for the GEF IW portfolio, and within this context, most LME Projects have aimed to constitute or support these structures within their participating countries. The GEF evaluation office adopted the formulation of IMCs as one of the process indicators in 1998.

Establishing an efficient technical team, under the IMC, from the same ministries, can ensure the collection of sound, verified information at national level to feed into the TDA process. It is also extremely beneficial to involve universities and research institutes, NGOs and the private sector in committees from the start. Stakeholders from

local communities, subsistence and artisanal fishers and other coastal dwellers should also be included to ensure that their knowledge and interests are represented. The common approach of establishing a committee in each participating country can begin to build consensus from the start of the process.

It is essential to get national agreement on the lead agency for coordination of these committees, ideally an agency that works well with other national partners. A healthy exchange of information is useful, and might be facilitated by a good lead agency. In the case of the ASCLME Project, three organisations were nominated by each participating country to coordinate data and information, capacity building and cruise coordination. The selection of the three leads was made by the countries against a clear Terms of Reference. The lead organization for Data and Information was the South African Environmental Observation Network (offshore node) which is a facility of the National Research Foundation, hosted by the Department of Environmental Affairs. The same lead was also responsible for coordinating an inter-ministerial team for the development of the Marine Ecosystem Diagnostic Analysis (MEDA), the equivalent of a National Diagnostic Analysis, which also provided the primary national technical input into the regional ASCLME TDA ([ASCLME/SWIOFP 2012](#)).

### Establishing a new Interministerial Committee

In the early 1980s, the focus for establishment of IMCs was in support of ICZM processes. In the 1990s, the focus changed to sustainable development, and further to climate change and ecosystem-based approaches as well as the blue economy, since 2000.

In the case where an LME project is either supporting existing IMCs, or considering new ones, the first step will always be to identify and evaluate what is already in place, and thereafter design or confirm a mechanism that will best serve the needs of the project and the countries in the long term.

Countries in most LMEs exhibit diversity in size, mode of governance, number and arrangement of marine related ministries, culture and socio-economic characteristics.

An approach recommended by McConney *et. al.* ([2016](#)) in establishing a new IMC is to:

- Outline the functions that the committee is expected to carry out, drawing on existing documentation of governance,
- Determine what mechanisms are in place, or have been tried in participating countries and territories to carry out these and related functions,
- Develop generic summary guidelines to establish/strengthen mechanisms, and
- Use a participatory approach to monitor progress with the establishment, strengthening and operation of these mechanisms over the duration of the Project.

The presence of a representative interministerial committee can help the process of development of National Action Programmes, as national policy interest will be well known by the IMC and response times for consultation with various ministries should be shorter. IMCs can provide an important vertical link between regional SAP development and national policy adaptation and NAP development.

Many Strategic Action Programmes mention the establishment of IMCs as targets for the implementation of EBM at national level; for example the Caribbean LME Project (CLME+) states that target participating countries should have:

- Sustainable national inter-sectoral/ministerial committees or equivalent mechanisms established or operational in at least 75% of the countries within the first five years of the SAP;
- Sustainable national inter-sectoral/ministerial committees or equivalent mechanisms established and operational in at least 90% of the SAP participating countries within the 10-year SAP implementation period.

Although an important tool, IMCs have not been used by every LME Project and are not relevant in every situation. The Benguela Current Large Marine Ecosystem Project I (BCLME) for example, was designed with five outputs, the first of which was:

- Effective intra and inter-project coordination and support through the establishment of a Program Coordination Unit (PCU) leading to the creation and functioning of the Interim Benguela Current Commission (BCC), and the identification of, and provision of resources for, Lead Agencies and Inter-ministerial Committees in each of the participating countries.

This was soon revised however, as it was recognised that with only three countries as participants, most of the relevant ministries were already present on the BCLME Project Steering Committee at regional level, and IMCs were not needed. Instead, the Project fixed a single lead agency for each country and introduced the Activity Centres and Advisory Groups. National Interministerial Committees are now planned for phase III.

In the Humboldt Current LME, Interministerial Committees were planned and implemented, meeting about twice a year. They are uncharacteristically large, with  $\pm 50$  members each. Members formed smaller technical working groups around specific issues (TDA/SAP, risk analysis, Ocean Health Index, etc.). A group of 15 were selected from IMCs for technical oversight and decision making (McConney *et. al.* 2016).

In both the Gulf of Guinea LME and the Guinea Current LME Projects, the Governance module was directed at improving socio-economic conditions through

- recovery of depleted fish stocks
- reducing ocean pollution, and
- restoring and maintaining habitats in support of a healthy ecosystem.

The establishment of IMCs in each GCLME country helped the SAP to be agreed upon and signed. National Programs of Action (NPA) and National Action Plans (NAPs) focussed on reversing fisheries depletion, reducing and preventing pollution, and restoring degraded habitats. They were prepared and approved by member states (Abe *et. al.* 2016)

## Functions of an Interministerial Committee

An IMC should follow international principles for good governance (accountability, effectiveness, efficiency, equity, inclusivity, legitimacy, participation, responsiveness and transparency, while also being responsive to national and local level requirements. The characteristics of IMCs are expected to differ between countries, but some universal objectives that an IMC should seek to attain include to:

- Involve stakeholders comprehensively:
  - State actors - government agencies, parastatal bodies
  - Non-state actors - NGOs, CBOs and academia
  - Private sector - from small to large enterprises
- Promote an enabling environment that ensures opportunity and support for stakeholder participation and encourages change agents such as individual leaders and champions
- Have a clear mandate that is at least administrative (politically endorsed) but preferably legal (for legitimacy, accountability)
- Have well documented processes that are available to all stakeholders (for transparency, accountability) to ensure:
  - Internal communication among stakeholders; provision of national input to regional projects and organisations; receipt and distribution of input from regional projects and organisations; appropriate national representation at regional level;
  - A system for documentation of activities, contributing to institutional memory, with outputs easily available to all stakeholders (for transparency and responsiveness);
- Have an institutionalised mechanism for regular review, evaluation, learning and adaptation (for efficiency, effectiveness and responsiveness);
- Serve to integrate sectors and actors involved in marine affairs at the national level;
- Function as a two-way linkage between national and regional governance processes;
- Address other functions specific to their scope and mandate including, inter alia, using marine ecosystem-based approaches, social-ecological system frameworks, risk analysis and resilience or vulnerability concepts, the details of which will differ by circumstance and change over time. (McConney *et. al.* 2016)

The CLME+ coordinated a study of ten LMEs, which found that the global state of IMC implementation termed National Interministerial Committees (NICs) has been highly variable, although the appreciation of the importance of IMCs has increased with time, both within successive series of projects and across the IW portfolio. The status of implementation of IMCs was also found to be very variable. In some cases, the IMC is a high- level committee and there is an additional technical committee; in other cases the IMC is the only national level committee and it has a direct role in implementing project activities.

In regions where IMCs were not successfully implemented, some suggested reasons include:

- A lack of appreciation of their importance,
- More interest in technical aspects of the project,
- Recognition that IMCs were a burden on already overworked national staff,
- Unwillingness to pressure (reluctant) countries, and
- Belief that it should be the role of national actors to establish IMCs (McConney *et. al.* 2016).

Challenges that have been identified include:

- Lack of will and/or capacity for organisation at the national level;
- Lack of funds to operate IMCs;
- Perception that project specific IMCs are too burdensome and that IMCs should be permanent mechanisms;
- IMCs not properly incorporated in project design;
- Project management unwilling to push countries to establish IMCs
- Issues of mis-matches of scale and scope have impacts on IMCs in several ways:
  - Topical scope of IMC (topical focus is too wide (e.g. Sustainable Development, climate change) or too narrow (e.g. fisheries governance);
  - Geographical scope of IMC too narrow (e.g. coastal zone management) or terrestrial (climate change);
  - Stakeholder and sectoral scope of IMC is too narrow (e.g. few different state or non-state actors);
  - Transboundary scope of IMC too limited (e.g. only national matters receive attention and few external linkages are used);

Factors explaining inactivity of IMCs after their establishment included:

- ineffective leadership;
- disinterest of parties involved;
- inability to dedicate time;
- lack of stipend or travel
- support for participants;
- inability to get follow-up commitment from members;
- disagreement on the state agency that should chair the NIC; and
- political interference or changes.



These are also barriers to their establishment. IMCs in other LME regions appear to suffer similar challenges (McConney *et. al.* 2016).

The CLME+ project also conducted a survey of 41 CLME+ project countries and territories. Approximately 35 IMCs were identified and contacted to identify lessons learned. That study found the governance arrangements to be more complex in large countries with several levels of governance and with governance devolved to local levels. In some cases, IMC-like arrangements were found at sub-national level as well. It was difficult for the study to determine which IMCs were active or inactive; of 25 current IMCs, 26% were considered to be inactive with meetings or activities either infrequent or non-existent.


The 35 IMCs fell roughly into 5 categories, with 37% focused mainly on marine governance, 26% on fisheries governance and 14% on the environment. 18% focused only on ONE sector or topic (e.g. fisheries governance, or ICM). Some were mandated by law but others had a looser arrangement.

Lessons learned / points to consider

- Operating costs of IMCs are often not adequately addressed, this includes financial cost but also transaction costs of keeping a diverse group of stakeholders interacting,
- Processes within IMCs are often poorly documented and institutional memory is often poor, and
- IMCs should have an institutionalized mechanism for review, so that the functioning of the committee can be measured and improved where necessary.

