



Sustainable fisheries within an LME context



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ARTICLE INFO

Article history:

Received 20 May 2015

Received in revised form

8 July 2015

Accepted 15 July 2015

Keywords:

Ocean governance

Fisheries governance

EAF

EBM

ABSTRACT

The Food and Agriculture Organization of the United Nations (FAO)'s mandate is central to the sustainable use of natural resources and biodiversity on the planet. The Organization's normative role at the global level offers a neutral forum for development of international instruments and agreements relevant to agricultural production (including fisheries), in addition to facilitating their implementation through field activities. FAO's role in the LME Program recently has been increasing, offering the opportunity to link fisheries governance frameworks at the sectoral level (such as the Ecosystem Approach to Fisheries—EAF), to broader ocean governance frameworks (such as ecosystem based management, EBM) as promoted within the LME movement. It is argued that these approaches are both needed and complementary and that links between the two can be fruitfully established as demonstrated by experiences made in FAO-led LME projects, i.e. the Bay of Bengal Large Marine Ecosystem (BOBLME) and the Canary Current Large Marine Ecosystem (CCLME).

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1. Introduction

The Food and Agriculture Organization (FAO) is the specialised agency of the United Nations mandated to deal with agriculture, forestry and fisheries. Looking at FAO's Constitution¹, the main purpose is to improve food and nutrition security thus contributing to social and economic development. Conservation of natural resources is also included as part of the functions of the Organization. Over the years, and with the increasing awareness on the negative impacts of human activities on the environment, the conservation aspects in FAO's work have become more visible. At present, the Organization has defined three goals, i.e. (i) eradication of hunger, food insecurity and malnutrition; (ii) the elimination of poverty and the driving forward of economic and social progress for all; and, (iii) the sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for the benefit of present and future generations².

The Organization also plays a key normative role at the global level by facilitating and offering a neutral forum for development of international instruments and agreements relevant to agricultural production (including fisheries) in addition to facilitating their implementation through field activities. Capacity development at country and regional level is an important area of work to prepare, implement, monitor and evaluate evidence-based policies, investments and programs. The Organization is also mandated to assemble, analyze, monitor and improve access to data and information, in areas related to FAO's mandate, and as such maintains the world global database on capture fisheries amongst others.

FAO's mandate, as reflected in its goals and main areas of work, is therefore central to sustainable use of natural resources and biodiversity on the planet, including both terrestrial as well as aquatic systems.

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¹ <http://www.fao.org/docrep/meeting/022/K8024E.pdf>

² <http://www.fao.org/about/en/>

The LME concept was introduced in a Symposium at the 1984 annual meeting of the American Association for the Advancement of Science (AAAS). The Symposium was followed by the seminal LME volume published by the AAAS entitled, *Variability and Management of Large Marine Ecosystems* (Sherman and Alexander, 1986). The world's LMEs are delineated on the basis of ecological criteria, including bathymetry, hydrography, productivity, and trophic relationships (Sherman and Alexander, 1986). On a global scale they produce 80% of the world's annual marine fisheries catch (Pauly et al., 2008). A five module strategy has been developed for supporting adaptive management of LME goods and services based on time-series data and information on LME (i) productivity, (ii) fish and fisheries, (iii) pollution and ecosystem health (iv) socioeconomics, and (v) governance literature (Sherman and Duda, 1999a, b; Wang, 2004a, b; Carlisle, 2014; Sherman, 2014a, b).

The Global Environment Facility has included support for LME projects in its program guidance since 1995 and, more recently, in its guidance for the 2014 to 2018 GEF replenishment funds (GEF, 1995, 2014). There are now GEF supported LME projects in 22 of the world's 66 LMEs. Financial assistance of \$3.1 billion has been provided by the GEF and other donors to 110 developing countries in Asia, Africa, Latin America, the Pacific and eastern Europe in support of the planning and implementation of ecosystem based management (EBM) practices (Sherman, 2014b).

FAO's role in LME projects until recently has been limited, as compared to other UN agencies but has been increasing more recently, also as a result of FAO becoming a GEF agency since 2008. The strategic role that fisheries play in relation to food security and poverty alleviation, in addition to creating opportunities for economic growth, places this sector in a special position vis-à-vis other sectors benefitting from the oceans. Furthermore, this sector is most dependent on healthy marine ecosystems and therefore has the highest stakes in relation to its sustainable use. This perception is reflected for example in the responsiveness that the sector showed in developing international instruments such as the Code of Conduct for Responsible Fisheries (CCRF) agreed to by the international community in 1995, three years only after UNCED. A commitment for sustainable fisheries in the marine ecosystem was made already in 2001 (Reykjavik, 2001) and guidelines for the Ecosystem Approach to Fisheries, aimed at helping member countries with practical implementation of the principles of sustainable development in fisheries, were developed shortly after (FAO, 2003). While much remains to be done for the practical realization of sustainable fisheries in the broader ecosystem context, the overall normative framework exists making fisheries an innovative sector in terms of embracing the principles of sustainable development.

