



Bay of Bengal Large Marine Ecosystem Project Phase II

Planning and Implementing Ecosystem Approach to Fisheries Management

Handbook

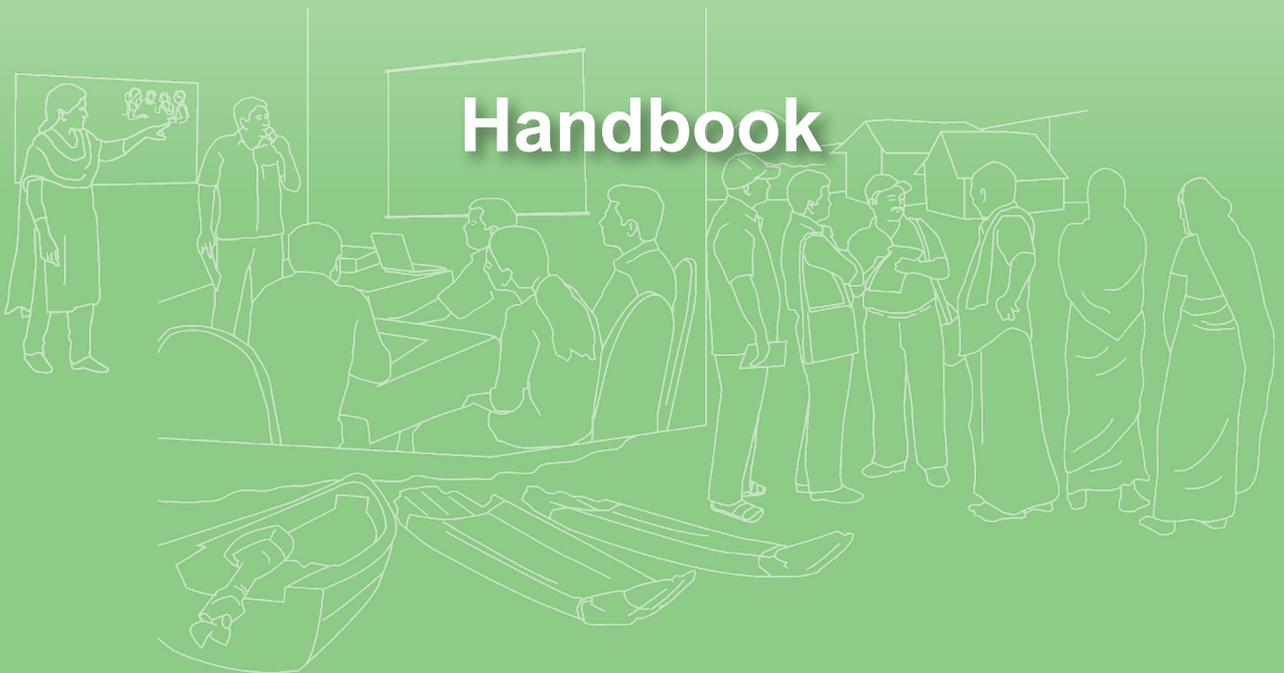




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**Bay of Bengal Programme Inter-Governmental Organisation
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The materials for preparation of this handbook were largely drawn and adapted from the Essential EAFM Training Course materials developed by the BOBLME Project Phase I (BOBLME, 2014). These materials themselves evolved from and closely followed the EAF guidelines and tools produced by FAO from 2003.

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Abbreviations and Acronyms

BOBLME	Bay of Bengal Large Marine Ecosystem Project
CBFM	Community Based Fisheries Management
CBFMP	Community Based Fisheries Management Plan
EA	Ecosystem Approach
EAF	Ecosystem Approach to Fisheries
EAFM	Ecosystem Approach to Fisheries Management
EBM	Ecosystem Based Management
EBFM	Ecosystem Based Fisheries Management
ETP	Endangered, Threatened, Protected
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FGD	Focused Group Discussion
FIP	Fisheries Improvement Plan
FMP	Fisheries Management Plan
FMU	Fisheries Management Unit
GEF	Global Environment Facility
LIA	Legal and Institutional Assessment
LME	Large Marine Ecosystem
MCS	Monitoring, Control and Surveillance
MPA	Marine Protected Area
NGO	Non-Governmental Organisation
REA	Resource and Ecological Assessment
SEAFDEC	Southeast Asian Fisheries Development Centre
SIDA	Swedish International Development Cooperation Agency
SEA	Socio-Economic Assessment
SPC	Secretariat of the Pacific Community
USCTI	US Coral Triangle Initiative

Glossary

Adaptive management: A systematic process for continually improving management policies and practices by learning from the outcomes of previously employed policies and practices. The basic steps of adaptive management are to implement actions, monitor their effectiveness; analyze, use and adapt; and then capture and share learning (Millennium Ecosystem Assessment, 2006).

Benchmark: A standard against which something can be measured or judged. It can describe where you want to go (target), where you have come from (baseline) or where you do not want to be (limit).

Co-management: Partnership arrangements between key stakeholders and government to share the responsibility and authority for the management of the fisheries and coastal resources, with various degrees of power sharing.

Community based management (CBM): Management planning and implementation carried out by the people in a community.

Ecological well-being: The state of the ecosystem in terms of health, biodiversity, supportive structures and habitats and food webs.

Ecosystem: A relatively self-contained system that contains plants, animals (including humans), micro-organisms and non-living components of the environment, as well as the interactions between them (SPC, 2010).

Ecosystem Approach (EA): A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way (CBD, 2000). Often used interchangeably with ecosystem-based management.

Ecosystem approach to fisheries (EAF): The purpose of an ecosystem approach to fisheries is to plan, develop and manage fisheries in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by marine ecosystems. An ecosystem approach to fisheries strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries (FAO 2003). The term was formally adopted at the 2001 FAO Reykjavik Conference and was not limited narrowly to management, but could cover development, planning, food safety and governance that covers the breadth of the FAO Code of Conduct for Responsible Fisheries.

Ecosystem approach to fisheries management (EAFM): EAFM is a more holistic approach to fisheries management that represents a move away from fisheries management systems that focus only on the sustainable harvest of target species, towards systems and decision-making processes that balance ecological well-being with human and societal well-being, within improved governance frameworks i.e. it is a practical way to achieve sustainable development. It addresses the multiple needs and desires of societies, without jeopardizing

the options for future generations to benefit from the full range of goods and services provided by marine ecosystems (Garcia et al., 2003; Food and Agriculture Organization 2003, 2011).

Ecosystem approach to fisheries management plan (EAFM plan): The output of a planning framework that outlines the objectives and integrated set of management arrangements for a fishery to generate more acceptable, sustainable and beneficial community outcomes.

Ecosystem-based management (EBM): A management framework that integrates biological, social and economic factors into a comprehensive strategy aimed at protecting and enhancing sustainability, diversity, and productivity of natural resources. EBM 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 (COMPASS Scientific Consensus Statement). Often used interchangeably with EA.

Ecosystem-based fisheries management (EBFM): The fisheries component of ecosystem-based management, but focused on a single sector. EBFM considers both the impacts of the environment on fisheries health and productivity and the impacts that fishing has on all aspects of the marine ecosystem. Often used interchangeably with an ecosystem approach to fisheries management (EAFM).

Fisheries management: An integrated process that controls fishing activities to improve the benefits that society receives from harvesting fish. It includes the activities of (i) information gathering, (ii) analysis, (iii) planning, (iv) consultation, (v) decision-making, (vi) allocation of resources and (vii) formulation and implementation, with enforcement, as necessary, of regulations or rules which govern fisheries activities. The main aim is to ensure the continued productivity of the resources and accomplishment of other fisheries objectives.

Fishery management unit (FMU): The area of the ecosystem and fisheries that is the focus for management under an ecosystem approach to fisheries management. The FMU can be a particular type of fishing, e.g. trawl fishery, and/or a particular resource fishery, e.g. shrimp fishery or a geographic area.

Goal: A goal is the long term outcome that management is striving to achieve. It often refers to a group of inter-related issues.

Good governance: Good governance is governance that includes (i) consensus, (ii) participation, (iii) accountability, (iv) transparency and (v) follows the rule of law and is (vi) responsive, (vii) equitable and inclusive and (viii) efficient and effective.

Human well-being: The state of the society in terms of health, education, food security, political voice and influence, living environment and economic security and safety.

Indicator: A variable, pointer, or index that measures the current condition of a selected component of the ecosystem. Indicators provide a link between objectives and action when they are compared to benchmarks.

Management actions: Specific actions (controls) applied to achieve the management objective, including gear regulations, areas and time closures (see MPA), and input and output controls on fishing effort, ecosystem manipulations or governance actions.

Marine protected area (MPA): A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature, with associated ecosystem services and cultural values (IUCN). MPAs include a wide variety of governance types (including community-based areas), and include, but are not limited to, marine reserves where no extraction is permitted.

Monitoring and Evaluation (M&E): the process of evaluating the performance of management actions for adaptive management. Participatory M&E is when stakeholders are involved in this process.

Monitoring, control and surveillance (MCS): The overall process used to ensure laws, rules and regulations are complied with.

Objective: What is intended to be achieved. An objective should be linked to indicator(s) against which progress can be measured. Positive or negative change resulting from the achievement of an objective is an outcome.

Precautionary approach (or principle): An underlying element of the broader framework of sustainable development. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation (UNCED, 1992).

Ramsar site: A wetland site designated to be of international importance under the Ramsar Convention, also known as “The Convention on Wetlands”, an international environmental treaty signed in 1971 in Ramsar, Iran, under the auspices of UNESCO. It provides the framework for conservation and wise use of wetlands and their resources.

Risk: A function of probability and consequence. Risk assessment is the process intended to calculate or estimate the risk to an object or system. The process includes identifying the severity of a hazard (its impact) and likelihood of it happening.

Scoping: Determination of the broad background to the fishery management unit (FMU), including a description of the geographic area, stakeholders, fisheries, critical habitats and issues on which a project or resource management plan must focus (SPC, 2010).