Recommendations from the CLME+ study that can be used by other LMEs include:

- 1 Clarify the specification of IMCs to determine more precisely what are or are not IMCs
- 2 Set out the several types and stages of IMCs that are of interest and potential for CLME+
- 3 Obtain more detailed information from countries to identify successes and best practices
- 4 Provide activity incentives for CLME+ project countries to establish or strengthen IMCs
- 5 Promote IMCs as critical mechanisms for marine governance beyond the CLME+ project
- 6 Assist progressive countries to advance their IMCs as models of success to be replicated
- 7 Develop a handbook of guidelines for establishing and operating IMCs in CLME+ countries (McConney *et. al.* 2016)



## 5. Best practice in MPA, ICM, MSP, and the use of fisheries refugia tools/elements and recommendations for inclusion into the strategic approach.

In addition to the support of LMEs, the GEF works at other scales, such as providing support for ICM at community and river basin scale, to promote sustainable use and habitat protection ([Sherman et. al. 2009](#)). The first operational strategy for IW in 1995 identified the importance of ICM and MPAs. From that time, ICM and MPA projects have been eligible for GEF funding through the GEF IW portfolio.

Many TDAs and SAPs in LMEs have incorporated the use of closely related spatial or species based instruments to assist the improvement of management and governance of LMEs. Some of the approaches used in conjunction with the LME approach have included: The Ecosystem Based Management Approach (EBM); An Ecosystem Based Approach to Fisheries (EAF); ICM; MSP; MPAs and fisheries refugia.

The use of some of these tools in completed SAPs to date has recently been reviewed (Table 1), including:

- SAPs for 8 LMEs plus PEMSEA emphasise or include ICM measures and activities,
- The relatively new approach of Marine Spatial Planning has been emphasized in few SAPs; the Red Sea, PEMSEA (ICM zoning), SAPPHIRE and CLME+,
- 6 SAPs include specific measures for creating or strengthening Marine Protected Areas, and
- The SCS+GT SAP includes a special emphasis with targets and deadlines for fisheries refugia / community run temporary closures for fisheries.

Table 1. LME management strategies for SAP implementation (from [UNDP 2017](#))

|   | NO. OF SAPS | FREQUENCY |
|---|-------------|-----------|
| Cost-Benefit Analysis of overall EBM approach and/or Value Chain Analysis for specific sectors (e.g. specific fisheries) to justify political support to EBM approach | 16          | 89%       |
| Identification and adoption of management areas for maintenance of biodiversity and related goods and services, including marine and coastal connectivity             | 16          | 89%       |
| Adoption of an effective EAF for the management of living marine resources & fisheries focusing on food security  | 14          | 78%       |
| Overall regional interaction and coordination on EBM and EAF issues   | 14          | 78%       |
| National and Region-wide standard application of successful procedures and tools such as EIA, SEA, ICM, MSP, GIS in the transboundary context                         | 14          | 78%       |
| National adoption of an EBM and EAF approach with associated effective monitoring and enforcement   | 12          | 67%       |
| Development of a regional network of connected MPAs and EBSAs   | 10          | 56%       |
| Adoption of new 'best practice' cost-effective technologies to address threats and impacts to the ecosystem   | 9           | 50%       |
| Improvements in mariculture techniques to reduce pressure on LMRs and the ecosystem   | 8           | 44%       |
| Restoration of natural ecosystem processes (e.g. within watersheds, mangrove restoration, artificial coral propagation, etc.)   | 8           | 44%       |

Programming separate projects across one region (as in the example of Vietnam) is an approach that has been used in some LME regions, but the preferable approach would be to ensure that the LME approach is more strategic from the start, includes adjacent rivers and inshore coastal regions and includes hotspot or national activities such as MPAs, ICM and fisheries refugia as local demonstrations in regional LME projects.

An example of action at provincial and municipal scale is the GEF-funded UNDP-supported Partnerships in Environmental Management for the Seas of East Asia (PEMSEA) program with its focus on ICM. ICM tools can be used in a manner similar to the LME approach but at local scale, by increasing awareness of the importance of ecosystem services and values, encouraging private sector involvement and multi-sectoral management ([Sherman et al. 2009](#)).



A good example linking LMEs, ICM and MPAs is the Gulf of Aqaba IW Project in the Red Sea LME. A transboundary marine park was established with World Bank and GEF support. The Aqaba Development authority for ICM was adopted and operationalized to sustain the MPA (Duda 2016). The project helped Jordan to operationalize the Aqaba development Authority for ICM in support of the MPA, protecting an area of sensitive reefs within the Red Sea LME. (Duda 2014).

The UNDP Ecosystems and Biodiversity (EBD) Programme supports projects for biodiversity management and sustainable development in costal and marine regions. Thirty five countries are beneficiaries, among them 7 LDCs and 10 SIDS. Interventions include the establishment, strengthening and financing of MPAs, integration of biodiversity management measures into other sectors (such as fisheries), the application of ecosystem-based adaptation in critical coastal habitats (mangroves, coral reefs), the sustainable livelihoods of coastal communities (incorporating payment for ecosystem services and microgrants).

## 5.1 The Ecosystem Based Management Approach

The geographic LME approach was itself designed to be a vehicle for operationalizing the Ecosystem Based Management (EBM) approach, with area large enough to address transboundary considerations (Duda 2016). The five-module approach for LME assessment is premised on the need for an EBM approach to LMEs, that is inclusive of all the ecological parameters as well as the human dimension. Ecosystem-based management provides a framework for the integration of these and other strategies to improve efficiencies and better management of ecosystems.

Single-approach strategies, that might include single-species fisheries management, MPA network development, climate change adaptation measures or pollution / invasive species management measures can be very useful tools, and make significant contributions to protection of ecosystems. However, a lack of integration with other strategies can lead to challenges in implementation and potential conflict between sectors and approaches.

A description of EBM is that it: "emphasizes the protection of ecosystem structure, functioning and key processes; is place-based in focusing on a specific ecosystem and the range of activities affecting it; explicitly accounts for the interconnectedness among systems, such as between air, land and sea; and integrates ecological, social, economic and institutional perspectives, recognizing their strong interdependences." (Bensted-Smith and Kirkman 2010).

NOAA provides a very useful tool for understanding EBM:

➞ <http://ecosystems.noaa.gov/EBM101/WhatisEcosystem-BasedManagement.aspx>

It describes EBM as having the following core characteristics:

- Adaptive and flexible, responsive to monitoring and research results,
- Place-based with geographic areas defined by ecological criteria,
- Cross-sectoral, considering interactions between sectors of human activity,

- Proactive, incorporating tradeoffs to manage the marine and coastal environments, and
- Inclusive and collaborative, encourages participation from all levels of government, indigenous peoples, stakeholders.

UN Environment's proposes the step by step process for moving towards EBM. It outlines the following steps for implementing marine and coastal EBM:

- 1 Making the case for marine and coastal EBM,
- 2 Examining the core elements of EBM, and
- 3 Moving towards EBM

The guidelines cover the full EBM process, from establishing a foundation, to charting the EBM process, and to applying and adapting EBM.

## 5.2 An Ecosystem Based Approach to Fisheries

Ecosystem Based Fisheries Management (EBFM) is an approach to fisheries management that puts the health of the ecosystem as a priority, rather than that of the target species. Traditional fisheries practices aim to maximize the catch of a single species, ignoring habitat, prey, predators of the target species and other ecosystem interactions. Unintended consequences of fishing may include habitat destruction, incidental mortality of non-target species, evolutionary shifts in population demographics, and changes in the structure and functioning of ecosystems.

Global discards in commercial fisheries were estimated at 27 million metric tons in 1997, which was then estimated at one fourth of the world's fish catch. Ecosystem based fisheries management seeks also to reduce global bycatch, through the introduction of ocean zoning and also the development and deployment of less damaging fishing technologies.

In particular, EBFM seeks to:

- 1 avoid degradation of ecosystems, as measured by indicators of environmental quality and system status,
- 2 minimize the risk of irreversible change to natural assemblages of species and ecosystem processes,
- 3 obtain and maintain long-term socioeconomic benefits without compromising the ecosystem, and
- 4 generate knowledge of ecosystem processes sufficient to understand the likely consequences of human actions. (Pikitch *et. al.* 2004)

Similarly, an Ecosystem Approach to Fisheries (EAF) is a holistic strategy for managing capture fisheries so that ecological, socio-economic and institutional dimensions are integrated (see Table 2). The EAF attempts to:

- reduce ecosystem effects of fishing on associated or dependent species such as predator or prey of the target fishery,
- reduce impacts of fishing gear on the environment,
- to improve selectivity and thus reduce bycatch and discards, as well as to, and
- reduce gear loss and ghost fishing.

The EAF Management Cycle (Figure 2) addresses:

- 1 Initiation and planning
- 2 Identify and prioritise issues
- 3 Develop management system
- 4 Implement and monitor

EAF planning and implementation may be at different time scales; for example one year for tactical, and 5-10 years for medium to long term planning and implementation (Bianchi *et. al.* 2016). The ecosystem approach to fisheries is well described in [➔ FAO Fisheries Technical Paper No 443](#) (Garcia *et.al.* 2003).

In those LMEs where fisheries are not sustainable, EAF planning and implementation is a valuable tool for dealing with fisheries issues within the LME EBM framework. This process has been adopted in the BCLME, BOBLME, CCLME and CLME where EAF is being implemented in the shrimp and ground fish fisheries. The "issue identification" step of EAF can be equated to the same step in the TDA process (Bianchi *et. al.* 2016).