Despite its strategic importance for food and nutrition security and for poverty alleviation, many fisheries are not well managed or are not managed at all and represent therefore a major threat to marine ecosystems and to food security for the coastal communities involved. In addition to fisheries a multitude of threats are eroding the resilience of the ocean's and their ability to sustain provision of goods and services. These impacts are often compounded and poorly managed. In this situation, there is a need for improved management of ocean activities at the multisectoral level and the LME program can play a key role in this context.

2. Governance approaches for sustainable LMEs

In its new strategic framework, FAO puts the emphasis on good governance. In particular, Strategic Objective 2 “increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner” considers the development of adequate policy and governance frameworks as key to achieving this objective.³

Good governance is considered as a precondition for sustainable development. The report of the High level Panel on Global Sustainability set up by the Secretary-General of the United Nations in 2009 to develop a new vision for sustainable growth and prosperity, entitled “Resilient people, resilient planet: a future worth choosing”⁴ provides key recommendations for sustainable development. Strengthening institutional governance is one of three main areas highlighted, in addition to empowering people to make sustainable choices, and working towards a sustainable economy. Governance is especially highlighted in the section covering marine and coastal ecosystems. The perception that improved ocean governance is key to its sustainability is also reflected in discussions taking place in international fora dealing with ocean issues as well as the many ongoing initiatives that focus on this topic and aimed at improving coordination among institutions and stakeholders (see Section 4).

In the LME approach “governance” is one of five modules, that encompass (i) productivity, (ii) fish and fisheries, (iii) pollution and ecosystem health, (iv) socioeconomics and (v) *governance*. The first four modules support the Transboundary Diagnostic Analysis (TDA) process, while the governance module is associated with periodic updating of the SAP development process.

In the LME approach to monitoring and assessing the changing conditions of LMEs, time-series indicator metrics on three of the five modules—productivity, fish and fisheries, pollution and ecosystem health—are based on the best available science indicators of change. Whereas in the socioeconomic module focus is on the economic benefits to society at risk from degradation of LME goods and services. And, in the matter of governance, attention is directed to processes for encouraging adaptive management actions for recovery and sustainability of LME goods and services at risk from environmental degradation.

³ <http://www.fao.org/docrep/meeting/027/mg015e.pdf>

⁴ UNGA, 2012. Resilient people, resilient planet: a future worth choosing. Report of the High-level Panel of the Secretary-General on Global Sustainability. A/66/700, pp. 6–102.

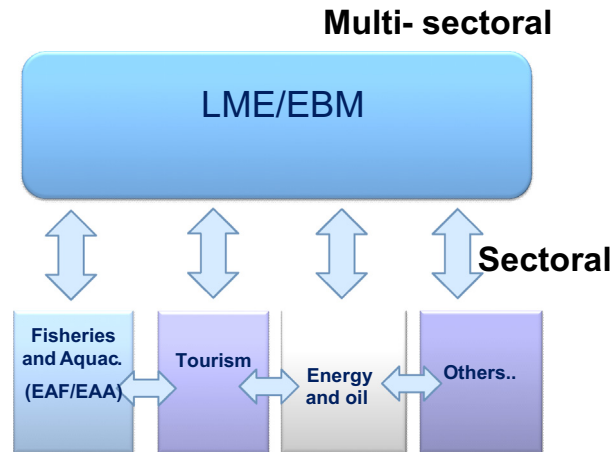


Fig. 1. Relationship between sectoral and multi-sectoral level of governance.

Some LMEs have initiated a process aimed at establishing LME scale regional governance mechanisms, for multisectoral management. As part of implementing Strategic Action Programmes (SAPs), LMEs have been encouraged to set up multi-sectoral and inter-governmental organizations to address transboundary sustainability issues that have been identified through their Transboundary Diagnostic Analysis (TDA) and often resulting from different human activities (e.g. fishing, tourism, marine mining, including oil and gas, etc.). Examples include the Benguela Current Commission (BCC) and the Guinea Current Commission (GCC), although the latter is not yet functional/operational. The novelty of these commissions is their aim to address multi-sectoral issues within the spatial domains of LMEs. It should be noted that UNEP's Regional Seas Programs (RSPs) address marine environmental issues at the regional level, but do so over larger areas, which may result in less manageable situations. Furthermore, the fact that RSPs operate through national environmental agencies might weaken the filtering down of policy decisions (action plans) taken at the regional level to national agencies responsible for managing specific sectors. It should also be noted that regional fisheries bodies (RFBs)⁵ make recommendations on fisheries issues including those in relation to impact from fisheries activities for the consideration and implementation of national authorities. In some cases RFBs, and in particular those with a management mandate (Regional Fisheries Management Organizations- RFMOs) can make decisions that will have to be adhered to by their members. The role and mandates of already existing mechanisms in RFBs are considered in setting up LME governance, to ensure that synergies are established, overlap avoided and clear roles and responsibilities defined.