Stakeholders: Any individual, group or organization who has an interest in (or a “stake”), or who can affect or is affected, positively or negatively, by a process or management decision.

Sustainable development: Development (improvement in human well-being) that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainable fisheries management: Fisheries management that promotes the contribution that fisheries makes to sustainable development.

Vision: Top-level aspiration of what the future will look like if management is successful.

Preparation of the Handbook

The need to apply an Ecosystem Approach to Fisheries Management (EAFM) is now globally accepted and has been endorsed in several international fora. Introduction of EAFM, as a holistic concept and alternative way to manage fisheries started after the Rio +20 conference in 2012 and several countries have adopted the concept for their national fisheries management.

While support for EAFM has been in place through a range of global declarations and policy instruments, progress in the implementation of an EAFM at national and regional levels has been slow, partly due to the practitioners lacking the relevant skills and experience to apply such an integrated and holistic approach with increased stakeholder involvement. The difficulty of doing so in practice has resulted in EAFM remaining a largely conceptual approach, which often lacks appropriate guidance to advance its implementation. To address this issue, and promote implementation of EAFM, a substantial number of guidance and resource materials, guidelines, scholarly articles and books on EAFM have been published and made available to wider audiences over the past one decade.

Similar to many other developing regions, implementation of EAFM in the Bay of Bengal region is still in its infancy. UN-FAO Bay of Bengal Large Marine Ecosystem (BOBLME) Project Phase I, funded by the Global Environment Facility (GEF), NORAD and SIDA for improving the regional management of the Bay of Bengal environment and its fisheries, developed training course curriculum and guidance materials for implementing EAFM in 2014. In BOBLME Project Phase II, one of the expected outcomes is that the EAFM is institutionalized in at least two sites in each country, namely Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand, thereby increasing involvement of grass-roots stakeholders in management decision-making. Preparation of this document is motivated by this requirement and the handbook is targeted at EAFM facilitators and practitioners of BOBLME Phase II project.

This handbook, rather than examining the EAFM as a concept, provides a clear planning and implementation framework that could be adopted by EAFM facilitators and practitioners in the Bay of Bengal region. While there are various approaches to plan and implement EAFM, the materials for preparation of this handbook were largely drawn and adapted from the Essential EAFM Training Course materials developed by the BOBLME Project Phase I. These materials themselves evolved from and closely followed the EAF guidelines and tools produced by FAO from 2003.

The handbook has been designed for situations typical to the Bay of Bengal region, with focus on the complex, data-poor fisheries with weak management. A practical field-level approach is used to show how EAFM plans can be developed and implemented under the constraints common to the Bay of Bengal region. The facilitators and practitioners will need to adopt and customize the procedure to the specific requirements of the selected Fishery Management Units (FMUs).

Abstract

Applying an ecosystem approach to fisheries management (EAFM) is considered the preferred option and best practice for the long-term sustainability of fisheries and the services that fisheries ecosystems provide to society. In BOBLME Project Phase II, one of the expected outcomes is that the EAFM is institutionalized in at least two sites in each country, namely Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. As EAFM policy and practice are relatively new to the region, grounding EAFM agenda in this vast and diverse region poses a challenge. Preparation of this handbook is motivated by this requirement. Rather than examining the EAFM as a concept, this document provides a clear planning and implementation framework that could be adopted by EAFM facilitators and practitioners in the Bay of Bengal region. While there are various approaches to plan and implement EAFM, the materials for preparation of the handbook were largely drawn and adapted from the Essential EAFM Training Course materials developed by the BOBLME Project Phase I.

In the Introduction, this handbook illustrates the three components of EAFM, namely ecological well-being, human well-being and good governance for sustainable development. The seven principles of EAFM are Good Governance, Appropriate Scale, Increased Participation, Multiple Objectives, Cooperation and Coordination, Adaptive Management and Precautionary Approach.

What differs in an EAFM versus conventional fisheries management is that, at its core, EAFM seeks to (1) manage fisheries within the context of the ecological and social systems in which they exist; and (2) increased participation of stakeholders/co-management, in which the communities of local resource users and government share the responsibility and authority for management.

In the succeeding sections, the handbook describes the procedure for adopting five steps of EAFM, namely, selecting the Fishery Management Units (FMUs), scoping the FMU, preparing and implementing the EAFM plan, and evaluating and adapting EAFM. As a starting point, basic knowledge and information can be gathered on the following questions: (1) what are the characteristics of the FMU? (2) what are the issues and threats to the resources, and (3) who are the stakeholders that are affected by the resources? In the next step, find the opportunities to address the issues through management actions.

Once the plan is agreed and formalized, implementation of management actions will start. The implementation workplan should clearly specify activities, timelines, and individuals or groups who will be responsible for each activity and for reporting. EAFM is a continuous, iterative, adaptive, and participatory process comprised of a set of related tasks that must be carried out to achieve a desired set of objectives. EAFM plans must be monitored to see if they are to be kept on track, and evaluated if there is to be learning from successes and failures. The planning cycle includes the process of assessment, monitoring, and evaluation.

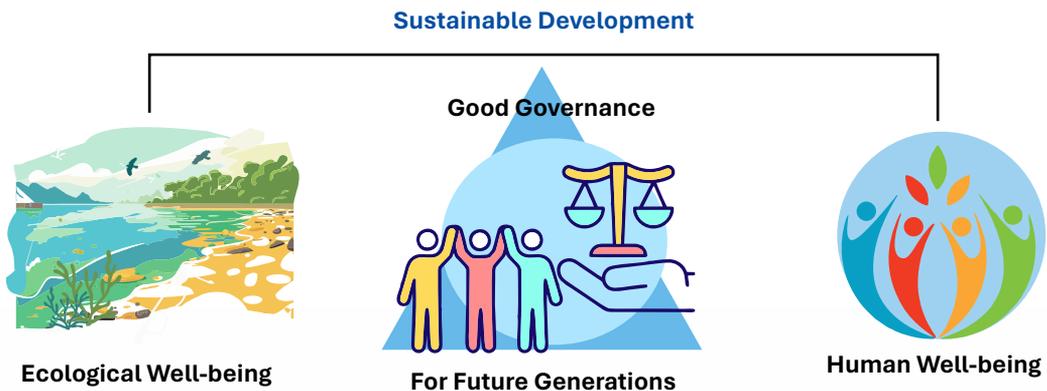
It is important to note that while these guidelines are produced for the Bay Bengal region in general, the execution has to be customized to specific FMUs.

1. Introduction

Ecosystem Approach to Fisheries Management (EAFM) offers a practical and effective means to manage fisheries more holistically. The management strategies in the region, to a large extent, have so far concentrated on fishing practices and have not addressed all the threats facing fisheries like climate change, pollution and habitat degradation. It has been realized that a broader and more inclusive approach is needed that expands on existing management. EAFM is an extension of the conventional principles for sustainable fisheries development, to cover the ecosystem as a whole. The EAFM aims to ensure that the capacity of ecosystems to produce fish and shellfish for food, employment and livelihoods, is maintained for the benefit of the present and future generations.

EAFM represents a move away from conventional fisheries management and focuses on decision making processes that balance ecological and human well-being with improved governance frameworks essential for sustainable development (Figure 1). This concept, which is relatively new to the region, needs to be adopted by the fisheries and develop management plans that not only work locally, but also fits into broader fishery/ecosystem strategies.

Figure 1. Finding balance between human well-being and ecological well-being through good governance for future generations



(Source: BOBLME, 2014. *Essential EAFM – Handbook*. www.boblme.org.)



The 7 EAFM principles can be summarised as follows (Figure 2):

1. **Good governance** to ensure both human and ecological well-being, including equitable allocation of benefits.
2. **Appropriate scale** that takes into account connections within and across ecosystems and social systems (these connections can be location-based; across different environments: land-air-sea; and across scales, i.e. district/regional/national/international).
3. **Increased participation** of key stakeholders.
4. Management for **multiple objectives** (balancing societal trade-offs entails working across scales and with different stakeholder objectives; the aim is to develop objectives which address multiple challenges/concerns).
5. **Cooperation and coordination** both vertically across different levels of government and society and horizontally across agencies and sectors.
6. **Adaptive management** that embraces change through learning and adapting.
7. Use of **precautionary approach** when uncertainty exists.

Figure 2. Seven principles of EAFM



(Source: BOBLME, 2014. *Essential EAFM – Handbook*. www.boblme.org)