In some cases it has been difficult to involve Regional Fisheries Bodies (RFBs) in the work of LMEs unless it was deliberately planned with FAO, but this has been shown to work in the cases of CCLME, GCLME, CLME+ and BOBLME at least (Duda 2014).



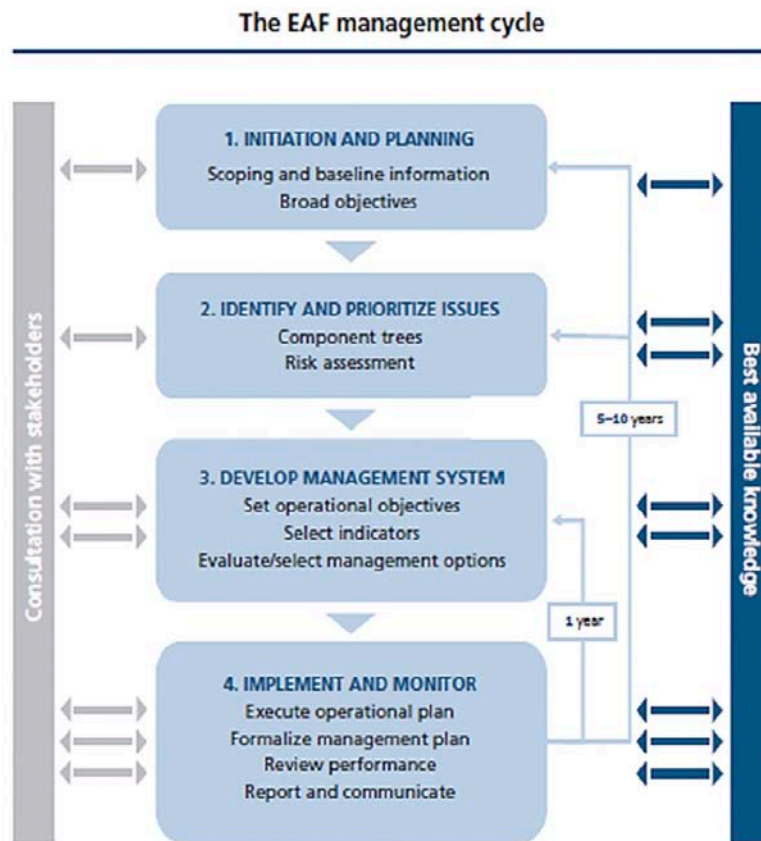


Figure 2. The EAF Management Cycle (Bianchi et. al. 2016)

The FAO Code of Conduct for Responsible Fisheries (1995) contains provisions for many aspects of the EAF, in particular calling for a management approach to fisheries that gives more attention to the ecosystem. The Code provides a synthesis of a number of binding and voluntary arrangements, agreements, conventions etc. of direct and indirect relevance to fisheries, to increase the sustainable contribution of fisheries to development. The term "Ecosystem Approach to Fisheries" was adopted by the FAO Technical Consultation on Ecosystem- based Fisheries Management in 2002, as a term that would not be limited narrowly to management, could easily cover also development, planning, food safety, etc., thus better matching the breadth of the FAO Code of Conduct (Garcia et.al. 2003).

Unsustainable fishing practices have resulted in close to 30% of fish stocks being overexploited or collapsed, within LMEs (GEF LME:Learn 2017). Thus, the inclusion of sustainable fishing management measures is essential in many SAPs. The EAF has been incorporated into the fisheries components of several LME projects.

In the Benguela Current LME, for example, the FAO has supported the BCC through its involvement in fisheries surveys and the implementation of an EAF in the region. The EAF Nansen Programme has also provided long term support to the three participating countries, through fisheries surveys and EAF training courses. WWF has also promoted EAF in the BCC region through establishing baselines for tracking EAF in the three participating countries and mobilizing the human dimension of EAF. WWF's Responsible Fishing Training Programme has been implemented in Namibia in partnership between the BCC and Namibian Fisheries Institute.

Table 2. A schematic comparison of traditional fisheries vs ecosystem based management (in Garcia et. al. 2003)

| Criteria                              |   | Fisheries management   | Ecosystem management  |
|---------------------------------------|---|--|---|
| <b>Paradigm</b>                       |   | Sector-based. Vertically integrated. Focusing on target resource and people.                                       | Area-based. Holistic. Loosely cross-sectoral. Focusing on habitats and ecosystem integrity.   |
| <b>Governance</b>                     | <b>Objectives</b>                       | Not always coherent or transparent. "Optimal" system output. Social peace.   | A desired state of the ecosystem (health, integrity).   |
|                                       | <b>Scientific input</b>                 | Formalized (particularly in regional commissions). Variable impact.  | Less formalized. Less operational. Often insufficient. Stronger role of advocacy science.   |
|                                       | <b>Decision-making</b>                  | Most often top-down. Strongly influenced by industry lobbying. Growing role of environmental NGOs.                 | Highly variable. Often more participative. Strongly influenced by environmental lobbies. Stronger use of tribunals.   |
|                                       | <b>Role of the media</b>                | Historically limited. Growing as fisheries crisis spreads.   | Stronger use of the media.  |
|                                       | <b>Regional and global institutions</b> | Central role of the Food and Agriculture Organization of the UN and regional fishery bodies.                       | Central role of United Nations Environment Programme (UNEP) and the Regional Seas Conventions.  |
| <b>Geographical basis</b>             |   | A process of overlapping and cascading subdivision of the oceans for allocation of resources and responsibilities. | A progressive consideration of larger-scale ecosystems for more comprehensive management, e.g. from specific areas to entire coastal zones and Large Marine Ecosystems (LME). |
| <b>Stakeholder and political base</b> |   | Narrow. Essentially fishery stakeholders. Progressively opening to other interests.                                | Much broader. Society-wide. Often with support from recreational and small-scale fisheries.   |
| <b>Global instruments</b>             |   | 1982 Law of the Sea Convention, UN Fish Stock Agreement and FAO Code of Conduct.                                   | Ramsar Convention, UN Conference on Environment and Development and 1992 Agenda 21, Convention on Biological Diversity and Jakarta Mandate.                                   |
| <b>Measures</b>                       |   | Regulation of human activity inputs (gear, effort, capacity) or output (removals, quotas) and trade.               | Protection of specified areas and habitats, including limitation or exclusion of extractive human activities. Total or partial ban of some human activities.                  |

The Bay of Bengal LME Project, together with NOAA and the Coral Triangle Support Partnership (CTSP), funded by the U.S. Agency for International Development (USAID), the FAO, and the Asia Pacific Fishery Commission (APFIC) developed very useful tools for EAF, including a training course and toolkit on the ecosystem approach to fisheries management, specific to the needs of the Asia-Pacific region.

In the Bay of Bengal LME, eight countries have provided fisheries advisories for hillsa and shad or Indian mackerel, that incorporated the ecosystem approach. Advisories were produced by a Regional Fisheries Management Advisory committee which received information from technical working groups. Together with partners APFIC, the Coral Triangle Initiative (CTI), USAID and NOAA developed a one-week training course on EAF (Essential ecosystem approach to fisheries management) which consists of 18 modules addressing EAF (Bianchi et. al. 2016).

➞ The Essential EAFM Handbook (Staples et. al. 2014)

The FAO has developed the EAF toolbox, which guides users through the four main EAF planning steps and activities. The toolbox aims to assist the choice of tool according to fishery type, resources and capacity.

➞ [www.fao.org/fishery/eaf-net/toolbox/en](http://www.fao.org/fishery/eaf-net/toolbox/en)

The Nansen Programme, now operating as the EAF-Nansen Project, has been instrumental in assisting fisheries projects in Africa for many decades. The Nansen Programme has collaborated with the Agulhas and Somali Currents LME (ASCLME) Project, the Benguela Current LME (BCLME) Project and its successor the Benguela Current Commission (BCC) as well as the Canary Current LME (CCLME) Project and the Guinea Current LME (GCLME) Project. In South Asia, the Nansen Programme has also collaborated with the Bay of Bengal LME (BoBLME) Project.

From 2007 when the EAF-Nansen project became fully functional, a partnership agreement was signed with the LME projects under implementation, namely ASCLME, GCLME and also the Interim Benguela Current Commission (BCC). The CCLME project came on line a few years later. The partnership agreements specified collaboration in various areas:

The Project collaborated with the BCC for example, to implement the following projects:

- Implementing a process which allows the view (auditing) and tracking of EAF in management (also known as the Tracking Tool project),
- Guidance on institutional arrangements which support EAF, and
- Integrating the human dimension of EAF into fisheries management in the BCC region.

The Tracking Tool project was intended to adapt the FAO/WWF-South Africa EAF Tracking Tool for use in the three countries in the BCC area and to build the capacity of scientists and managers in all three countries and particularly in Angola in Ecological Risk Assessment (ERA) methodology and practice, and the use of the tracking tool, to be able to participate fully in the project. Another objective was to assess progress made in implementing an EAF in the region through periodic ERA reviews.

The project was considered a success, and the approach was used to establish EAF implementation baselines in the ASCLME, CCLME and GCLME. the EAF-Nansen Project also collaborated with the South West Indian Ocean Fisheries Project (SWIOFP), which is one of three projects in the ASCLME programme, to assist each ASCLME country, except Somalia and South Africa, both technically and financially to prepare an EAF management plan for at least one fishery.