In terms of institutional responsibilities for natural resources management two levels of governance are recognized. One is sectoral, that focuses on sustainability in a given sector, and one is multi-sectoral, focusing on the interactions between sectors and their compounded impacts at ecosystem level. In this respect environmental concerns and the environmental sector, albeit not having a direct management responsibility, needs to engage at the sectoral and multisectoral level to ensure that environmental concerns and standards are mainstreamed into the sectors and that environmental goals are agreed across sectors and monitor implementation of resulting standards in a given region is achieved. At the sectoral level it will be important to make sure that the three dimensions of sustainability (environmental, social-including equity issues, and economic) are considered and integrated and tradeoffs balanced. The cross-sectoral level will ensure coherence and coordination across sectors to achieve overall sustainability goals. Setting relevant policy objectives, strengthening institutional and legal frameworks to create the enabling environment to transition to sustainable agriculture (including fisheries and aquaculture), establishing practices that are participatory, accountable, equitable and transparent are considered as a pre-condition for sustainability of agriculture systems, including fisheries. Fig. 1 provides a simplified representation of the two levels of governance required in relation to managing impacts by different sectors, on the one hand and managing interactions among sectors operating in the same area and thus requiring an EBM approach. Obviously this representation becomes more complex when nested spatial scales (e.g. local, national regional and global) are included.

At the multisectoral level, as with EBM, integrated plans for a given region/ecosystem are developed (e.g. through marine spatial planning), common conservation and development objectives are set (possibly through stakeholder consultations) and also user rights may be allocated across sectors and stakeholders. At this level, assessment of ecosystem services can provide the basis for assessing the synergies or tradeoffs across sectors. However, respective sectors are responsible for managing a given activity (i.e. fisheries) in a way that is consistent with overall principles and broad objectives set for the given region/ecosystem. So the governance architecture should include and engage all relevant institutions and related processes to ensure integration across sectors and to ensure good management and compliance within respective sectors. Furthermore, both levels of governance need to have in place appropriate policy/management cycles as shown in Fig. 2, that

⁵ <http://www.fao.org/fishery/topic/2940/en>



Fig. 2. Policy/management cycle required both at the multi-sectoral level, as well as at sector level.

can take up data and information, generate advice, make decisions, implement decisions and review all aspects of the process (Mahon et al., 2012). These cycles represent adoption of adaptive management, and should be implemented in a participatory way.

Obviously this scheme, although complex, is relatively simple when applied to a specific region within a single country, although this has proven challenging also in countries with well-established governance systems and long tradition of sustainable natural resource use (e.g. Cochrane et al., 2014). When the ecosystem or area considered encompasses several nations, such as in the case of LMEs, the governance architecture becomes more complex as collaborative and decision making mechanisms for transboundary issues have to be established, both for EBM overall and for sector management at the regional level, while ensuring the link to the national and local processes, where decisions are to be implemented.

The LME program offers a unique opportunity to coordinate activities in the marine environment in an innovative way, particularly as regards multisectoral coordination and decision making for transboundary issues, i.e. issues across national boundaries. Within this system, and as main users of the marine environment, fisheries are also expected to enhance their management in a way that is coherent with the principles of sustainable development. In the section below a brief introduction to the Ecosystem Approach to Fisheries, as an innovative approach to sustainable fisheries, will be presented. The approach is being implemented, among others, in the LMEs for which FAO has a responsibility, i.e. the CCLME and the BOBLME.

2.1. The Ecosystem Approach to Fisheries (EAF)

FAO has been promoting the adoption of an Ecosystem Approach to Fisheries (EAF) for the past decade or so (FAO, 2003). However, it should be noted that the FAO Code of Conduct for Responsible Fisheries (CCRF, 1995), formulated on the wake of the Earth Summit (Rio, 1992) is the first milestone in fisheries in terms of capturing principles of sustainable development. EAF is, in effect, a means of implementing many of the provisions of the Code and provides a way to implement these in a practical and comprehensive way. EAF is a holistic strategy for managing capture fisheries so that ecological, socio-economic and institutional dimensions are integrated.

Box 1—Operationalizing the Ecosystem Approach to Fisheries

- A management plan is developed for a very specific area/system with operationally defined boundaries;
- stakeholder participation is envisaged at all levels of the planning and implementation steps;
- all key components of a fishery system (ecological, social-economic and governance), are comprehensively considered while also taking into account external drivers;
- sustainability issues that need attention are identified and prioritized through a formal process (e.g. risk assessment);
- management objectives related to environmental and social/economic aspects are reconciled including explicit consideration of tradeoffs between them;
- an adaptive management process is established that includes mechanisms for feed-back loops at different time scales to adjust the tactical and strategic performance based on past and present observations and experiences;
- ‘best available knowledge’ is the basis for decision-making, including both scientific and traditional knowledge, while promoting risk assessment and management and the notion that decision making should take place also in cases where there is lack of detailed scientific knowledge; and
- the system builds on existing management institutions and practices.