2. Approach to Plan and Implement EAFM

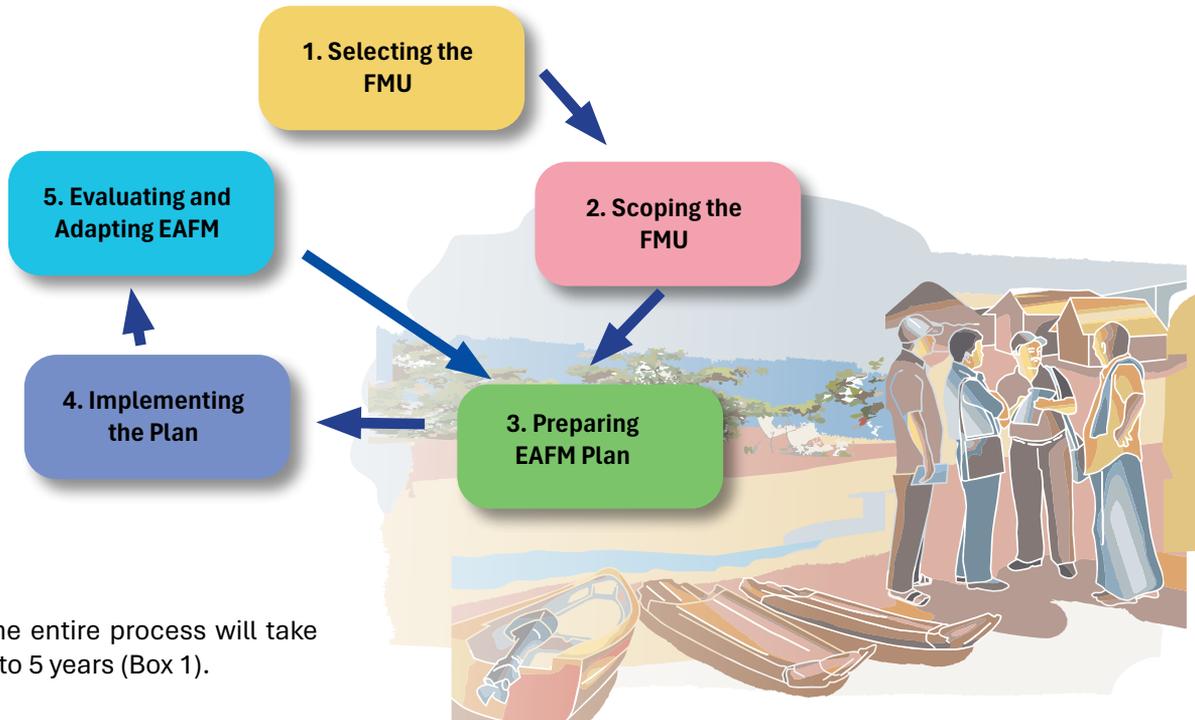
Planning and implementation of Ecosystem Approach to Fisheries Management (EAFM) requires a step-by-step approach by following a standard procedure. Similar to other fisheries management approaches, the key element of this approach is to deal with all the ecological consequences of fishing and also understanding the social and economic implications.

For implementing EAFM in the BOBLME Phase II, a 5-step approach will be undertaken. The five steps and details are presented in Table 1 and Figure 3.

Table 1. Details of EAFM step-by-step approach

Step	Task	Approach	Duration	Output
1.	Selecting the FMU - Short-listing the FMUS - Selecting the FMUs	Consultation workshop	4 months	FMU selected
2.	Scoping the FMU - Define the FMU - Identify stakeholders - Identity issues and opportunities in the FMU	Data collection, Consultations, FGDs, Secondary info	+ 4 months	FMU defined
3.	Preparing EAFM Plan - Establish and foster participatory/ co-management arrangement - Identify vision, goals & objectives - Develop indicators & benchmarks - Identify management actions & implementation mechanism - Formalise the agreed plan - Identify the challenges and opportunities in meeting the goals & objectives	Stakeholder meetings, Workshops, FGDs, Community meetings, Training	+ 4 months	EAFM plan developed
4.	Implementing the Plan - Monitoring, Compliance and Surveillance - Developing communication strategy - Conflict management	Stakeholder meetings, Training, Co-managemnet by stakeholder group	+1 to 2 years	EAFM implemented
5.	Evaluating and Adapting EAFM - Evaluating the Plan - Adapting the Plan	Stakeholder meetings, CO-management by stakeholder group	+1 to 2 years	EAFM adapted

Figure 3. Five steps of EAFM



The entire process will take 3 to 5 years (Box 1).

Box 1. How long will it take to execute EAFM?

Time estimation for planning and implementing EAFM is of paramount importance to everyone involved, from stakeholders to EAFM team members. It is hard to fix standard time limit to execute EAFM, as execution is influenced by several factors that are concomitant with the scale, complexities and challenges. It should be recognized that EAFM is a suite of iterative activities, working toward long-term change. Time taken to execute EAFM depends on some of the following factors:

- The major focal point of time estimation is the operational readiness of the stakeholders, particularly the primary resource users to execute EAFM.
- The progress towards an EAFM requires acceptance to move beyond conventional fisheries management, and consider management within the full social-ecological system within the institutional context. Implementing such an expanded scope of management takes time and calls for proper understanding and cooperation among the stakeholders.
- In fisheries where conventional management is well-grounded, it is relatively easier and faster to implement EAFM. A long history of dependence on government welfare measures for short-term monetary and material benefits rather than on long-term sustainable fisheries and ecosystem will take long time to reverse the trend.

- Readily acceptable social and achievable administrative measures in the EAFM plan will quicken the process.
- Institutional issues, such as stakeholder disagreements and low levels of participation will delay the process.
- In cases where the scale of operation is large, for example, very large geographic boundaries or many types of fisheries or involving too many sectors outside the fisheries sector, will take time to get the consensus of all the players.
- If the underlying knowledge base and quality of advice is not based on sound scientific background, there will be delay to convince the stakeholders and take them on-board.
- Lack of conducive policy framework and regulatory support will delay the effort.
- Conflict among the stakeholders during different steps may derail the process and need time and effort to put the mechanism back on track.
- Finding adequate funds for different activities during the process could take time.

Though time estimation is difficult, it is necessary to anticipate the challenges and delays and prepare a mitigation plan. Solutions must be tailored to the local conditions that emerge from time-to-time. It should be realized that no one-size-fits-all. Resolving conflicts, building trust and establishing consensus-building procedures through proper communication strategy and continuously engaging the stakeholders for acquiring cooperation should be an integral part of EAFM execution to reduce time delays and address the challenges.

Depending on the complexities and challenges encountered, it is reasonable to expect that full-scale execution of EAFM may take 3 to 5 years. Time delay can be anticipated in the implementation stage. The EAFM Team/Facilitators have a great role in addressing the challenges and reducing the time delay. They should ensure acceleration of community-level engagement and collaboration of stakeholders to ensure incorporation of EAFM into the existing form of management.



3. Selecting the Fishery Management Units (Step 1)

Selection of suitable Fishery Management Unit (FMU)* plays a significant role in the success of the project. A scientifically grounded methodology is needed for selecting FMUs, integrated with stakeholder consultation, to ensure objective, comprehensive, and data-driven decision-making. Such a methodology will provide an unbiased framework, allowing for a thorough evaluation of ecological, socio-economic, and governance factors, and align selection of FMUs with broader conservation and fisheries management goals. The approach should not only enhance the credibility of the selection process of the FMUs, but also ensure that the chosen Units are suitable for demonstrating the efficacy of EAFM and fostering its long-term sustainability and scalability. Therefore, the development and application of a scientific methodology, complemented by expert consultations, is fundamental to the successful implementation of EAFM initiatives.

EAFM can be applied at a number of geographic scales, ranging from a large marine ecosystem (LME) to a fishing community (cluster of villages). While the options for selecting the EAFM for implementation are many (Table 2), EAFM works best at the level of a “fishery” and it is important to clearly define the area to be managed, i.e. the FMU.

Ideally, the chosen FMU should:

- relate to some known ecological boundaries, although this is often difficult to achieve in a practical sense as ecological boundaries seldom coincide with political boundaries and are often nested;
- cover the whole of the geographical range of the main stocks; and
- cover all the gears that are fishing that stock, including both small-scale artisanal fishers and large-scale commercial fishers.

Table 2. Options for selecting the EAFM for implementation

* FMU (Fisheries Management Unit) is used to refer the EAFM sites. FMU is a more practical and

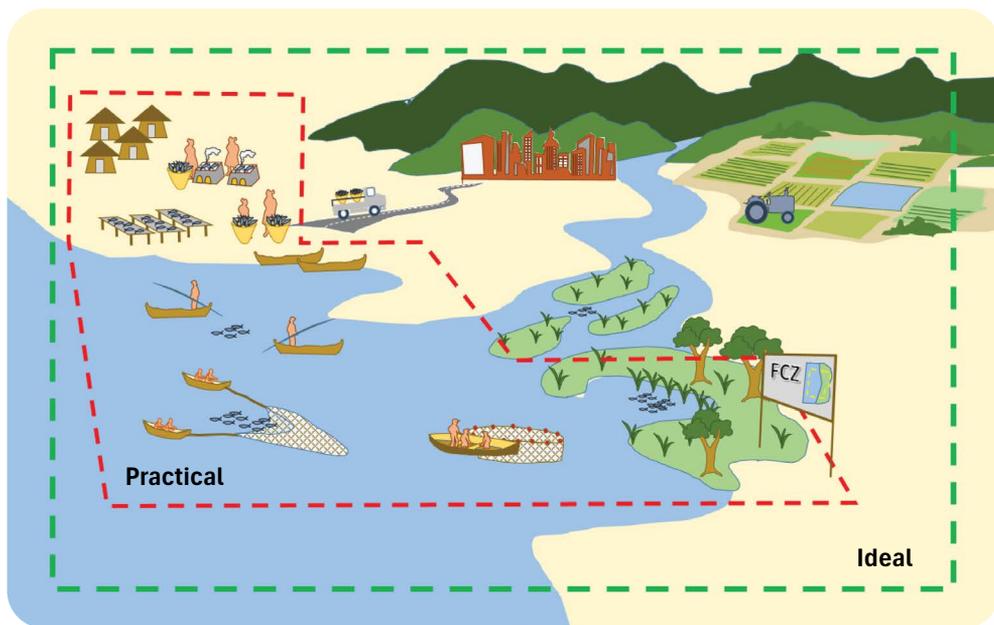
Option	Example
Critical Habit-based	Coral reefs-based; mangroves-based; Lagoon-based; Seagrass-based
Area-based	Maritime States/Provinces, Marine Management Areas
Species-based	Shark Fishery, Hilsa Fishery, Pelagic Fishery, Demersal Fishery
Fishery-based	Trawl Fishery, Gillnet Fishery, Purse-seine Fishery
Issue-based	Overfishing, Pollution, Coastal Disasters, Safety-at-sea, Climate Change
Transboundary	Fish Stocks, Ecosystems, Other Issues

accepted term in EAFM, which could be area-based, species-based, fishing gear-based or critical habitat-based.

It must be recognised that the FMU may not completely cover the whole area (Fig. 4). Ecosystems are often nested and on different geographical scales. Considering a fishery adjacent to a community may be adequate for sedentary species such as a seacucumber or seaweed stock that is fished almost exclusively by that community, but totally inadequate for a more mobile fish such as a coastal tuna that are fished by different stakeholders and different gears along the coast, as well as by the community.