Fisheries governance frameworks at the sectoral level (including the Ecosystem Approach to Fisheries) must be linked to broader governance frameworks (such as EBM); this has been successfully demonstrated in some LME Projects such as the BOBLME and the Caribbean LME ([Bianchi \*et al.\* 2016](#)).

BOBLME and the CLME have explicitly incorporated EAF into SAPs.

## 5.3 Integrated Coastal Management (ICM)

Integrated Coastal Management (ICM) or Integrated Coastal Zone Management (ICZM), is a cyclical process that aims to build increasingly effective and resilient governance. ICM programs tend to be planned over 15-20 year periods, longer than donor-funded projects tend to last. Management and conservation goals are usually set by governance agencies and local stakeholders together - depending on national priorities and policies. Geographic boundaries tend to be set by stakeholders and authorities, and are not pre-determined by biogeographic considerations.

The term Integrated Coastal Management was first used in 1992 during the Earth Summit in Rio de Janeiro. A widely-used definition is "a continuous and dynamic process, which unites government and the community, science and management, sectoral and public interests in preparing and implementing an integrated plan for the protection and development of coastal ecosystems and resources" (GESAMP 1996). ICM is essentially a set of principles guiding a participatory approach for integrating environmental, economic, social, cultural and recreational objectives (a methodology for conservation and development that can be applied in any programme or region).

Defining features of Integrated Coastal Management are that:

- It is a cyclical process that aims to build effective, equitable and sustainable governance through successive cycles of intervention and learning,
- Conservation and development goals to be attained are defined by stakeholders and relevant authorities, and will be dependent on values and national policies, and
- The geographic boundaries of the ICM programme are defined and refined by the stakeholders and relevant authorities, and are not determined by biogeographic considerations. The programme area is generally one where the interests of stakeholders overlap, and where there is a need to introduce or improve inclusive, sustainable management.

Objectives of ICZM (according to the ICZM protocol to the Barcelona convention) are to:

- Facilitate, through the rational planning of activities, the sustainable development of coastal zones by ensuring that the environment and landscapes are taken into account in harmony with economic, social and cultural development,
- Preserve coastal zones for the benefit of current and future generations,
- Ensure the sustainable use of natural resources, particularly with regard to water use,
- Ensure preservation of the integrity of coastal ecosystems, landscapes and geomorphology,
- Prevent and/or reduce the effects of natural hazards and in particular of climate change, which can be induced by natural or human activities, and
- Achieve coherence between public and private initiatives and between all decisions by the public authorities, at the national, regional and local levels, which affect the use of the coastal zone.

Sorensen (2000) estimates that 345 ICM projects have been implemented in 95 coastal countries / states, of which 70 were developing nations. Most ICM project have been small-scale projects, driven by a need for inter-sectoral coordination in a specific, small area - an MPA, a port, island or a section of a coast. ICM/ICZM varies considerably in size, from country-wide (as in the example of Bangladesh), to the size of a municipality (Chonburi, Thailand and Xiamen, China). The development of ICM programs has largely been driven by the threats posed by coastal or land-based issues such as tourism, inshore pollution, and competing demands on the coast. Fisheries are often not well represented in ICM projects (Bensted-Smith and Kirkman 2010).

Up to 2012, the GEF had invested \$126 million USD in 32 ICM projects around the world, including in the seas of east Asia, Mediterranean Sea and the West Bering Sea. Some interesting examples include:

- The Pacific Integrated Water Resources Management (IWRM) project had an emphasis on freshwater drainages and aquifer linkages to coastal areas. The emphasis was on the impacts of land-based activities that have the potential to degrade coastal areas, and the importance of ridge-to-reef approaches that start on land, to understand land-based impacts on LMEs, and
- Integrated Watershed and Coastal Areas Management (IWCAM) is one successful example in the Caribbean SIDS.

Developing ICZM/ICM protocols to add to regional seas Conventions has been one way to incorporate new mechanisms for management and governance of the coastal zone via national and local ICM implementation. The Mediterranean region was the first to successfully introduce an ICZM protocol to a Regional Seas framework. The Strategic Partnership for the Mediterranean LME (MedPartnership) project supported countries for implementation of the Protocol through capacity building, aquifer management and 13 demonstration projects. The transfer of environmentally sound technology (TEST) was implemented in 43 industries to reduce pollution loads and improve water productivity. Support for a more effective network of MPAs (through capacity building and demonstration projects) led to Libya establishing its first MPA, and to Management plans for MPAs being drafted by Croatia, Algeria and Turkey (IW: Learn). In addition, the UNEP GEF project MED Integration of Climatic Variability and Change into National Strategies to implement the ICZM Protocol in the Mediterranean had a focus on assisting countries to better understand climate change concerns, integrated into ICZM planning.

Over the past two decades, ICM has been applied in many sites across East Asia, covering more than 31,000 km of coastline and benefiting tens of millions of people in coastal areas. Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), is of particular note as an example of a regional portfolio of ICM projects. Its geographic coverage includes the six sub-regional seas of the East Asian region. PEMSEA's combination of site-specific projects with regional networking, rather than hierarchical governance, has proven to be very effective (Thia-Eng 2006). Examples of demonstration projects in the PEMSEA region are:

Pollution reduction and waste management in Xiamen, China

- Three cycles of ICM implementation supported better access to the beaches and sea, plus improving the cleanliness and health of the coastal environment.

Food security and livelihood management in Chonburi, Thailand

- ICM implementation aimed at the sustainable management of blue swimming crabs. A demonstration project was started in the Sriracha municipality in 2006, and since applied in seven additional municipalities, with a marked increase in catches (94% increase 2011 to 2012).

Water use and supply management in Preah Sihanouk Province, Cambodia

- A five-hectare freshwater reservoir was rehabilitated, benefiting over 5000 people in the local area through improved access to potable water for domestic and agricultural use.
- Improved weather resources reduced annual water expenses for small scale business by an average of 30%.



## Habitat protection, restoration and management in Batangas, Philippines

- 14 coastal municipalities and stakeholders established a network of MPAs to manage and protect fisheries resources, coral reefs, seagrass beds and mangroves. Residents benefited from increased catches and the return of economically important fish species.

## Natural and man-made hazard prevention and management in Danang, Vietnam

- An ICM programme in the Danang region focused on measures to strengthen resilience to climate change, including natural buffers against storm surges, improved forecasting and early warning, response and recovery measures. 6.5 KM of dykes were strengthened as a barrier to saltwater intrusion, saving more than 400 hectares of agricultural land. ([Thia-Eng 2016](#))

While demonstration projects were supported in seven of the PEMSEA LMEs (focused on ICM, spatial management in terms of zoning, and inclusion of MPAs) work at a larger, LME-wide scale was supported in four of the seven individual LMEs (SCS + GT, YSLME, ATSEA -Indonesian Seas LME, and Sulu-Celebes LME).

In the Western Indian Ocean, the GEF funded, UN Environment implemented Project Addressing Land-based Impacts on the Coastal Zone (WIO-LaB) supported the development of an ICZM Protocol to the Nairobi Convention. In 2006, the Regional Program for the Sustainable Management of the Coastal Zones of the Countries of the Indian Ocean Project (ReCoMaP) was initiated to strengthen the regional ICZM capacity in the counties of the Western Indian Ocean. The project was implemented by the Indian Ocean Commission (COI) and the European Union (EU), and it assisted in the development of national ICZM strategies in Comoros, Seychelles, Mauritius, Madagascar, Kenya and Somalia. The project also encouraged the development of a regional protocol under the Nairobi Convention ([Bille and Rochette 2010](#)). The chief success of the ReCoMaP project was in building the consensus needed among the parties of the Nairobi Convention, to begin the process of developing a regional framework ([Martin 2014](#)).

## 5.4 Marine Spatial Planning (MSP)

Marine Spatial Planning or Maritime Spatial Planning (MSP), has been defined as: "a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process" ([Ehler and Douvere 2009](#)).

The IOC/UNESCO has developed excellent guidance material on MSP ([Ehler and Douvere 2009](#), [Ehler 2014](#)) which sets out the 10-step approach for MSP, outlining steps and tasks for undertaking Marine Spatial Planning in generic terms. It incorporates best practice, what has worked or not worked in MSP initiatives around the world.



Key characteristics of effective marine spatial plans are that they are:

- Ecosystem-based, balancing ecological, economic, and social goals and objectives toward sustainable development,
- Integrated, across sectors and agencies, and among levels of government,
- Place-based or area-based,
- Adaptive, capable of learning from experience,
- Strategic and anticipatory, focused on the long-term, and
- Participatory, stakeholders actively involved in the process.

As of 2017, 45 marine spatial plans had been approved around the world, and 65 are starting or planned. ([Ehler pers comm. 2017](#))

The [CBD and GEF-STAP Report \(2012\)](#) reviews MSP around the world, and identifies good lessons from implementation in various projects and should be used as a reference.

There is much room for the two concepts, ICM and MSP, to be better harmonized so that planning and management on the coasts can be integrated with adjacent river systems and spatial planning in the marine realm out to the extents of the EEZ. Many countries have set up effective ICM committees at national or local level, and these should be brought in to the MSP process which is still only starting to be implemented in many countries.