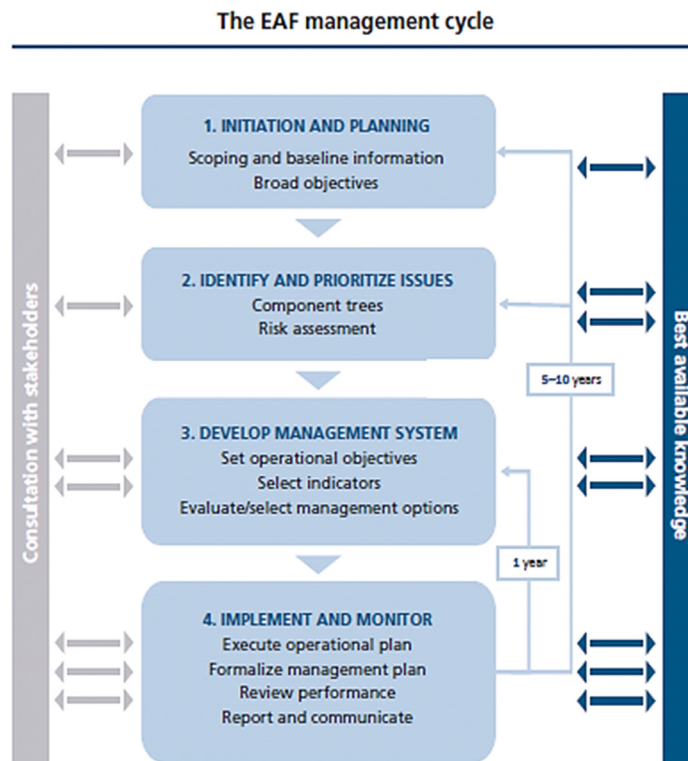


Fig. 3. The EAF planning and implementation at different time scales (e.g. one year for tactical and 5–10 years for medium to long term planning and implementation).

The political commitment to EAF formally materialized in connection with the ‘Reykjavik Conference on Sustainable Fisheries in the Marine Ecosystem’ (Reykjavik, 2001), when 45 participating countries undersigned a declaration and a pledge to incorporate ecosystem considerations in fisheries management. This commitment was reinstated in connection with the WSSD (Johannesburg, 2002) where 2010 was agreed as target for its application (WSSD, Plan of Implementation, Paragraph 29, d). The Twenty-seventh Session of the Committee on Fisheries (COFI) in 2007 broadly agreed that “EAF was the appropriate and necessary framework for fisheries management”.

The key features of the framework proposed in the FAO guidelines for planning and implementing under an EAF management are presented in Box 1.

Development of fisheries management plans is a key element in the implementation of these integrated approaches. It should be noted that the CCRF (FAO, 1995) also explicitly requires that “Long-term management objectives should be translated into management actions, formulated as a fisheries management plan or other management framework”. Implementation of an ecosystem approach requires, perhaps more explicitly than under conventional fisheries management and the CCRF, that management plans be developed by taking into account the three dimensions of sustainability.

The planning process consists largely of examining existing or developing fisheries to identify key objectives (ecological, social and economic), priority issues to be addressed in order to move towards these objectives and the action required.

The outcome of this planning process constitutes the backbone of EAF fisheries management plans. Fig. 3 shows the EAF planning and implementation⁶ steps, including initial planning, implementation and feed-back loops that are essential under an adaptive framework. Implementing EAF will require an initial planning exercise (including ‘Scoping’, ‘Setting objectives’ and ‘Formulating actions and rules’), to revise existing or developing new management plans for a given fishery, a sub-sector (e.g. small-scale fisheries) or a given region. The steps of the planning and implementation process of Fig. 3 are very similar to those undertaken under conventional fisheries management. There are, however, a number of additional mandatory elements under an EAF. These include stakeholder participation at all steps of the planning, management and decision-making process, use of best available knowledge, which also implies that the planning and decision making should take place without postponing until improved knowledge is available. Another innovative element of the EAF framework is to consider the priority of actions along the three main dimensions of fisheries systems, i.e. the ecological, human and institutional dimensions.

Managers and stakeholders are encouraged to use ample time to identify, discuss and agree on the broad objectives and values that the management system is supposed to address and related to those, what issues pose the highest risk of not achieving the intended objectives. The process is guided by the issue tree presented in Fig. 4.

⁶ Source: FAO, 2014

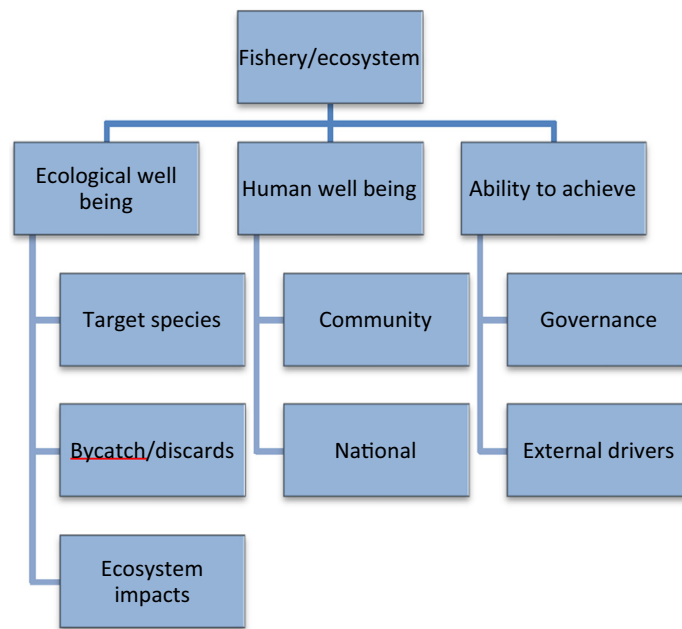


Fig. 4. Issue tree guiding the integrated assessment of a fishery (or an area/ecosystem) that guides the integrated assessment that is at the basis of developing fisheries management plans.