Where too much of a species' range falls outside the FMU – for example, a fishery where the stock is shared by two provinces/countries (as is the case with some coastal tuna species) or where there are other water users – then every effort must be made to engage the other parties in the planning.

Figure 4. Ideal vs Practical FMU



(Source: BOBLME www.eafmlearn.org)



3.1 Short-listing the FMUs

The following information will be collected for initial short-listing of potential FMUs:

1. General characteristics of the site/ecosystem.
2. Geographical area/extent
3. Uniqueness of the site in terms of biodiversity/critical habitat/ETP species/biological productivity
4. Status of fisheries (major species caught, craft and gear used/unique fisheries)
5. Dependent human population (number of villages/sources of livelihood)
6. Governance structure (sanctuary/MPA/biosphere/Ramsar site/stakeholder participation/co-management arrangements)
7. Data availability (focus of research organizations, government projects -completed/planned)
8. Key issues and opportunities from the fisheries and ecosystem perspective.

The above information will be collected from experts, publications and other secondary sources.

3.2 Selecting the FMUs

After initial short-listing, the FMUs will be selected and finalized for implementing the EAFM. The following important points will be taken into account for selection of FMUs:

- EAFM is a process that consists of 5 steps, including planning and implementation. While the application of criteria should consider all the steps, special attention may be paid to the *implementation potential* of the EAFM Plan.
- Selection will be done through a consultative process by stakeholders like representatives from fisheries and environment departments, researchers, NGOs and others, preferably in a Workshop.

For selecting the FMUs from the short-listed FMUs, a set of six criteria will be applied.

Criteria 1. Stakeholder Participation

EAFM is a participatory process, and stakeholders are the central part of management. Potential stakeholders include fishers and fisher associations, governments (local - district – national), fishery related (e.g. boat owners, traders, vendors, processors), compliance and enforcement, other users (e.g. tourism, ports) and external agents (e.g. NGOs, researchers). A co-management approach is at the heart of EAFM and is more likely to foster participation. Co-management is a partnership arrangement between stakeholders and governments to share the responsibility and authority for the management of a fishery, with various degrees of power sharing. In the present approach to the selection of EAFM Units, government (administrators and managers) participation has been segregated as a separate criterion, the reason being that the approach to foster the participation of government stakeholders is often different from that to be followed for other stakeholders.

Application:

While stakeholder participation is recognised as the most important criterion for successful planning and implementation process, the question is how this criterion can be used for the selection of EAFM Units. In the FMUs where stakeholders are highly receptive and willing to participate in the initiatives to improve management measures for sustainable fisheries management and restoration of ecosystem, it is relatively easier to plan and operationalize EAFM. For example, in FMUs where a formal or informal co-management arrangement already exists, the implementation would be fairly smoother and successful. This factor may be considered while applying this criterion for the selection of EAFM Units. In short, FMUs with the potential for a high level of stakeholder participation may be assigned higher scores.

Criteria 2. Government Participation

Active participation of governments/departments is essential for co-management for the purpose of organising and facilitating co-management processes like formation of co-management councils, unlocking financial resources, approving and formalising the plan and linking the policy with action.

Application:

It is easier to engage the government in locations/FMUs where the government has taken initiatives and invested in managing the fisheries/conserving the ecosystem. Moreover, the governments would have invested in the sites/schemes by considering public demand and where the possibilities of ecological and human well-being will be conspicuously high. FMUs with high levels of government interest and investment will be acceptable to the governments for implementing EAFM and, hence, may be assigned higher scores.

Criteria 3. Technical and Institutional Capacity

EAFM is a complex and long-term process and critically requires technical and institutional capacity for successful planning and implementation. Technical and institutional capacity implies that EAFM activities are carefully planned and executed, following a clear plan. In reality, the capacity involves more experimentation and learning. Availability of technical and institutional capacity effectively facilitates the process by which individuals, groups, organisations, institutions and societies can (i) perform core functions, solve problems, define and achieve desired objectives over time, and (ii) understand and deal with their development needs in a broad context and in a sustainable manner. Therefore, technical and institutional capacity with diverse expertise will be required. For example, during the planning phase, scientific capacity (both formal and traditional knowledge) will be required for resource assessments, fishing operations, ecology, etc, and community capacity will be required to facilitate stakeholder involvement, including conflict resolution, negotiation skills and participatory engagement. Developing the EAFM plan will also involve drafting and understanding legislation and how to develop the plan with stakeholders. During the implementation phase, presentation and communication skills (especially with fishers and fishing communities, policy decision-makers and the media) will be required.

Application:

The availability of technical and institutional capacity within or in the vicinity of the FMUs will greatly facilitate planning and implementing the EAFM. In FMUs, where the institutions are already working on the FMU and have good knowledge and capacity, and if there is no conflict of interest, it will provide an impetus to the entire process. FMUs already engaged with public, private, or local institutions with technical capacity may be assigned higher scores.

Criteria 4. Appropriate Scale

Determining an appropriate scale that takes into account connections within and across ecosystems and social systems (these connections can be location-based, across different environments, and across scales, i.e. district/regional/national/international) is important. Scaling is in terms of ecological scale (for example, distribution of species, extent of fishery on geographical scale), socioeconomic scale (for example, a single community/fishery in restricted areas or spread along the coastline, price of fuel that affects fishermen across the coastline), and governance scale (spans across all levels, from local community to provincial, to national, to sub-regional, to regional and to global). Scaling requires careful consideration because incorrect decisions on scale could lead to sub-optimal social, economic or ecological outcomes for the fishery. For the highest likelihood of success, an EAFM plan should be developed pragmatically and based on practical scales and boundaries.

Application:

There is no 'ideal' scale for EAFM. The shortlisting of FMUs has to be based on the potential of the project to implement within practical scales and boundaries.

Criteria 5. Issues in the FMUs

EAFM plan is developed basically by identifying and prioritising issues and threats in the FMUs. The issues may negatively impact ecological well-being, human well-being and governance. EAFM provides opportunities to address multiple issues and find solutions. Overfishing, overcapacity, bycatch, declining quality of economic value of fish catch, habitat loss, pollution, climate change and conflicts within and external sectors are some issues that negatively affect fisheries and ecosystems.

Application:

Every FMU will have issues of varying dimension and intensity. FMUs that face intense threats and issues that could be addressed by the present project, considering the relevance and objectives of the project, have to be identified. The shortlisting of FMUs has to be based on the potential of the project to find solutions to the issues and implement considering the limited human and monetary resources and time availability.

Criteria 6. Information/Data Availability

Information and data lead to gaining an insight into the FMUs, increases the understanding and decreases uncertainty. It is important for decision-making, developing EAFM plan,

problem solving and improving the process. Data is also important to establish baselines, benchmarks, indicators and goals. However, lack of data and information should not be used as an excuse for not taking action. In this situation, precautionary approach will be the backbone of EAFM.

Application:

FMUs having enough data/information are in an advantageous position to begin action. FMUs with good amount of reliable and relevant data/information may be assigned higher score.

Scoring

The stakeholders will discuss on the short-listed FMUs based on the above criteria and allot scores. Utilizing the criteria, each Unit will be compared against every other in terms of how well it meets each criterion. Appropriate scoring system (for example, 1 to 9) can be developed for comparison. A matrix as under will be created to compare each site with every other, against every criterion individually, so as to facilitate a comprehensive evaluation.

Criteria 1

	FMU 1	FMU 2	FMU 3	FMU 4	FMU "N"
FMU 1	1				
FMU 2		1			
FMU 3			1		
FMU 4				1	
FMU "N"					1

Criteria 2

	FMU 1	FMU 2	FMU 3	FMU 4	FMU "N"
FMU 1	1				
FMU 2		1			
FMU 3			1		
FMU 4				1	
FMU "N"					1

Criteria “N”

	FMU 1	FMU 2	FMU 3	FMU 4	FMU “N”
FMU 1	1				
FMU 2		1			
FMU 3			1		
FMU 4				1	
FMU “N”					1

Assigning relative weight to criteria

It is possible that all the criteria will not have equal influence in finalising the FMU. For example, importance of participation of primary stakeholders and government is very high in FMUs, and without their participation, the EAFM initiative will fail. Hence, criteria related to primary stakeholder and government participation should be subjected to greater weight compared to other criteria. Considering this, weight was assigned to each criteria by consulting with experts (Box 2). The weightage assigned to each criterion is given in Table 3.

Table 3. Weight assigned to each criterion

#	Criteria	Weightage
1	Stakeholder participation	0.374
2	Government participation	0.312
3	Technical & Institutional capacity	0.180
4	Appropriate scale	0.064
5	Issues in the FMU	0.044
6	Information/data availability	0.026

By summing up and normalizing the pair-wise comparison scores for the FMUs, a hierarchy of important FMUs can be established.



Box 2. Assigning weight to each criterion

All the selected criteria may not carry equal weight. By assigning weights to the criteria, each option can be evaluated objectively for making informed decisions. For assigning weight to the selected criteria, a team of experts was consulted and the following method was adopted by the experts:

Pair-wise comparison of criteria: A matrix as under was created to compare each criterion against every other, in a fundamental scale of 1-9 so as to facilitate a comprehensive evaluation. [1- Equally important; 3- Moderately more important; 5- Strongly more important; 7- Very strongly more important; 9- Extremely more important] (Saaty and Kearns, 1985; Forman and Peniwati, 1996; Hartwich and Janssen, 2000).

In the matrix, the experts assigned scores (odd numbers – 1, 3, 5, 7, 9) to each pair of criteria based on their relative importance to implementation of EAFM.

	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Criteria "N"
Criteria 1	1				
Criteria 2		1			
Criteria 3			1		
Criteria 4				1	
Criteria "N"					1

The relative element compared with itself is 1; therefore, diagonal of matrix (upper left to lower right cells) contains 1's. The judgment values were given by the experts by consensus. In case of disagreement, intermediate values (2,4,6,8) were given.