Ocean-based industries are expected to double their contribution to global value by 2030. Growth projections include:

- Marine aquaculture to triple,
- Industrial-scale capture fisheries to more than double,
- Maritime and coastal tourism to double,
- Port activities to more than double, and
- Offshore wind to grow by a factor of 80 (albeit from a small base) ([OECD 2016](#)).

Pressures on marine ecosystems, demand for ocean space, and areas for potential conflict are thus likely to grow. ([OECD 2017](#)).

The LME approach should take into account the fact that many countries have begun or are planning MSP exercises. As a tool for optimizing the use of ocean space, MSP is and should be complementary to the LME approach. Two clear points of mutual benefit between the processes are that IMCs set up to support the TDA process at national level can be used for the multi-sectoral MSP process, and vice versa. If the TDA process is already commencing, but the MSP is yet on the horizon, the TDA or NDA can attempt to make sure that all sectors are covered and that information collection also covers reviews of available spatial data that can feed into the MSP process at a later stage.

An MSP process, while often driven at national or sub-national level, can be a lever / tool to drive NAPs or part thereof. MSP should certainly be considered as one of the instruments that could be supported or promoted by the SAP implementation project, and implemented in pilot transboundary regions or by participating countries at national level.

The SAP implementation projects in the Agulhas and Somali LME region have identified the regional need for supporting MSP processes. As such, the SAPPHIRE Project ProDoc (inception in late 2017) includes outputs:

- Outputs from Marine Spatial planning process adopted as part of effective management and governance mechanisms, and implemented where feasible,
- Marine Spatial Planning capacity developed and techniques enhanced to support and guide the designation of management areas as part of a dynamic management process (with a focus on zoning of marine coastal areas and development of community management frameworks for those zones – to link in with development of LED plans where possible and appropriate), and
- Strengthen capacity for communities to engage in participatory Marine Spatial Planning and associated management.

Angola, Namibia and South Africa in the BCLME region have jointly committed to the use of MSP for the spatial planning and management of ocean space. Technical support from GIZ and project support from the MARISMA Project (Benguela Current Spatial Management and Governance Project) has assisted the MSP process in the three countries.

Two useful tools developed by the IOC/UNESCO are:

➔ [MSP, a step-by-step approach](#)

➔ [Guide for evaluating MSPs](#)

Pinarbasi ([et. al. 2017](#)) reviewed tools currently available for Marine Spatial Planning. Thirty four tools were identified in 28 different MSP initiatives, with different purposes, levels of usage and complexity. Many of the tools listed in databases were conceptual and not used in real MSP implementation, and the need for improving functionality, stability and ease of use was highlighted in the report. Most of the decision support tools were used by planners, and the greatest application was for site identification, closely followed by communication, assessment of environmental impact and conflict analysis. Tools being used most often were Marxan (9 uses), and Seasketch (8 uses). The matrix of tools used, and the processes for which they were used may be found in ➔ <http://dst.azti.es/matrix/>

The Center for Ocean Solutions has developed a guide for selecting appropriate tools for MSP.

➔ [Decision Guide: Selecting Decision Support Tools for Marine Spatial Planning \(Center for Ocean Solutions 2011\)](#)

Jointly implemented by the Abidjan Convention Secretariat and GRID-Arendal, the Mami Wata Project (Enhancing Marine Management in West Africa through Training and application) has developed tools to assist the countries of the African Atlantic Coast, covering the three LMEs: BCLME, GCLME and CCLME, to undertake MSP.

➔ <https://mamiwataproject.org/tools/> (pending finalization of tools location soon)

Please refer also to the [➤ Marine Spatial Planning Toolkit](#), focusing on MSP at transboundary scale.

## 5.5 Marine Protected Areas

Although there is no one single definition, the IUCN defines Marine Protected Area (MPA) as “a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”. MPAs are one of the policy instruments that are available to help ensure the conservation and sustainable use of vulnerable ecosystems. MPAs are particularly well suited to address over-fishing, marine resource exploitation and habitat destruction, and maintaining natural coastal protection (OECD 2017).

Area based protection through MPA designation helps to maintain ecosystem health and productivity, while also providing a refuge for exploited marine species. Globally, well designed and managed MPAs play an important role in protecting, enhancing and restoring ecosystems and fisheries. They are frequently used in conjunction with other spatial and species-based tools such as MSP, ICM and fisheries effort-limiting management measures. MPAs are defined in various ways; the traditional definition is of a strictly no-take zone, while newer MPAs, particularly those in areas with a high human reliance on artisanal fisheries, tend to have zones of use and no-take. MPAs help to maintain the full range of genetic variation for key species, which improves resilience of populations under pressure from human exploitation and global change (Agardy and Staub 2006, Oliver *et. al.* 2009).

The term “Marine Protected Area” has various definitions and degrees of protection in different regions, and they can differ in shape, size, purpose and management approach. The World Conservation Monitoring Centre (WCMC) has developed six categories of MPAs

- Scientific purposes or as a strict nature reserve; wilderness protection
- Ecosystem protection and recreation (often National Park)
- Conservation of specific natural features (often National Monument)
- Conservation through close management and monitoring of species
- Landscape/seascape conservation and recreation (no protection assigned)
- Sustainable use of natural ecosystem

IUCN has seven categories, though they are comparable, just with Category 1 sub-divided into 1a and 1b.

- **Ia Strict nature reserve:** Strictly protected for biodiversity and also possibly geological/ geomorphological features, where human visitation, use and impacts are controlled and limited to ensure protection of the conservation values
- **Ib Wilderness area:** Usually large unmodified or slightly modified areas, retaining their natural character and influence, without permanent or significant human habitation, protected and managed to preserve their natural condition
- **II National park:** Large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities

- **III Natural monument or feature:** Areas set aside to protect a specific natural monument, which can be a landform, sea mount, marine cavern, geological feature such as a cave, or a living feature such as an ancient grove
- **IV Habitat/species management area:** Areas to protect particular species or habitats, where management reflects this priority. Many will need regular, active interventions to meet the needs of particular species or habitats, but this is not a requirement of the category
- **V Protected landscape or seascape:** Where the interaction of people and nature over time has produced a distinct character with significant ecological, biological, cultural and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values
- **VI Protected areas with sustainable use of natural resources:** Areas which conserve ecosystems, together with associated cultural values and traditional natural resource management systems. Generally large, mainly in a natural condition, with a proportion under sustainable natural resource management and where low-level non-industrial natural resource use compatible with nature conservation is seen as one of the main aims. The category should be based around the primary management objective(s), which should apply to at least three-quarters of the protected area – the 75 per cent rule. (Dudley 2008, Stolton et. al. 2013)

The Convention on Biological Diversity Aichi Biodiversity Target 11 states: "By 2020, at least 17% of terrestrial and inland water, and 10% of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes." SDG14 Target 14.5 states: "By 2020, conserve at least 10% of coastal and marine areas, consistent with national and international law and based on the best available scientific information".

By 2014, global MPA coverage was only 3.41%, of which only 0.59% was classified as no-take, prohibiting extractive resource use such as fishing and mining (OECD 2017).

Brander et. al. (2015) examined the net benefits of protecting marine habitats through expanding the coverage of no-take MPAs to 10% and 30%, with benefits exceeding costs in the range of 3.17-19.77% (OECD 2016). They found that the total cost of achieving 10% coverage of MPAs was estimated at 45-47 billion USD between 2015-2050. The costs of achieving 30% coverage were 223-228 billion USD. Costs included in the calculation were set-up, operating costs of MPAs and opportunity costs to commercial fisheries, but do vary according to the size and location of MPAs. Total ecosystem benefits of achieving 10% coverage was estimated at 622-923 billion USD over 2015-2050 and between 719-1145 billion for 30% coverage. Ecosystem protection services that were considered included coastal protection, fisheries, tourism, recreation and carbon storage.

Twelve of the UNDP Ecosystems and Biodiversity (EBD) Programme projects target MPAs, covering 81 MPAs with a total coverage of 9.9 million hectares. Funding goes towards creating, supporting and strengthening MPAs, with \$40 million in grants from GEF and other donors, and \$97 million in co-financing.

MPAs have traditionally been no-take zones and are frequently associated with increased biodiversity, biomass and size of focal species within their borders. Some MPAs have been demonstrated to improve Catch Per Unit Effort (CPUE) beyond their borders through the export of larvae or juveniles, but this is highly dependent on the local marine geography and species assemblages, and is not always the case. In fact, displaced fishers may intensify their efforts just outside MPAs, thereby reducing the local CPUEs ([Pernetta et. al. 2010](#)).

## Tools for Marine Protected Areas

In the Mediterranean, by 2013, 675 MPAs had been created, but there was no systematic method for their evaluation. In 2013, IUCN and WWF developed a guide for quick evaluation of management in Mediterranean MPAs. The evaluation tool consists of 18 indicators assessing all dimensions of MPA management, from management approaches to the final outcomes in terms of biodiversity conservation, stakeholder participation, governance and socio-economic impacts.

### ➞ Guide for quick evaluation of management in Mediterranean MPAs

The IUCN Programme on Protected Areas produced a report to assist the evaluation of MPAs. [How is your MPA doing?](#) is a guidebook of natural and social indicators for evaluating marine protected area management effectiveness. It contains step-by-step instructions on how to carry out effective monitoring including on selecting indicators, planning and conducting the evaluation and communicating the results for adaptive management. The guidebook provides a stepwise process for planning and evaluating the management effectiveness of MPAs. It lists 42 MPA-specific indicators that managers can use for evaluating their site. The book draws on the work of the MPA Management Effectiveness Initiative.