This issue tree is further unpacked into more detailed trees (see for example http://www.fao.org/fishery/eaf-net/eaftool/eaf_tool_1/en)

This step, issue identification, is an important one as most commonly different stakeholders have different values and different perceptions of the main sustainability issues, which leads to conflicts.

The approaches taken to fisheries management typically fall into one of two areas: (1) command-&-control measures that dictate what fisheries stakeholders can or cannot do, or (2) incentive aligning tenure systems and rights-based approaches that are intended to align business and economic incentives with conservation objectives. The specific actions needed depend on context and these will have therefore to be identified on a case-to case basis. The EAF provides the framework for comprehensively identifying key sustainability issues and related solutions that will be context-specific, depending on culture, type of fishery/issue and resulting from participatory processes.

Once EAF management plans are developed, their implementation entails the establishment of a “management cycle” considered essential for the sustainability of fisheries (see Fig. 2). Establishing the management cycle for the implementation of the management plan means, in effect, an adaptive management approach.

The EAF is a sector based approach to sustainable fisheries and is primarily applied in the context of addressing issues that are caused by and/or can be controlled by the sector itself. However, the approach also helps identifying external factors impacting the sector that are beyond the control of the fisheries and aquaculture authorities and stakeholders. Examples include coastal development, mining, pollution from land-based activities etc. If any of these factors are identified as undermining the sustainability of the resource base, links have to be developed with the competent authorities to find ways to mitigate these impacts and/or negotiate trade-offs.

The key steps for planning and implementing management plans integrated across sectors are very similar to what is described above. The main differences can be summarized as follows:

- The authority for developing and implementing the multi-sectoral management plan needs to be established, for example through legislation. In addition to facilitating the planning process, the authority will be responsible for monitoring that the plan is adequately implemented by all the participating sectors.
- Setting sustainability objectives coherently across the different sectors. These have to be consistent with policy goals related to ecological, social and economic dimensions of sustainability as reflected in relevant policies.
- Allocation of spatial and temporal distribution of human activities in the given area/ecosystems (including development of a use conflict compatibility map).

The TDA process of LME programs can be compared to the “issue identification” step of the EAF process, and the SAP to the management plan. The main difference is that the LME process addresses transboundary issues in the context of all sectors in a given region. In those LMEs where fisheries are not sustainable, EAF planning and implementation is a valuable tool for dealing with fisheries issues within an LME/EBM framework. This approach has been adopted in the LMEs for which FAO has responsibility, i.e. the BOBLME and the CCLME as well as in the CLME (Caribbean Large Marine Ecosystem) where

Table 1

Main components of the BOBLME project.

Component 1. Strategic Action Programme
Component 2. Coastal/marine natural resources management and sustainable use
Component 3. Improved understanding and predictability of the BOBLME environment
Component 4. Maintenance of ecosystem health and management of pollution
Component 5. Project management, monitoring and evaluation, and knowledge management

the EAF is being implemented in the shrimp and groundfish fisheries of that region. In the BCLME region, fishery sustainability issues in an ecosystem context were explored, and options for sustainable management investigated through a collaborative effort with FAO (Cochrane et al., 2007), which resulted in making the region well acquainted with concepts and methodologies relevant to EAF.

In the following sections some experiences with combining sector-based (EAF) and multisectoral (EBM) processes will be presented through the examples of the Canary Current LME (CCLME) and the Bay of Bengal LME (BOBLME).⁷

3. The BOBLME experience

The Bay of Bengal Large Marine Ecosystem (BOBLME) Project started in April 2009. The BOBLME covers around 6 million km² of sea area. The countries involved, Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand are some of the most populous in the world. Over 450 million people live in the Bay of Bengal area and their numbers are increasing rapidly. The majority of these people are poor and rely heavily on the marine resources which are being affected by overfishing, removal or degradation of important marine habitats, and pollution.

The eight countries have committed themselves to work together through the BOBLME Project to improve the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries.

One of the major issues facing the region's coastal fishing communities is that the fishing pressure has increased to levels that cannot be sustained, and many fish stocks are showing signs of being overfished. While catch information is patchy and highly uncertain, there is some evidence to suggest that the fishing pressure in the Bay of Bengal has increased to the extent that catches have increased tenfold over the last 60 years. This situation is exacerbated further by the illegal incursion of foreign fleets, increased competition and conflicts between artisanal and large-scale fishers, encroachment by nationals into the territorial waters of neighboring countries, and the prevalence of destructive fishing practices.