Assigning relative weights to criteria: By summing and normalizing these scores, the relative weight of each criterion was determined, thus establishing a hierarchy of importance. An excel file with pre-fixed formula was used for the purpose.

Geometric Mean (GM) of each row is called estimates of eigenvector component (Saaty, 1980), and it is normalized to the unity by dividing each entry (GM of each row) by the sum of all entries (sum of GM of all rows). The normalized value thus obtained is relative weight or local priority or normalized priority vector of each element.

Statistical validation: Measures of inconsistency derived from relevant statistical analyses (i.e., estimation of maximum eigen value; consistency index; consistency ratio) provide information on violation of numerical (cardinal) and transitive (ordinal) consistency of the inferences.

The consistency ratio (CR) provides a measure of the probability that matrix was filled in purely at random; it is a comparison between current matrix and a purely random answering of questions. Acceptability of CR is 0.1 (Harker, 1989), in some cases it can be tolerated up to 0.2, but never more than that (Saaty and Kearns, 1985). If CR is not acceptable then the judgments values were revised through more careful analysis.



4. Scoping the Fishery Management Unit (Step 2)

For preparing EAFM planning and implementation process, a number of startup tasks are required in the selected Fishery Management Unit (FMU). The chosen FMU should clearly identify the ecological boundaries and define the goals and objectives. Once the location and boundaries of the FMU are defined, the FMU needs to be scoped and profiled so as to bring together all the relevant background information.

The scoping and profiling of the FMU will serve as a:

- Basis for all EAFM planning and management activities; and
- Baseline for future monitoring and evaluation of performance.

The FMU profile will help answer the following key questions:

- What is the current condition of resources, patterns and problems of resource use?
- What are the patterns of power in resource access and use, i.e. between the government, and communities?

Much of the required information for scoping may be already available with different agencies, organizations and stakeholders; and the scoping exercise can be basically one of compilation and collation. However, for validation, and to address information gaps, the EAFM team will have to work with stakeholders to profile the fishery and the ecosystem.

The information to be gathered on the FMU should be a balance between scientific information and indigenous knowledge. The broad range of interests, issues and dimensions in the fishery should be captured in the profile. In practice, the most important consideration for the team is a balance of expertise, so as to collect data which are relevant and useful. These data will then act as a baseline and will be a starting point for monitoring the performance of EAFM.

The following four tasks need to be completed for the scoping exercise:

1. Define the Fishery Management Unit (FMU)
2. Stakeholder analysis
3. Identify the issues and opportunities in the FMU
4. Preparation of a scoping document for the FMU

4.1 Define the FMU (Task 1)

A successful EAFM plan requires a clear statement of the area to be managed – the FMU. The FMU needs to be clearly defined by undertaking the following precise assessments:

- (i) Resource and ecological assessment
- (ii) Socio-economic assessment
- (iii) Legal and institutional assessment.

4.1.1 Resource and Ecological Assessment (REA)

REA will include information on biological and physico-chemical parameters. It will show the current status of the fishery resources and provide a description of the resources and fleet/gears used (number of resource users, gear, catch, habitat). It will also explain the history of fishing and management, by providing details on past development of the fishery in terms of fleets, gear, people involved, etc.

Information will include:

- Physical setting (geophysical overview including: land, coastal habitat, overview of coastal forests, rivers and watershed, if any); and maps
- Environment and climate (temperature, seasons, rainfall, cyclones)
- Important habitats (coral reefs, seagrass beds, mangroves, wetlands, beaches, soft-bottom, estuaries, lagoons and bays)
- Biodiversity
- Technical attributes of the fishery, e.g. type (artisanal, small-scale, commercial, industrial), gear/fishing technology, species harvested, catch, level of exploitation
- Special environmental considerations: details of critical environments, particularly sensitive areas and endangered species.

4.1.2 Socio-Economic Assessment (SEA)

SEA is a way to learn about the social, cultural, economic and political conditions of individuals, households, groups, communities and organizations in the context of a fishery. SEA will involve the analysis of the benefits and costs that are derived by an individual, group or community from their use of a given fishery resource. Economic evaluations focus on net economic benefits, which describe benefits through the use of prices and markets. Social evaluations tend to focus on a broader definition of benefits and costs that an entity derives from a given activity or resource.

SEA helps determining the potential effects of management decisions on the stakeholders, improving policy decisions, minimizing adverse impacts and maximizing benefits.

The information that will be included for SEA are:

- Resource use patterns
- Description of stakeholders (characteristics) and their interests
- Description of other uses/users of the ecosystem, especially activities that could have major impacts
- Arrangements for coordination and consultation processes
- Gender analysis
- Stakeholder perceptions
- Indigenous knowledge
- Community services and facilities

- Market attributes for extractive and non-extractive uses of resources
- Non-market and non-use values
- Social and economic values and benefits (including post-harvest).

4.1.3 Legal and institutional assessment (LIA)

The LIA identifies various resource users, stakeholders and organizations involved in resource management, analyse their roles in management, and evaluates the existing level of involvement of stakeholders in managing the resources. The LIA identifies and examines the existing legislation, policies, regulations and programs for resource management (fisheries, coastal management, marine protected areas, coastal ecosystems) at different levels of government (village, municipal, district, state/province, regional, national, international) and community (customary, traditional).

The information that will be included for LIA are:

- The extent and way in which stakeholders are represented; democratic processes and levels of representation
- *Community arrangements*: identification of stakeholders; community organizations (mandate, functions, membership, structure, period of existence, resources, funding); boundaries (political, physical/natural, gear, customary, fishing area); property and tenure rights; rules and regulations (formal/informal, operational, collective choice, constitutional); decision-making and conflict management mechanisms; surveillance, monitoring and enforcement; compliance levels; nested relationships between organizations and rights (complementarities, conflicts, overlaps, gaps which support or hinder effective management)
- *Other institutional and organizational arrangements* (international, national, regional, state/ provincial, municipal, village): government administrative agencies (mandate, functions, structure, resources); policies, legislation, regulations and programmes for resource management and environment; economic and community development; resource management strategies and programmes; non-governmental organizations (mandate, functions, structure, funding); surveillance, monitoring and compliance; nested relationships between organizations and their influence (complementarities, conflicts, overlaps, gaps which support or hinder effective management)
- Extent of stakeholder participation
- Extent of community-based management and co-management arrangements
- Incentives for collective action and cooperation among resource users.

For the three assessments, large amount of information can be collected from secondary data; and complement and validate with primary data collection, by using participatory techniques like semi-structured interviews and focused group discussion. Primary data collection will be useful, particularly for assessing the levels of stakeholder participation, surveillance, enforcement and compliance.

Collection of information/data for the three assessments can be done jointly. The data generated in the three assessments will be used as the baseline information for planning and implementing EAFM.

4.2 Stakeholder Analysis (Task 2)

A stakeholder is any individual, group or organization which has an interest in or which can affect or is affected, positively or negatively, by the EAFM process. The network of stakeholders that needs to be involved in the EAFM is complex, both in terms of vertical linkages (national to local), horizontal linkages (between different users of the natural resources) and in terms of geographic coverage. Many stakeholders are needed to implement an EAFM effectively, especially in surveillance or compliance. Stakeholder analysis is conducted to identify potential partners for the EAFM, to explore possible approaches to gather support to implement the EAFM. Support or lack of support by stakeholders can lead to the success or failure of an EAFM.

The stakeholders for the FMU will be identified in the LIA.

All relevant stakeholders need to be listed and categorized. It is important to include the people likely to be most affected (positively or negatively) by the EAFM planning process. The stakeholder categories that will be common in the FMU are given in Table 4.



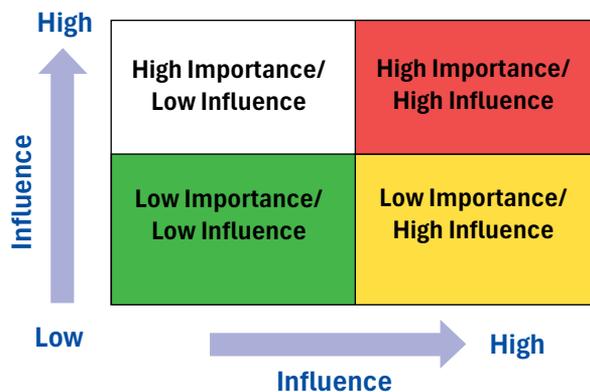
Table 4. List of stakeholder categories

Stakeholder categories	Identify specific nodal person/ agency for the FMU
State Departments <ul style="list-style-type: none"> • Fisheries • Environment • Commerce • Others (specify) 	
Fisheries Dependents <ul style="list-style-type: none"> • Fish workers • Boat owners • Fisher associations • Traders • Vendors • Others (specify) 	
MCS <ul style="list-style-type: none"> • Coastguard • Others (specify) 	
Advisors/Influencers <ul style="list-style-type: none"> • Research Institutions • Academic Institutions • NGOs • Local leaders • Others (specify) 	
Other Users <ul style="list-style-type: none"> • Tourism Operators • Coastal Developers • Others (specify) 	
Other Categories <ul style="list-style-type: none"> • Specify 	

This table, with modifications if need be, may be used for listing the stakeholders in the FMU. Often, the checklist of stakeholders will be long. Finding the right balance between engaging as many stakeholders as possible versus having large uncontrollable mob is difficult. Hence it is important to prioritise the stakeholders. The prioritised stakeholders will be consulted for preparation of the EAFM plan subsequently.

One way to prioritise the stakeholders is to use a 2x2 matrix where stakeholders are plotted according to (i) how important the stakeholder is to the EAFM process on one axis (Y axis) and how much influence (power) they have over the EAFM process on the other axis (X axis) (Fig. 5).