Embedding MPA planning into other complementary approaches such as MSP and ICZM, and establishing IMCs to bring a broad scope of stakeholders together, can be of greater benefit to the process, plus help to foster better policy coherence ([OECD 2017](#)).

## Locally Managed Marine Areas

Locally managed marine areas (LMMA) have been demonstrated to be extremely effective management tools, as demonstrated in the Pacific and Western Indian Ocean. These often incorporate closed areas, partial use areas and temporary open/closed areas. LMMAs and community co-managed areas can be more locally acceptable than closed access parks or traditional non-use MPAs, in some regions of the world ([Duda 2016](#)).

Beach Management Units (BMUs) were first established along the Kenyan coast in 2006. They bring together state actors and resource users to share resource management responsibility for marine and coastal resources. BMUs are enshrined in law since 2007, and they have been widely implemented as a means to institutionalize fisheries co-management. 73 BMUs were established along the 600km Kenyan coastline and islands between 2007 and 2013. The objectives of these BMUs are to:

- Strengthen the management of fish-landing stations, fisheries resources and the aquatic environment,
- Support the sustainable development of the fisheries sector,
- Help alleviate poverty and improve the health, welfare and livelihoods of the members through improved planning and resource management, good governance, democratic participation and self-reliance,
- Recognise the various roles played by different sections of the community, including women, in the fisheries sector,

- Ensure the achievement of high quality standards with regard to fish and fish products,
- Build capacity of the members for the effective management of fisheries in collaboration with other stakeholders, and
- Prevent or reduce conflicts in the fisheries sector. (Kanyange et. al. 2014)

Fiji's first LMMA was established in 1997 by the community of Ucunivanua on the East Coast. A three-year ban on harvesting was declared in a 24-hectare stretch of inshore waters. The success of this first closed area was replicated, and the Fiji Locally Managed Marine Area Network grew from this. By 2009, the network had increased to include 250 LMMAs covering 10745 square KM, over 25% of Fiji's inshore area. The network incorporates various management tools, including Marine Protected areas (UNDP 2012a). Also in the South Pacific, the Vanuatu islands of Nguna and Pele, sixteen indigenous communities are responsible for managing a conservation area of more than 3,000 hectares of marine and coastal resources (UNDP 2012b).

Madagascar's first community managed marine protected area was established in 2005 as a partnership between local people, research institutes, NGOs (driven by Blue Ventures) and a fishing company. The partnership was led by Blue Ventures, which implemented a 650 km<sup>2</sup> LMMA. It is managed by an association made up of local leaders from 25 villages, with technical support from Blue Ventures. The LMMA began with an experimental temporary closure for octopus fishing in 2005. Octopus is the most important species economically, in the area, with 99% of the catch exported. The temporary closure was a success and the increase in size and number of octopus at the reserve opening was shown to more than make up for the losses during the closure. In 2006, 25 villages created Velondriake, the first locally managed marine area in Madagascar. The temporary closure model has now been replicated over 150 times in Madagascar, and also in Mauritius. The establishment of the LMMA and its associated work have led to notable social, environmental and economic benefits. Destructive fishing practices have been banned and local fish stocks have been shown to have improved (UNDP 2012c, Oleson 2011, Cripps and Harris 2009).

Madagascar now has 64 LMMAs around the coastline, using a variety of legal structures to manage natural resources at local level, including the establishment of local customary law (Dina), community managed MPAs (IUCN category V or VI), and areas where management has been transferred to local communities ("Gestion Locale Sécurisée" or GELOSE).

Marine and coastal habitat now under local management measure 7250 km<sup>2</sup>, which is 11% of Madagascar's coastal shelf. This is 1/3 larger than the area under Madagascar's formal national parks system.

LMMAs use four main management tools:

- Permanent and temporary reserves and fishery closures,
- Fishing gear restrictions – e.g. bans on beach seine nets,
- Alternative livelihood initiatives such as aquaculture, and
- Mangrove forest restoration management.



## 5.6 Fisheries refugia

MPAs are not the only, or necessarily the best tools for sustainable management of small scale fisheries.

Fisheries refugia may be spatially and geographically defined as "marine or coastal areas in which specific management measures are applied to sustain important species during critical stages of their life cycle, for their sustainable use. The approach for securing habitats builds on local community knowledge of fish reproduction and co-management, to limit fishing gear and effort at critical periods in fish life cycles, to improve the sustainability of fisheries (Paterson and Pernetta 2008, Sherman *et. al.* 2009).

Natural refugia are, for example, features of the habitat which protect individual fish from being caught, such as canyons, boulders, crevices and overhangs, or mangrove forests (nursery habitat providing protection) for juvenile fish. As fishing effort and technology has improved and diversified, the amount and distribution of natural refugia has decreased. The primary difference between the traditionally defined MPA and refugia, is that MPAs are broadly focussed at protecting ecosystems and habitats, while refugia are chosen to be of relevance to life cycles of particular species, and they also have a focus on sustainable use rather than protection. Multiple use MPAs might also be categorized as refugia if they promote the concept of sustainable use (Pernetta *et. al.* 2010).

The definition of refugia as management tools is expanded to the following characteristics:

- Not be simply "no-take zones",
- Have the objective of sustainable use for the benefit of present and future generations,
- Provide for some areas within refugia to be closed due to their critical importance [essential contribution] to the life cycle of a species or group of species,
- Focus on areas of critical importance in the life cycle of fished species, including spawning, and nursery grounds, or areas of habitat required for the maintenance of broodstock,
- Have different characteristics according to their purposes and the species or species groups for which they are established and within which different management measures will apply, and
- Have management plans.

Management measures that may be applied within fisheries refugia may be drawn from the following [non-exhaustive] list of classical fisheries management actions:

- exclusion of a fishing method (e.g. light luring, purse seine fishing)
- restricted gears (e.g. mesh size)
- prohibited gears (e.g. push nets, demersal trawls)
- vessel size/engine capacity
- seasonal closures during critical periods of fish life cycles
- seasonal restrictions (e.g. use of specific gear that may trap larvae)
- limited access and use of rights-based approaches in small-scale fisheries

Table 3. Short term vs long term objectives of resource and institutional related goals of fisheries refugia (Pernetta et. al. 2010).

| Resource-Related Goal - Increased Resilience of Regional Fish Stocks to the Effects of Fishing   | Institutional-Related Goal - Fisheries and Habitat Management Conducted in an Integrated Manner   |
|--|---|
| <b>Longer-Term Objectives</b> <ul style="list-style-type: none"> <li>Increased average size of important species</li> <li>Increased egg production of important species</li> <li>Increased recruitment of important species</li> <li>Increased biomass of important fish species</li> </ul>  | <b>Longer-Term Objectives</b> <ul style="list-style-type: none"> <li>Community-based management of fisheries <i>refugia</i> for integrated fisheries and habitat management</li> <li>National and regional level commitments for integrated fisheries and ecosystem management</li> <li>Appropriately represented fisheries agenda in broader multiple-use marine planning initiatives</li> </ul> |
| <b>Shorter-Term Objectives</b> <ul style="list-style-type: none"> <li>Safeguarding of natural <i>refugia</i></li> <li>Reduced capture of juveniles and pre-recruits of important species in critical fisheries habitats</li> <li>Reduced targeting and capture of important species when forming spawning aggregations</li> <li>Reduced targeting and capture of migrating fish</li> </ul> | <b>Shorter-Term Objectives</b> <ul style="list-style-type: none"> <li>Community-based management of fisheries <i>refugia</i> for fisheries management</li> <li>Understanding among fishing communities of critical habitats and fish life-cycle linkages</li> <li>Enhanced capacity of fisheries departments/ministries to engage in meaningful dialogue with the environment sector</li> </ul>   |

Table 4. Comparison between the objectives, benefits, site selection criteria, use and acceptability of traditional MPAs and fisheries refugia (Pernetta et. al. 2010).

|                              | Marine Protected Areas  | Fisheries Refugia   |
|------------------------------|---|---|
| Strategic Objectives         | Protection of biodiversity<br>Tourism<br>Increased fish production                | Improved management of fish stock and habitat links<br>Increased resilience of stocks                                 |
| Purported Fisheries Benefits | Enhanced stock in MPA leads to bigger catches outside                             | Safeguarding fish in places and at times critical to their life-cycle will reduce growth and recruitment over-fishing |
| Site Selection Criteria      | Species diversity/richness<br>Uniqueness of the site<br>Site's representativeness | Importance to the life-cycle of economically important spp.<br>Likelihood to improve stocks                           |
| Use Status                   | Strict protection-multiple use (typically no-take fisheries zones in SCS)         | Based on sustainable use rather than prohibition of fishing   |
| Acceptability to communities | Concern that costs outweigh benefits<br>Enforcement is costly                     | Objectives and scientific basis well accepted by fishing communities and local officials                              |

GEF has supported interventions at local scales for securing valuable habitats for livelihoods and food security. An example is the GEF/UNEP South China Sea and Gulf of Thailand LME Projects. Experience in Southeast Asia, and in the Philippines in particular, suggested that no-take areas for fisheries were not well accepted by communities, and experienced problems of compliance. Between 2002 and 2008, the UNEP GEF Project Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand (together with the Southeast Asian Fisheries Development Center (SEAFDEC) and member countries) developed and refined a concept of fisheries refugia, targeting mainly transboundary, demersal finfish and non-fish resources. The concept is based on the fact that different habitats and areas are of critical importance during different stages in the life cycle of each species. The project developed a framework for a regional system of refugia in the SCS and GT, recognizing two sets of goals that related to 1) the resource and 2) to the institutional framework for management with an overall goal of increasing the resilience of fish stocks. Actual management measures would potentially include seasonal closures, fisheries management zones within multiple use MPAs, short term/spot closures, and closed seasons to safeguard spawning fish or reduce pressure on migrating fish. National activities were carried out by the departments or institutes of the government ministries of Cambodia, Indonesia, Malaysia, Philippines, Thailand and Vietnam. Guidelines for the acceptance of refugia as a management tool were accepted as part of the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in the Southeast Asian Region (SEAFDEC 2006). This provides a good example of how fisheries related regional organisations can be engaged by LME Projects (Duda 2014).