One of the major objectives of the BOBLME's resources management component is to introduce and promote collaborative fisheries management approaches for selected key transboundary species (highly migratory species or fish stocks shared by several or all adjacent countries) through the development of regional and sub-regional management plans and harmonization of data collection and standardization. In the first instance, the Project will focus on hilsa, Indian mackerel, and sharks assisting the development of management plans, strengthening data and information collection and assessments of the status of the stocks.

A second key issue is the continued degradation of highly productive coastal and near-shore marine habitats such as coral reefs, mangroves and estuaries, and seagrass beds which serve as fish spawning and nursery areas.

The BOBLME Project has focused on strengthening and harmonizing the resource management capability in each participating country, and gaining a better understanding of the major marine resources and the environment so that critical issues and the underlying causal agents that are contributing to a decline in the health of the Bay of Bengal ecosystem can be addressed (Table 1).

The Project completed its Transboundary Diagnostic Analysis to identify and prioritize the major regional environmental concerns and their root causes in 2012; and in 2015 the countries have finalized a Strategic Action Programme to address and remediate them.

3.1. Implementing sustainable fisheries in the BOBLME

Under the regional objective “fisheries and other marine living resources are restored and managed sustainably”, the eight countries participating in the BOBLME project have produced fisheries advisories for hilsa shad or Indian mackerel in the Bay of Bengal that incorporate the ecosystem approach. These advisories have been produced by a “Regional Fisheries Management Advisory Committee”, which itself receives information from technical working groups on topics such as: the biological status of hilsa/Indian mackerel (regional stock); the impact the fishery is having on the environment, the impact

⁷ A more comprehensive presentation of CCLME and the BOBLME is provided in separate chapters.

the fishery is having on endangered, threatened and protected species; the impact the fishery is having on other species; the external factors that threaten the fishery; and the socioeconomic and governance issues.

In response to the need for regional capacity development, expressed by representatives of fisheries agencies and institutions within the wider Asia-Pacific region through intergovernmental and regional fisheries bodies such as the Asia-Pacific Fisheries Commission (APFIC), the Coral Triangle Initiative (CTI), and an ASEAN-SEAFDEC Ministerial Resolution, a training development partnership, consisting of BOBLME and collaboration partners APFIC, CTI, USAID and NOAA developed a one-week training course on EAF, entitled “Essential Ecosystem Approach to Fisheries Management” (E EAFM).

Based on the overall EAF approach (FAO, 2003) the EAFM training course is structured into 18 modules, spread over 5 days. It covers basic topics such as why we need EAFM, and what exactly EAFM is. The course provides basic knowledge on the EAFM process and a framework for decision-making for responsible and sustainable capture fisheries management. Trainees learn about EAFM principles and concepts and use an EAFM plan template to develop a draft fisheries management plan. They also learn the principles of co-management and how to foster cross-sector coordination; and practice the crucial skills of effective communication, facilitation and conflict management.

Essential EAFM was piloted in mid-2013 in Malaysia, by March 2015, with the assistance of a range of partners, 23 EAFM training courses and 8 training-of-trainers courses have been held across South Asia and South East Asia.

3.2. Supporting multi-sectoral processes in the BOBLME

There are many regional bodies, organizations and partnerships—with a range of mandates and competencies—working towards the same environmental goals in the Bay of Bengal and there is potential for them to collectively provide momentum and synergy at the national, sub-regional and regional levels. The BOBLME Project worked with more than 20 institutions, bodies and agencies during its first phase. This has contributed to improved understanding of resource and habitat status and related management activities in the Bay of Bengal; fostered collaborative action and exchange of information; reduced duplication of work; and promoted the optimal use of funding and other resources.

The SAP comprises a broad range of activities relating to a diverse spectrum of topics and sectoral interests that span a wide geographical area. At present, there is no single body or environmental convention with a complete mandate to cover all aspects of the SAP across its entire geographical range. The SAP contains an institutional arrangement for SAP implementation which would consist of a consortium of countries and major partners and donors working in the areas of fisheries, environment, and pollution and water quality. This is envisaged as an intermediate arrangement, while the possibility of a permanent arrangement will be explored during the SAP implementation phase.

Based on the above, establishing multisectoral institutions and processes has not really started in the BOBLME, but the above activities can be considered as preparatory towards a stronger multi-sectoral and regional integration.

4. The CCLME experience

The Canary Current Large Marine Ecosystem (CCLME) is situated in the Atlantic Ocean on the North West coast of Africa. The countries within the recognized limits of the CCLME include Spain (Canary Islands), Morocco, Mauritania, Senegal, The Gambia and Guinea Bissau. Both Cape Verde and the waters of Guinea are considered adjacent waters within the zone of influence of the CCLME. The financial beneficiary countries part of the Canary Current Large Marine Ecosystem project (CCLME project) are those listed above with the exception of Spain.

The current population of CCLME countries is estimated to be 64.5 million, and while population growth rates have dropped over the past 20 years, they remain at > 2 percent per annum (2011 estimate, World Bank, 2013).