Figure 5. A 2x2 matrix for importance and influence stakeholder analysis



(source: BOBLME handbook)

- Those in the red box (high importance + high influence) are key stakeholders for EAFM success; they need to be kept motivated and on board as they are ‘allies’. They do not need convincing about the importance of EAFM- they already know.
- Those in green box (low importance + low influence) are not interested and have little influence; they need to be kept informed and involved, with minimal effort and monitoring.
- Those in yellow box (low importance + high influence) require active strategies. They need to be moved to the red box, they need to ‘buy in’ into the EAFM process, as they could be potential supporters and could use their influence to support the process.
- Those in white box (high importance + low influence) have to be consulted and their views obtained and incorporated to make the process effective.

4.3 Identify the Issues and Opportunities (Task 3)

During the participatory workshops with stakeholders, an important activity is to identify all issues relevant to the fishery, to help stakeholders decide where to focus the management system so as to generate the best outcomes for the stakeholders. The issues need to be identified along with the opportunities to address the issues in consultation with the stakeholders.

To assist this process, the issues can be separated into the three EAFM component groups as given in Table 5.

Example of a few indicative issues are:

- Ecological well-being: Overfishing, Bycatch, Unsustainable fishing, IUU fishing, Biodiversity loss, Habitat loss, Pollution, Climate change

Table 5. Separating the issues into EAFM components

EAFM Components	Identify Explanation	Impacting Issues	Opportunities to address issues under the project
Ecological Well-being	All ecological assets relevant to the fishery (stocks, biodiversity, habitats)		
Human Well-being	Social and/or economic outcomes currently being generated by the fishery, both the good (e.g., food security and economic development) and the bad (e.g., conflicts)		
Good Governance	Management and institutional systems in place to deliver wanted outcomes (e.g., compliance, democratic process, conflict resolution, institutional arrangements)		

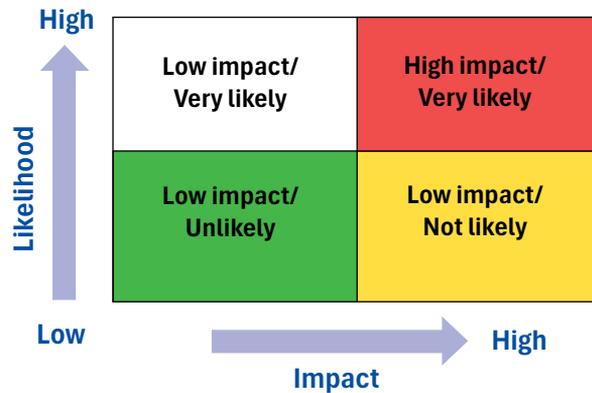
- Human Well-being: Unprofitable fishing, Gender disparity, Poor health infrastructure, Product quality, Marketing, Conflicts, Climate change issues, Safety-at-sea, Natural disasters, Aspirations to adopt technological advancements
- Good Governance: Weak resource management, Open access regime, Uncertainty about stock status, Economic development vs conservation, Lack of proper planning, Lack of MCS capacity, Lack of awareness on rules and regulations, Lack of stakeholder participation and co-management, Weak institutional capacity and infrastructure, Poor compliance and enforcement.

Because a large number of issues can be identified, the key part of the whole EAFM process is to ensure only the most important are addressed by direct management intervention. This requires a determination of their relative priority using a prioritization procedure. A successful planning process relies, for the most part, on prioritization of the identified issues by undertaking a risk assessment.

A simple semi-quantitative risk assessment is to rate each issue as to whether it has (i) high, medium

or low likelihood of occurring, and (ii) high, medium or low impact when it occurs. These are then plotted on a 2x2 matrix diagram as shown in Figure 6. In this way, the high likelihood/high impact issues are identified. High priority issues are those with a high likelihood of occurrence and high impact and they require direct management, and are taken forward into the planning process. The medium risk issues might also be identified and mentioned in the EAFM plan in case their priority changes over time.

Figure 6. A 2x2 matrix to prioritise issues based on risk assessment*



* Risk = Impact x Likelihood of Occurrence

4. 4. Preparation of Scoping Document (Task 4)

The first three tasks will lead to preparation of a Scoping Document for the FMU with the following broad headings:

1. BACKGROUND
2. APPROACH & SOURCE OF INFORMATION
3. DESCRIPTION OF THE FISHERY MANAGEMENT UNIT
 - 3.1 Definition of the FMU
 - 3.2 Resource and Ecological Assessment
 - 3.3 Socio-Economic Assessment
 - 3.3 Legal and Institutional Assessment
 - 3.4 Identification and Prioritisation of Stakeholders
 - 3.5 Identification and Prioritisation of Issues and Opportunities
4. CONCLUSION AND SUGGESTIONS



5. Preparing EAFM Plan for the FMU (Step 3)

Good management needs good planning. Planning should always be participatory as it provides an opportunity to consider the future and what outcomes are desirable by the people. Planning encourages input from key stakeholders who will gain ownership of the plan and will facilitate better implementation. It also provides more certainty for the roles and responsibilities of the different players. For the EAFM process to succeed, men and women resource users, local organizations and communities, as well as local government officials and other stakeholders need to be enabled to make decisions. During the planning stage, stakeholder consultations are used to determine what is to be achieved by the management and how success will be measured. This involves agreeing the objectives, management actions and performance measures, as well as indicators and benchmarks for monitoring progress, and for identifying whether adjustments are required. All these tasks need to be accomplished by engaging the stakeholders. Stakeholder engagement is an ongoing activity that continues throughout the EAFM process.

Strong stakeholder engagement could be achieved through co-management arrangement. There is a powerfully-built interdependence between the ecosystem approach and co-management as they are largely complementary. Management approaches can be “top-down”, i.e. fully implemented by the governments; or “bottom-up”, where community-based management entails full devolution of responsibilities to communities/ fishers. In the real world, power sharing is usually somewhere in-between these two extremes.

Fisher associations exist in many fishing communities. However, these organizations will not automatically be suitable as representative organizations in co-management. It is likely that they were established with objectives that relate more to improving monetary incomes like improving marketing, or getting government subsidies. “In these cases, a new organization may have to be established, or the outlook of the existing organizations will have to be changed to play major roles in resource and ecosystem management”. These changes may be difficult and lengthy. In some cases, where the community organizations address the issues related to the resources, those organisations need to be strengthened.

5.1 Establish and Foster Stakeholder Participatory/Co-management Arrangement

In the scoping phase, the stakeholders representing government departments, resource users, research institutions, NGOs and others will be identified and prioritized for engaging in EAFM planning and implementation.

From the list of prioritized stakeholders, a group of key stakeholders need to be identified. The key stakeholder group will be a small number of stakeholders representing different sectors of the community and management agencies who will work with the facilitators to guide the EAFM process. The stakeholder group will play a liaison role between the stakeholders and the EAFM team. The group is crucial as it gives/gets responsibility and power to/from the community members, as well as others.

The stakeholder group will have a leader, who will be elected by the group members or will be an unanimous choice. Each member will have defined roles and Terms of Reference.

The group will meet at regular intervals to discuss current issues and potential solutions. It will serve to:

- Help stakeholders understand the EAFM
- Identify problems, issues, and opportunities in the FMU and coordinate with government line departments
- Monitor fishing and other activities related to the FMU
- Assist in preparing EAFM plan and decision-making
- Support the government schemes and management measures in the FMU
- Adopt best practices/standards in harvest, post-harvest, occupational safety and disaster preparedness in the FMU
- Create awareness among the fishing and other coastal communities about responsible fishing and resource conservation.

Stakeholder engagement will be ensured by facilitating participatory workshops, awareness raising and community mobilization (Box 3). Meetings and discussions are held among the stakeholders. To do this they need to increase their awareness and understanding of fisheries resources and their management in an ecosystem context.

5.2 Identify Vision, Goals and Objectives

Vision is a long-term aspirational statement that describes the FMU's goals for the future and the impacts it aims to make. It will be an ambitious, feasible, broad and strategic statement. It should be short and simple, preferably in a single sentence, and written in present tense. For example,

“Smallscale Fisheries of FMU XXX Sustained”.

Goals will be at broad level and limited to three to five for any EAFM plan. A goal is the long term outcome that management is striving to achieve. It often refers to the issues that require direct intervention of a group of inter-related issues.

It may be appropriate to consider a goal for each of the three components of EAFM.

- Ecological Well-being,
- Human Well-being, and
- Good Governance.

It is recommended that two goals for “ecological well-being” will be identified, as this component covers both the fishery resources and the general ecosystem issues. This will help expand fisheries-centric thinking to the ecosystem scale. Example of goals are:

- Maximum Sustainable Yield achieved for the fishery;
- Impacts on vulnerable and endangered species reduced;
- Maximum social benefits realised from the fishery;
- Compliance and enforcement improved.

After identifying the FMU goals for each EAFM component, the next step is to clearly determine what is to be achieved for each issue in the fishery – *the objective*. An objective is a formal statement detailing what is intended to be achieved for each issue and which management actions are going to be used. The first thing to do is to develop objectives for the high-risk issues (high likelihood/high impact) that are clear, measurable and directly linked to one or more of the higher level goals. The operational objectives that are chosen for each of the issues to be managed need to be outcome-based and can best be described by answering the question: “What do you want the fishery to achieve for this component at the moment and why?”

The objectives are for operational management of the fisheries that are at the core of the EAFM plan. Some medium-risk issues might require identification of a mechanism in the plan for ongoing review and some form of contingency plan. Low-risk issues might be noted in the plan, explaining why they are considered low risk.

Using the high priority issues identified in the scoping exercise, it should not be difficult to create an objective directly from the issue. The objective needs to state what will be achieved, e.g. “minimize the bycatch and improve the status of the fishery”. Stakeholders will also need to decide on the possibility of achieving the objective.

Some considerations for identifying goals and objectives are:

- Identify an objective for each issue requiring direct management.
- There may be more than one management objective for an issue, and one management objective may address more than one issue.
- Agree upon goals and objectives through consultation with the stakeholders. Ensure that all concerned stakeholders agree.
- Obtain stakeholder input or advice on their appropriateness and practicality.
- Divide responsibilities and resource entitlements carefully to minimise conflict.