Experiences in the uptake of the fisheries refugia concept from the SCS + GT region that can be taken up by other areas include:

- Use concepts relevant to stakeholders
- Place an emphasis on sustainable use rather than prohibition of fishing
- Focus on fish life-cycle and critical habitat linkages

One constraint in the use of refugia as a management tool, is the lack of information about fish life cycles and their critical stages.

The South China Sea experience with the use of fisheries refugia can be referenced as an important example of one more tool that can be used as one of the complementary management strategies to support the sustainable use of marine resources and mitigate high levels of fishing pressure on small scale fisheries. It is also a useful tool for building partnerships and enhancing communication between the fisheries and environmental sectors, and in some way mitigates the adverse reaction to MPAs concept from fisheries communities, by emphasizing the sustainable use rather than the no-take concept. ([Paterson \*et. al.\* 2013](#))

## 6. Revised strategic approach

The revised approach, as presented in Figure 3 below, aims to update and describe the traditional 5-module LME approach, with a clear link to the recommended TDA/SAP mechanism for transboundary assessment and management reform, while demonstrating the scale of some component activities, and complementary approaches / management tools. The emphasis is on governance assessment, revision, and reform as the key feature to the process.

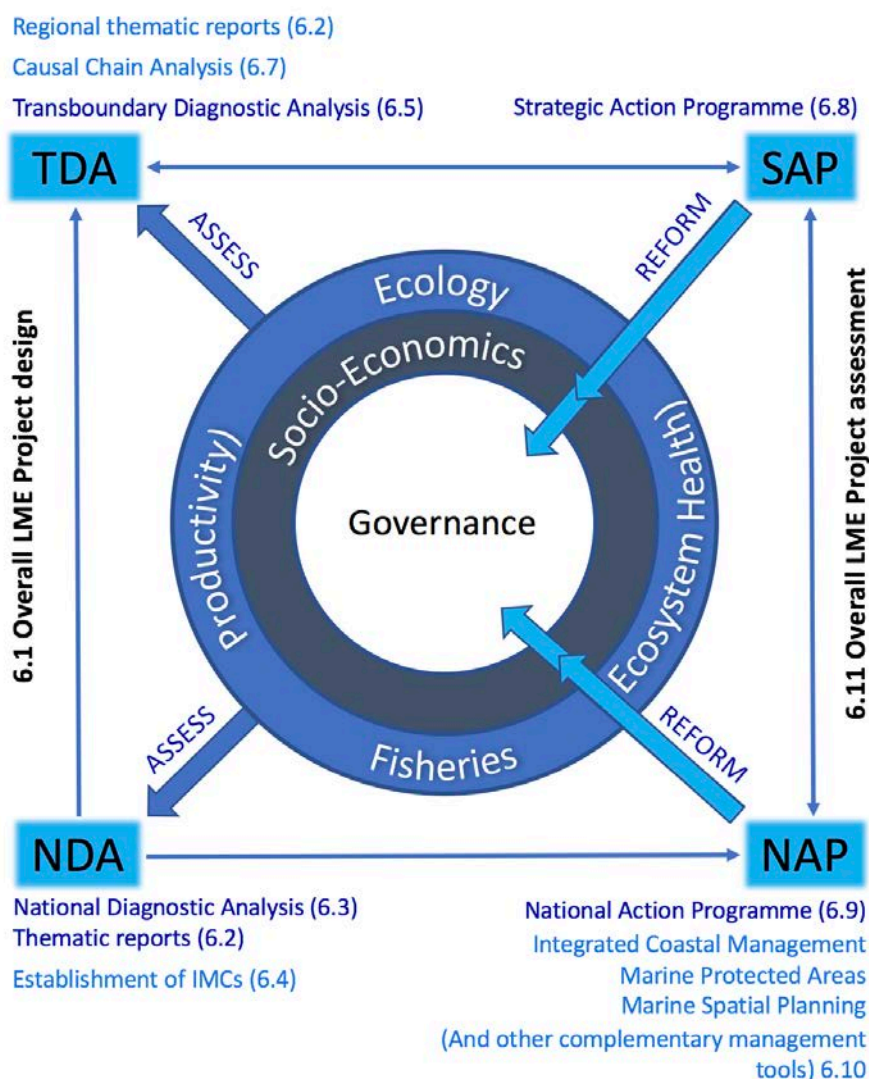


Figure 3. Summary of the revised strategic approach



## 6.1 Overall LME Project design

The LME Project toolkit (Section 1. Background and introduction) provides an overview of the project cycle, and elements necessary for the process of developing and running a LME Project.

## 6.2 Regional thematic reports

Regional thematic reports are frequently written to summarise and present the most recent literature and findings related to marine and coastal transboundary biophysical resources, socio-economic or governance conditions

➔ TDA/SAP Manual  
.....

## 6.3 National Diagnostic Analyses (NDA)

As an alternative to regional thematic reports, or sometimes in addition to them, some LMEs have supported the development of National Diagnostic Analyses in participating countries as a precursor to the regional TDA. This has been demonstrated to be a very useful tool as the first step in the process of TDA development in certain regions. The Agulhas and Somali Current LME Project, for example, invested two years in the development and support of national-level technical teams who coordinated the production of a multidisciplinary Marine Ecosystem Diagnostic Analysis (MEDA), based on published data, grey literature and new data collected during the LME project. This was done in addition to other regional surveys and served to build a sense of national ownership in the TDA ([ASCLME/SWIOFP 2012](#)).

## 6.4 Inter-ministerial committees (IMC)

Interministerial Committees serve to facilitate the inter-ministerial dialogue necessary for cooperation. IMCs can play a vital role in the TDA/SAP process by providing for intersectoral engagement as well as better communication between projects and processes (eg between IMC and MSP and MPA activities). The objective of the TDA/SAP process is to achieve high level support for the transboundary management of an LME, and as one of the first steps to achieving this, establishing a committee at national level can build a firm base of support in each of the participating countries.

## 6.5 Transboundary Diagnostic Analysis

A Transboundary Diagnostic Analysis (TDA) is a tool for assessing the state of a Large Marine Ecosystem. A TDA is usually based on a number of fact-based reports, either defined by theme (**regional thematic reports**) or by participating country (**National Diagnostic Analyses**), or a combination of the two. A causal chain analysis is an essential component of the process of developing a TDA, the results of which are a series of prioritized issues facing the ecosystem. The next component is a draft selection of options for investment and reform in order to resolve the ecosystem issues, some of which are taken forward into a Strategic Action Programme.

The [TDA/SAP manual](#) provides step-by-step guidance for the development of a regional TDA and a SAP.

From the outset, project managers and stakeholders in an LME need to plan and design the TDA to ensure that the analysis and fact finding is strategic, relevant, topical, is of an appropriate scale, and that it includes emerging issues. This is essential if conclusions are to be drawn that lead to policy change and real action. The TDA process must already consider SAP implementation needs, limitations and arrangements, as well as long term partnerships for ecosystem management.

The knowledge needs assessment is critical and needs to cover the traditional biophysical bases, but MUST have an emphasis on governance arrangements and socio-economic data, including blue economy costs and benefits. LME projects can make a real difference by gathering social and economic information that may not already be available, and presenting it in such a form that decision-makers can easily see the consequences of management options, to their commercial industries as well as to coastal populations and artisanal users. The value of ecosystem services, and an understanding of alternative livelihoods, and how feasible these may be, must be considered.

- [The Environmental Economics toolkit](#) provides useful, practical tools for these assessments.

In the design of thematic reports or National Diagnostic analyses that inform the TDA, the tools for SAP implementation must be considered upfront. For example:

- If conservation tools are particularly important, ensure that the Marine Protected Areas sector has a leading role to play, and that biodiversity and MPA-relevant aspects are thoroughly covered in the TDA;
- if one or more MSP processes are underway or planned, ensure that all the MSP-relevant sectors are engaged in the TDA process.

The TDA should be a multipurpose tool, as resources are often limited in national agencies responsible for reporting to related conventions and complementary approaches. In the design of a TDA, it would make sense to harmonise some parameters to make a clear link to other global assessments and agreements for which reporting is required, such as the TWAP, SDG14, TEEB for oceans, the World Oceans Assessment process, and other indicator programmes such as the Ocean Health Index.



## 6.6 The 5-module ecosystem approach

The ecosystem-based 5-module approach to management and assessment of LMEs was developed in order to ensure the inclusion of all aspects of the ecosystem, during the implementation of the LME approach. The five modules are discussed and described in some detail in Chapter Two, with a reference to the suite of indicators for the five modules, developed by the GEF-funded TWAP:

- Fish and Fisheries,
- Productivity,
- Pollution & Ecosystem Health,
- Socio-economics, and
- Governance.