The CCLME includes one of the world's Eastern Boundary Upwelling Ecosystems (EBUEs), renowned for their high biological productivity. The CCLME supports important fish populations of small pelagic, demersal and tuna resources. Annual production ranges from 2 to 3 million tonnes (Heileman and Tandstad, 2008)⁸, the highest fisheries production of any African LME.

Fisheries in the CCLME currently support an estimated one million jobs (FAO, 2009), and is the basis for the livelihoods of > 150,000 artisanal fishermen (Sambe, 2009; FAO, 2009) many of whom migrate widely within and outside the region, fishing and trading fish and fish products across national borders.

Covering different climatic zones, from the temperate north to the tropical south, the CCLME hosts a wide range of coastal and marine habitat types, including critical wetland habitats, estuaries, seagrass beds, mangroves and diverse coral communities. An initial economic valuation of the ecosystem goods and services done by the CCLME project (Interwies and Görlitz, 2013) indicates that the CCLME generates a yearly economic value of around 11.7 billion US\$.

At the same time some of these ecosystem services are under threat with many of the key fisheries resources classified as overexploited and unsustainable practices impacting many of the important habitats, having a negative impact on biodiversity and ecosystem quality.

⁸ <http://iwllearn.net/publications/regional-seas-reports/unep-regional-seas-reports-and-studies-no-182/lmes-and-regional-seas-i-west-and-central-africa>.

Table 2
CCLME Project components.

Component 1: Multi-country process and frameworks for understanding and addressing priority transboundary concerns
Component 2: Strengthened policies and management based on improved knowledge and demonstration actions, to address priority transboundary concerns on declining marine living resources of the CCLME
Component 3: Strengthened knowledge, capacity and policy base for transboundary assessment and management of habitat, biodiversity and water quality critical to fisheries

The countries have therefore come together under the CCLME project with the goal to: ‘reverse the degradation of the Canary Current Large Marine Ecosystem caused by over-fishing, habitat modification and changes in water quality by adoption of an ecosystem-based management approach’.

The CCLME project aims at enabling the participating countries to address priority transboundary concerns on declining fisheries, associated biodiversity and water quality through governance reforms, investments and management programs. It fosters cooperation among project countries and contributes to a strengthened monitoring of the status of the CCLME based on sound science. As such the CCLME project aims at institutionalizing cooperative and adaptive management of the Canary Current LME, both at multisectoral level, as well as within the main sectors such as fisheries.

The CCLME Project design is derived from a country-driven participatory process combining a simplified TDA/SAP process with the 5-modular LME approach. The countries have chosen to combine productivity with fish and fisheries (Component 2), while encompassing ‘pollution and ecosystem health’ within a domain of transboundary concerns defined as ‘biodiversity, habitat and water quality’ (Component 3). Component 1 (Regional coordination for TDA/SAP process and LME assessment) integrates socio-economic and governance assessment and actions (Table 2). Each component includes technical working groups addressing specific topics, and components 2 and 3 also supports in total five demonstration projects addressing issues relating to improved management of shared stocks, reduction of bycatch, mangrove restoration and MPAs in a fisheries context. Five scientific surveys have also been conducted to improve the knowledge of the Canary Current Ecosystem.

The CCLME countries have reached agreement on the priority transboundary issues, and the TDA document is under finalization, encompassing amongst others the results and knowledge gained from the scientific surveys and the working groups. The Strategic Action Programme is currently under preparation, and a proposal on future governance arrangements is also under development, building on the strengths of existing institutions and processes. The demonstration projects have also provided valuable experiences in this regard.

4.1. *Implementing sustainable fisheries in the LME context in the CCLME*

Focus has been put on addressing management of shared stocks with an EAF framework. Key resources addressed include small pelagics, migratory coastal species, demersal (finfish, cephalopods and crustaceans); vulnerable species (e.g. sharks and rays, marine mammals, marine turtles). Under Component 2, stakeholders, including resource users, have been contributing to the different thematic working groups as well as to the workshops under the demonstration projects with the aim of establishing cooperative working arrangements, to test new methodologies and promote new measures.

As such, one of the demonstration actions of the project promotes multi-country agreement on sub regional resource assessment, and policies and plans for the sustainable management of transboundary shared stocks of small pelagic fish species distributed in the upwelling zone between Morocco and southern Senegal (including waters of The Gambia).

Achievements include (i) improved knowledge of small pelagic resources, their ecosystem and interactions with climate; (ii) formulation and agreement on a regional policy for sustainable management of small pelagic fisheries in North West Africa; and (iii) elaboration of a draft regional management arrangement for shared small pelagic stocks using EAF.

The draft regional management framework was developed and is based on the principles and methodologies of the Ecosystem Approach to Fisheries (EAF).