5.3 Identify Indicators and Benchmarks

After finalising the management objectives, indicators and benchmarks will be identified. This is necessary to measure the performance of each objective.

An indicator is an attribute; for example, temperature, area of mangroves, fish catch, catch rates, etc, or even number of collaborative meetings as an indicator of cooperation and coordination across agencies. More than one indicator may be used to monitor performance of the same management objective. In practice, it should be possible to estimate the indicators from data that have been or could be collected.

A benchmark describes where you want to go (target); for example, *50 percent of juveniles reduced in the catch*. In fisheries jargon, these are often referred to as target and limit reference points.

Indicators and benchmarks need to be:

- Specific (in terms of quantity, quality and time);
- Measurable (objectively verifiable at acceptable cost);

- Available (from existing sources or with reasonable extra effort);
- Relevant (to objectives and sensitive to change); and
- Timely (to ensure usefulness to managers).

5.4 Identify Management Actions

After finalising the set of management objectives, indicators and benchmarks for the FMU, the next step is to produce an agreed set of management actions that address the issues and meet the objectives. In most cases, there will be several management actions that could address a particular objective and a list of these could be assembled through brainstorming sessions with members of the target community, assisted by the key stakeholder group and relevant government agencies. For each objective, it is useful to prepare a list of all possible management actions with particular attention given to their ease of application, likelihood of success, feasibility and cost. All management actions must include details on the persons/ organisations responsible and the time frame required for implementation.

It also should be ensured that the management actions will be complied by the stakeholders. Good approaches for compliance of management actions include:

- Social mobilization;
- Coastal resource management best practices;
- Legislation and regulation;
- Information management and dissemination;
- Education and outreach; and
- Monitoring and evaluation.

In the initial phase of management, public education, outreach and enforcement processes are necessary to help stakeholders become familiar with the management actions. When benefits of management are understood, the stakeholders will develop a sense of “ownership” —and a commitment to—the success of the management.

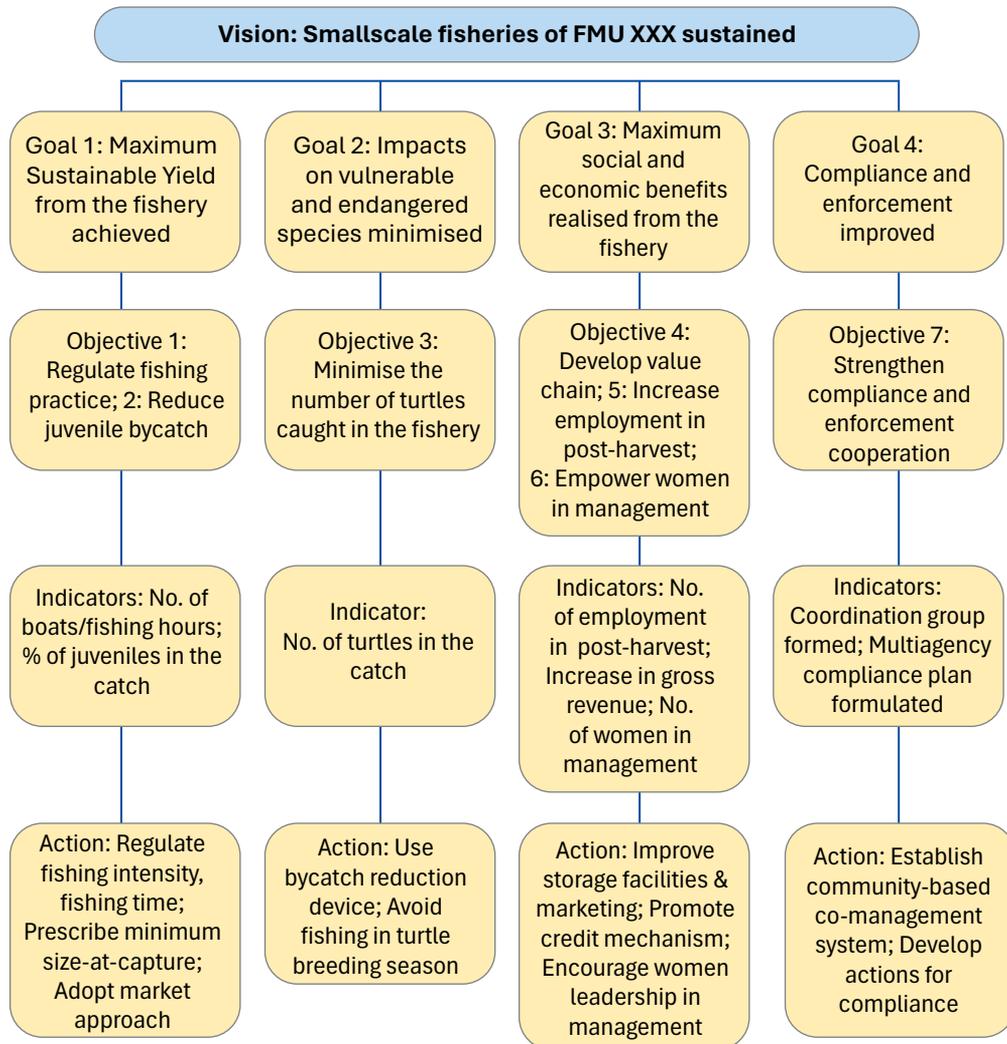
As for any other plan, developing the EAFM process will require budget and other sources of funding to support the process. Sufficient, timely and sustained funding, is critical to the sustainability of the EAFM process. In the early stages of implementation, funding may be obtained from government organisations or external donor organisations or development/ management projects.

An example of guidance to help in developing EAFM plan by identifying goals, objectives, indicators and management actions is shown in Figure 7. The following important points should be remembered for preparing the EAFM plan:

- The entire plan originates from the issues identified in the scoping exercise.
- Adopting a consultative process is very important to develop the EAFM plan. It fosters ownership of the plan, trust and working relationship among the stakeholders.

- Roles and responsibilities of stakeholders need to be clarified and that will form the link between major players such as fishers, government and non-government fishery agencies, research institutes, and other stakeholders.

Figure 7. Flowchart for developing an EAFM plan (example)



5.5 Formalise the Agreed Plan

Before beginning to implement, the agreed set of management arrangements need to be formalised. Formalisation makes the plan formal and official. This needs validation and ‘buy-in’ by the stakeholders, and their endorsement and adoption of the plan, and makes the plan progress for implementation with the cooperation of the stakeholders.

Depending upon the jurisdiction and fishery, this may need to be a formal, legal document, or it may be as simple as a list of activities agreed to, and maintained by the local community leadership. It is necessary to determine what level of formalization is required for the EAFM plan to ensure that the specific arrangements are both legally and socially enforceable by the relevant authority or groups. This may involve local or regional authorities or local community leaders, or a combination of these. There is little chance of success if the plan is not endorsed by those who influence the implementation of the plan.

5.6 Identify Challenges and Opportunities

There will be challenges and opportunities in meeting the identified goals and objectives. The challenges may include:

- Cost
- Conflict among the stakeholders
- Lack of political, stakeholder, institutional support
- Lack of human capacity/skills
- Lack of data and information.

It is important to identify the constraints and find potential solutions. In the EAFM plan, the ways to address the constraints have to be identified. The constraints could be addressed through facilitations, focus group discussions, conflict management and negotiations.

The EAFM Plan will be complete with the following template:

EAFM Plan for FMU XXX

1. Scoping the FMU
 - Define the FMU
 - Stakeholders identification and prioritisation
 - Issues and opportunities in the FMU
2. EAFM Plan
 - Participatory/Co-management arrangement
 - Vision, Goals and Objectives
 - Indicators and Benchmarks
 - Management actions
 - Plan formalization
 - Challenges and Opportunities in meeting goals and objectives
3. Way Forward for Implementation of the Plan

Box 3. Stakeholder engagement and management

As participatory co-management is at the core of EAFM, the Project Team/Facilitators(s) must take strategic and structured approaches to develop stakeholder relations throughout the EAFM process. Many stakeholder engagement and management tools can be adopted, depending on the desired level of engagement for each stakeholder group in different stages of EAFM process, and identify the actions and tactics to increase their involvement and ownership of EAFM. The narrative below provides an outline of suggested tools to engage stakeholders depending on requirements at different stages of EAFM.

Effective facilitation

Effective facilitation is necessary for all stages of the EAFM process and with all types of stakeholders. The EAFM team needs to have facilitation skills and an awareness of how to do facilitation. The main role of an effective facilitator is in guiding the EAFM process. He or she should try to ensure a fair, inclusive and open process that would balance the participation of everybody and establish a safe space in which all stakeholders can fully participate. The main characteristic of an effective facilitator is that he or she is content-neutral. Content neutrality means not taking a position on the issues being discussed and not having a position or stake in the outcome.

Participatory workshops

Participatory workshops are a form of group activity where EAFM stakeholders come together in smaller or larger groups with a shared common purpose (e.g. to find out more about the EAFM process; to learn about fisheries related activities; to define FMU issues; to decide on management actions, etc.). The workshops are a key method for EAFM planning and implementation process. Participatory workshops are to be used throughout the EAFM process and are especially essential in the planning stages.

Meetings

Meetings are another key EAFM activity, bringing together stakeholders to reflect on and discuss common topics. The meetings need to be well planned with a clear objective and scheduled around people's availability. Meetings do not need to be long; sometimes scheduling fifteen minutes with the right people together can be much more effective than making phone calls, holding a series of individual meetings or sending emails which people may not read. Meetings, like participatory workshops, will be used throughout the EAFM process with different categories of stakeholders.

Focus Group Discussions

A focus group consists of a small number of people with knowledge and interest in a particular topic. Usually a facilitator helps to get the discussion started and then takes a back seat. The Facilitator lets the discussion flow but intervenes to refocus the discussion, or bring out salient issues. The discussions explore a specific set of issues and are often unstructured. Participants can make their own questions, frames and concepts and develop their own priorities. Focus groups can be used for many EAFM purposes: to generate information during the EAFM process; to build consensus; to validate data gathered through other tools; to identify problems and solutions; for planning or reviewing.