The LME Approach, incorporating the 5-module ecosystem approach, as well as the TDA/SAP/NAP design, should be an integrated, multidisciplinary approach that attempts to improve on the traditional sectoral and country-based approach to ecosystem management.

## 6.7 Causal Chain analysis

The causal chain analysis is a process of taking the issues and concerns that were identified during TDA development, and identifying their direct, indirect and root causes. This allows appropriate policy interventions to be developed and focused where they will have the greatest benefit. Causal links are identified between environmental and socio-economic impacts, economic sectors and root causes that are responsible.

The methodologies used to develop and also to present causal chains differs between water bodies. The TDA/SAP manual [TDA/SAP manual – Section 3.9 Causal chain Analysis](#) describes the advantages of the two main formats:

.....

Table 5: Causal Chain Analysis characteristics

| CAUSAL CHAIN TYPE                            | ADVANTAGES AND DISADVANTAGES   |
|--|--|
| Table or matrix<br>(e.g. Bay of Bengal LME)  | <ul style="list-style-type: none"> <li>✓ Simpler to produce</li> <li>✓ Conceptually easy for the expert to produce</li> <li>✗ Difficult to show linkages between causes</li> <li>✗ Can be conceptually difficult for the reader to understand</li> <li>✗ Often difficult to identify SAP interventions</li> </ul>  |
| Flow diagram<br>(e.g. Kura-Aras River Basin) | <ul style="list-style-type: none"> <li>✓ Show linkages between causes</li> <li>✓ Work well using the sectoral approach</li> <li>✓ Conceptually easy for the reader to understand</li> <li>✗ Difficult to construct</li> <li>✗ Conceptually difficult for the expert to produce</li> <li>✗ Time consuming</li> <li>✗ Often difficult to identify SAP interventions</li> </ul> |

## 6.8 Strategic Action Programme

A Strategic Action Programme is an agreed, multinational framework for strategic actions to protect the coastal and marine environment. In the context of GEF IW recommended methods, it should be based on the factual Transboundary Diagnostic Analysis with guidance from the causal chain analysis. A SAP is a negotiated document, the success of which is largely based on a shared understanding of the challenges facing marine and coastal management, and pragmatic, possible solutions.

The [TDA/SAP manual](#) provides step-by-step guidance for the development of a regional TDA and a SAP.

- Good practice in Strategic Action Programme implementation

## 6.9 National Action Plans

NAP are developed together with, or following the development of the regional SAP. NAPs are the mechanism through which transboundary policy reform can be operationalised and realized in national policy harmonization or change. (see section 4.2. Good practice in NAP implementation: Elements for formulating NAPs and operationalisation of National Interministerial Committees) Link to [TWAP](#) and to the LME SCorecard for projects/LMEs to choose their own indicators as appropriate.

## 6.10 Complementary tools

Since the first GEF IW strategy, GEF has recognised and supported instruments like ICM and MPA development and management as important tools for sustaining ecosystem health. ICM and MPA projects have been requested of the GEF, by countries, and have been approved. These tend to address concerns and requirements at a different scale than the broader LMEs. It is essential to incorporate these tools into LME work, to address transboundary concerns at the national and local level ([Duda 2016](#)).

Instead of being separate projects, ICM or MPA elements should be programmed into SAPs to address management concerns at sub-LME and sub-national scale. The Vietnam example, of programming projects at different scales is one approach. Probably a more desirable approach is to integrate ICM and MPA projects and LMMA / fisheries refugia projects as demonstration projects in LME-wide projects.

The PEMSEA series of projects in seven LMEs of East Asia focussed on ICM, spatial management (zoning), and inclusion of MPAs ([Duda 2016](#)).

In several SAP projects, these tools and others have been employed to complement the TDA/SAP LME approach. The GEF-5 strategy further realized the need for country support to address the challenges of increasing climate variability and change (sea-level change, ocean warming, ocean acidification, shifts in productivity and fish stocks, and reduced ecosystem resilience). GEF-5 supported governance reforms at local, national and regional scale to integrate ecosystem-based approaches such as ICM and MSP, which take human health into account as well as ecosystem health ([GEF IW:LEARN ProDoc](#)).

Many of the LME project successes to date have been made possible through partnerships with other public and private organisations such as IOC/UNESCO, IUCN, NOAA, UNEP, FAO, UNIDO, ICES and the World Bank. Working collectively, guidance and management, training and cooperation tools have been developed. Several IOC/UNESCO programmes contribute scientific and technical input into LME programmes, and these contributions could also be better incorporated to improve the long-term benefits and sustainability of GEF investment. Complementary approaches / management tools may include but are not limited to:

- An Ecosystem Based Approach to Fisheries,
- Integrated Coastal Management (ICM),
- Marine Spatial Planning (MSP),
- Marine Protected Areas (MPAs), and
- Fisheries refugia.

SAP implementation projects and NAPs should make better use of these complementary tools to tie these national and local governance approaches into the LME approach. ICM projects should also utilize terrestrial and marine spatial planning and conservation tools, plus link to the adjacent work of Regional Fisheries bodies and initiatives in ABNJ. Partnerships with other expert groups such as IOC/UNESCO for MSP, the joint work of the CBD and GEF-STAP should be ensured so that existing tools and guides can be used to incorporate these measures into the work of the LMEs ([Duda 2016](#)).

## 6.11 Project assessment

The **>> LME Scorecard toolkit** provides a system and indicators for LME Project assessment and review.

## 6.12 Stakeholder engagement

Throughout the process of development of the TDA and SAP, considerable effort must be made to involve all relevant sectors, stakeholders and the public in the process. The TDA is itself a useful tool for multi-sectoral consultation and exchanges of information and perspectives ([Wang 2004](#)).

**>> Stakeholder engagement toolkit**



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## GEF LME:LEARN

GEF LME:LEARN is a program to improve global ecosystem-based governance of Large Marine Ecosystems and their coasts by generating knowledge, building capacity, harnessing public and private partners and supporting south-to-south learning and north-to-south learning. A key element of this improved governance is main-streaming cooperation between LME, MPA, and ICM projects in overlapping areas, both for GEF projects and for non-GEF projects. This Full-scale project plans to achieve a multiplier effect using demonstrations of learning tools and toolboxes, to aid practitioners and other key stakeholders, in conducting and learning from GEF projects.

## PROJECT COMPONENTS

- 1** Global and regional network of partners to enhance ecosystem-based management and to provide support for the GEF LME/ICM/MPA projects to address their needs and incorporate climate variability and change considerations.
- 2** Synthesis and incorporation of knowledge into policymaking; capture of best LME governance practices; and development of new methods and tools to enhance the management effectiveness of LMEs and to incorporate ICM, MPAs and climate variability and change, including the five LME Approach modules.
- 3** Capacity and partnership building through twinning and learning exchanges, workshops, and training among LMEs and similar initiatives.
- 4** Communication, dissemination and outreach of GEF LME/ICM/MPA project achievements and lessons learned.

## PARTNERS



### GLOBAL ENVIRONMENT FACILITY

Through its strategic investments, the GEF works with partners to tackle the planet's biggest environmental issues. The GEF is the funding agency for LME:LEARN and the portfolio of projects we provide services to.



*Empowered lives.  
Resilient nations.*

### UNITED NATIONS DEVELOPMENT PROGRAM

UNDP works to eradicate poverty and reduce inequalities through the sustainable development of nations. UNDP works in cooperation with other UN agencies, the GEF, international financial institutions, regional organizations, NGOs, the private sector and others to improve water and ocean management and sustain livelihoods at local, national, regional and global scales through effective water and ocean governance. UNDP is the implementing agency for the GEF LME:LEARN project. .



### INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION OF THE UNITED NATIONS EDUCATIONAL SCIENTIFIC AND CULTURAL ORGANIZATION

IOC-UNESCO promotes international cooperation and coordinates programmes in marine research, services, observation systems, hazard mitigation, and capacity development in order to understand and effectively manage the resources of the ocean and coastal areas. IOC-UNESCO is the project executor and contributes capacity building, technical knowledge, data and information exchange, project management, and project sustainability.



### INTERNATIONAL UNION FOR CONSERVATION OF NATURE

IUCN provides public, private and non-governmental organizations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together. IUCN is responsible for development of the Environmental Economics toolkit and the LME Hub on the GEF LME:LEARN website.



### INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA

ICES is a global organization that develops science and advice to support the sustainable use of the oceans. ICES is responsible for the Governance Working group, delivery of the Governance Toolkit, organization of training courses and dissemination of best practices.



### CONSERVATION INTERNATIONAL

CI is a nonprofit environmental organization with a goal to protect nature as a source of food, fresh water, livelihoods and a stable climate. CI is responsible for the development of the toolkits on Stakeholder Participation and LME Assessment, as well as developing a guide on planning and implementing comprehensive marine management capacity development.



### NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (U.S)

NOAA is an agency of the U.S. Department of Commerce that enriches life through science. NOAA has a diverse range of diverse skills and expertise that it shares as part of their continued science and technical support of LME projects and other related capacity building activities for ecosystem-based approaches in the management of coastal and marine resources.

This global project is funded by the Global Environmental Facility (GEF), implemented by the United Nations Development Programme (UNDP), and executed by the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The GEF LME:LEARN's Project Coordination Unit (PCU) is headquartered at UNESCO-IOC's offices in Paris.

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