Several multidisciplinary meetings have been organized to identify and prioritize key ecosystem issues for the given fishery/resource, to propose appropriate management actions, and based on the results, a draft management plan has been drawn up in close consultation with stakeholders and experts with expertise on shared stock management plans, including technical, legal and economic aspects. The management plan for small pelagics highlights the scope of the shared small pelagic stocks of Northwest Africa, identifies the ecological, socio-economic and governance and external drivers issues associated with the fishery and the estimated levels of risk posed by these issues affecting the sustainability of the fishery. The resulting report provides the priority (high risk) sustainability issues and provides elements for developing management systems that address these. Obviously actual implementation of the plan will require associated action at national level to ensure that management, policies and practices are coherent with what was agreed at the regional level. Furthermore, policy cycles will have to be established at the regional level, making sure that these are linked to those at the national level.

As for fisheries, other issues have been identified related to habitat degradation and declining water quality.

It is also the case for the demonstration project related to MPAs where participatory management mechanisms have been promoted for the fishing communities around selected MPAs and a design of a regional MPA network.

4.2. *Supporting multi-sectoral processes in the CCLME*

The CCLME has actively been promoting inter sectoral collaboration at both the national and regional level.

Sector ministries, other government actors and different stakeholders are involved through the National Inter-Ministry Committees (NICs) designed by the CCLME to ensure consultation with the different involved sectoral agencies and stakeholders at the national level, resulting in an integrated approach in support of the CCLME. Of the 7 countries of the CCLME, five of them have functioning National Inter-Ministry Committees. These are also involved in priority setting and strategic planning through the SAP process.

Furthermore, under Component 1 (Regional coordination for the LME assessment and the TDA/SAP process), representatives of users of CCLME goods and services are supported to participate in national level meetings or in special regional fora (e.g. West African Marine and Coastal Forum). They are also involved as resource persons at National Inter-Ministry Committee meetings (NICs) and are fully involved in the process of CCLME SAP formulation.

Under Component 3, the involvement of resource users concern consultation of energy sector personnel in the assessment of risks from offshore petroleum, the formulation of contingency plans and protocol to protect mangrove. The involvement of agriculture and water management representatives has been promoted to assess the impacts of river flow regimes on marine and coastal ecosystems.

It should be noted that while some progress has been made at the national level, regional and multisectoral processes at the regional level are just starting.

As in the Bay of Bengal LME project, there are many regional bodies, organizations and partnerships—with a range of mandates and competencies—that are working in the Canary Current region. The CCLME project has engaged in and developed partnerships with many of these to promote collaboration and common understanding of key transboundary issues and how these can be handled. Regional organizations such as the Sub-regional Fisheries Commission (SRFC), the Fishery Committee for the Eastern Central Atlantic (CECAF) and the Abidjan convention all have important roles in the CCLME. The Regional Partnership for Coastal and Marine conservation in western Africa (PRCM)—a partnership of NGOs and IGOs, can also become an important regional partner through its participation in the CCLME SAP implementation phase.

5. **Conclusions**

Ocean governance in its most comprehensive implementation entails a complex web of institutional arrangements that link policy cycles occurring at different scales within a given sector (from local, national, regional and global scales) and, within each scale, across sectors. In general, it has become increasingly important that cross-sectoral linkages are established to coordinate use of marine ecosystem services. Nonetheless, strengthening sectoral processes, including the respective sector capacity to participate to integrated management processes, also needs to be given priority. This implies that EBM will not replace sector management, but rather will address the additional level of complexity represented by the increasing interactions among different users/ sectors.

Addressing multi-sector governance has proven to be very challenging also within most advanced countries. The complexity of establishing multisectoral processes across national boundaries, as in the LMEs, has to be appreciated, particularly given the additional challenges that developing countries face in relation to their limited human and financial resources on the one hand, and level of overall governance (in terms of transparency, accountability, rule of law, etc.) on the other, compounded by weak institutions. Regional, multi sectoral governance has to be considered a long term objective and its achievement will also rely on the establishment of well-functioning institutional processes for decision making at different scales—national and local, that can underpin the regional and cross sectoral collaboration.

The fishery sector plays a strategic role in relation to food security and poverty alleviation in particular in many developing countries, in addition to creating opportunities for economic growth. Furthermore, this sector is most dependent on healthy marine ecosystems and therefore has the highest stakes in relation to its sustainable use. This role should be recognized and strengthened, at various scales including as part of the international conservation agenda. Given the above, the fishery sector could become a prime mover in fostering coordination with other sectors and thereby facilitating the establishment of multisectoral processes and formulation of common goals. At the international level, a stronger participation of specialised agencies, such as FAO, in the LME movement could create important synergies between FAO's own work with its fisheries constituency and the LME movement.

The LME approach offers a unique opportunity to support establishment of multisectoral processes for transboundary issues at appropriate scales defined on an ecological basis, bringing different sectors together working towards common goals.

Good progress has been made in the FAO co-led CCLME (jointly with UNEP) and BOBLME projects in providing scientific and technical assistance to the participating countries as they move in their TDA phase toward sustainable development of LME goods and services. However, there is much yet to be done. Moving from coordination to decision making processes

across scales, sectors and countries is a huge step which will most probably require time and resources, and possibly a higher level of development and good governance overall within the countries involved.

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