Focus Group Discussions are a key technique to be used throughout the EAFM process – at the analysis, planning, implementation and review phases. Regular discussions throughout the EAFM lifetime can be a key way of ensuring participation and collaboration, monitoring progress and of picking up problems, and addressing potential conflict.

Negotiation

Negotiation is concerned with resolving conflict, usually by trading concessions. Negotiation should be regarded as potentially beneficial for both parties. Naturally, the task of all negotiators should be to maximize their own side's benefits, but this can only be done if an agreement can ultimately be reached. Negotiating skills are important during the potential conflicts between stakeholders that are likely to arise in the EAFM process, as well as when negotiating for support from donors or authorities.

Awareness raising campaign

Awareness raising is an ongoing process of building institutional knowledge, as new people come on board and others move away. For EAFM to succeed, it is necessary to continually build awareness of EAFM-related issues at all levels, educate and increase knowledge. Awareness raising is important to get the support of stakeholders throughout the EAFM lifetime.

Community mobilisation

Community mobilization is a process of empowerment, building awareness, promoting new values and behaviours, establishing self-reliance, building relationships, developing organizations and leadership, and enabling communities to take action through co-management to seek community support and build a base of support among community members. Mobilisation is done by holding meeting(s) to discuss the vision or mission, reach consensus and agree on developing an organization or join an existing organization. Community mobilization is essential throughout the EAFM process as it is interlinked with promoting co-management. It will start during scoping the FMU, and continued during the planning and implementation process. Community mobilization will involve using the tools described above.

Semi-structured interviews

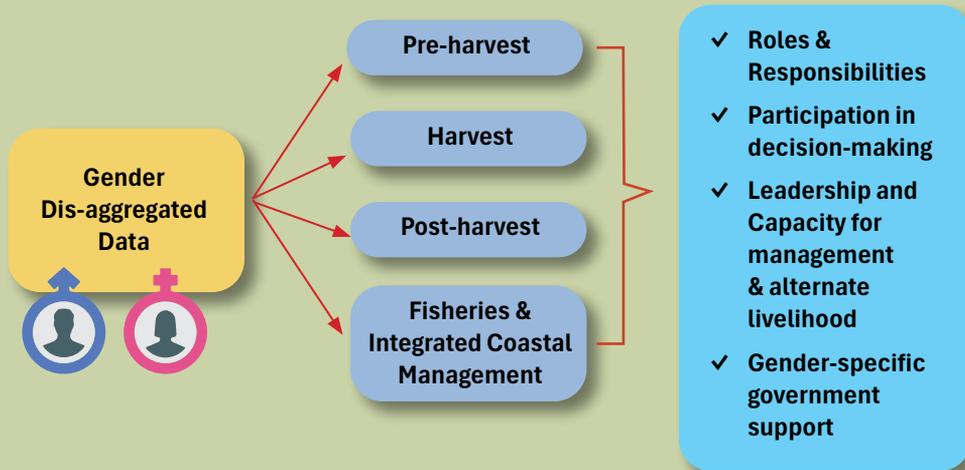
Interviews involve asking people questions, either individually or as a group. Semi-structured interviews (SSIs) are a more focused, two-way conversation than a formal interview. They rely on an adaptable, rather than rigid or prescriptive, interview guide. The advantage of this technique is its flexibility and responsiveness; the interview can be matched to individuals and circumstances. At the same time, the use of an outline or guide can make data/information collection reasonably systematic.

Semi-structured interviews can be used at the analysis, planning and review phases of the EAFM process. They can be carried out as part of scoping and identifying issues and priorities. They are also a common tool in evaluations (and impact assessments further down the line), where they are used to elicit views from a broad range of stakeholders regarding the changes and developments that have taken place since the inception of an EAFM programme.



Box 4. Gender analysis

Gender equality is fundamental to conservation and sustainable development. Assessing the role, involvement and contribution of men and women is an important aspect of scoping the FMU. Prevailing social conditions provide women with less access to income, assets, resources, technology, training and decision-making power than men. Additionally, there is a lack of quantification of the true scale of contribution of women.

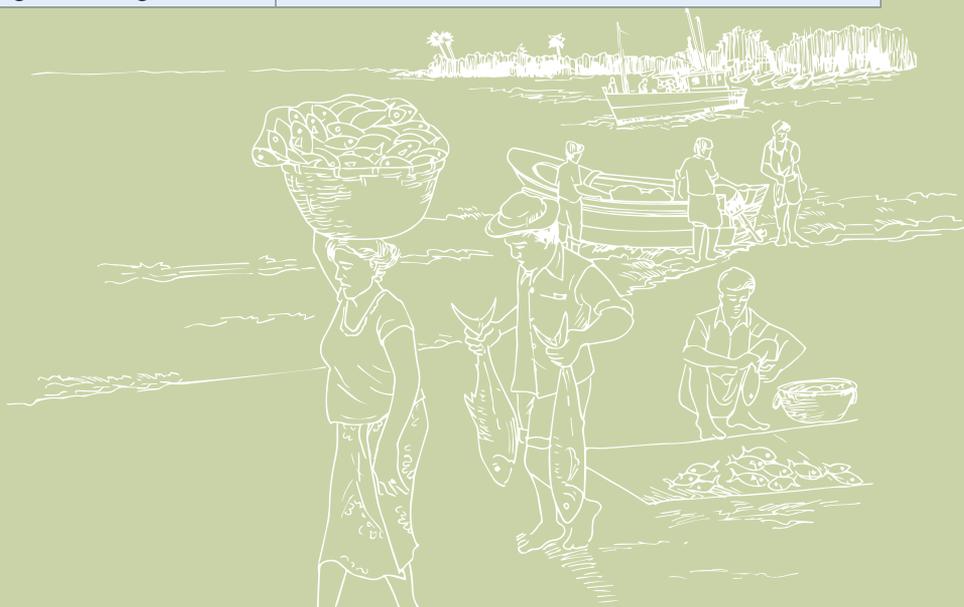


Box 5. EAFM plan for gender mainstreaming

- Gender analysis carried out during FMU scoping need to be integrated into the EAFM plan.
- Efforts should be made for gender-equal redistribution of tasks.
- It is important to ensure the needs and aspirations of different women, minorities and vulnerable groups are integrated; and representation, participation, access and benefits are enjoyed by both men and women in various EAFM activities.
- The goal of mainstreaming is to ensure equal life outcomes for women, men, minorities, and other marginalized groups.
- Equal consultation with men, women, and other minority groups should be held throughout the EAFM, planning, implementation and monitoring and evaluation phases.

The Table below gives a preliminary checklist that can be adapted and improved according to specific contexts.

Overarching Plan	Specific Plan
Mainstream gender in all stages of EAFM	Ensure integration of women's and men's understandings and needs into EAFM plan
Capacity building in achieving EAFM objectives in the FMU	Provide a roadmap, guidance and support
Ensure increase in women's participation	Promote active engagement and leadership
Support participatory approaches	Ensure women of all age groups and backgrounds are involved in frequent dialogues
Create enabling environment by establishing legal frameworks	Identify gaps in policies and build upon the existing organizations and coalitions that are in place to support the women
Allocate sufficient fund and resource for gender integration	Provide funding for the above activities and to ensure that the initiatives are sustained



6. Implementing EAFM Plan (Step 4)

Once the EAFM plan is approved and agreed, implementation should start. Implementation of EAFM is based on the plan and agreed activities. The implementation process will involve numerous decision-making points. A good practice is to develop a set of rules and regulations as a companion document to the EAFM plan. All the activities in the EAFM plan must be implemented correctly and in a timely manner if the goal and objectives are to be achieved. Many of the problems facing fishery management (for example, water pollution, destruction of fish habitat due to coastal development, climate change), fall outside the direct control of fisheries. Therefore, implementing the EAFM plan will require fisheries managers/facilitators to reach out, coordinate and integrate with environmental agencies.

It would be useful to prepare an implementation work plan that outlines what needs to be done to implement the EAFM plan, by whom, by when, and where. Generating a work plan requires going through the full set of EAFM actions and determining

- (i) What are the specific tasks that need to be undertaken?
- (ii) Who are the actual persons/institutions that will be responsible for completing these tasks?
- (iii) When the tasks will be complete?

Table 6 is an example to show the specific tasks that could be undertaken for the given management actions. However, the actions and tasks will change depending on the actual issues, stakeholder perceptions and their cooperation.

6.1 Monitoring, Control and Surveillance

There is no point in developing management actions unless compliance can be ensured. Compliance is the outcome of *voluntary acceptance* of, and action in accord with the management rules and regulations. On the other hand, enforcement is the act of *enforcing or ensuring observance of and/or obedience of rules and regulations*. It is always preferable to make compliance a preferred outcome compared to enforcement actions. Compliance is best achieved when fishers perceive management as being legitimate and fair, and are convinced that it is beneficial.

In fisheries, the enforcement of, and compliance with, management actions is known as “Monitoring, Control and Surveillance (MCS).” MCS is the mechanism for implementing agreed management actions. The components of MCS comprise:

1. Monitoring (M) – the collection and analysis of information relevant to compliance;
2. Control (C) – the rules by which the fishery is governed; and
3. Surveillance (S) – observing and policing to ensure compliance with the fishing rules.

To ensure implementation, it is important that the functional group of stakeholders should monitor the compliance in the context of rules that have been set-in and make amends if they are not properly complied with.

Table 6. Example to prepare specific management tasks

Objective	Management action	Specific task
Regulate fishing practice	<ul style="list-style-type: none"> Regulating fishing intensity/fishing hours 	<ul style="list-style-type: none"> Registering & licensing the boats Observing seasonal & spatial closures Catch reporting by fishers in prescribed format
Reduce juvenile bycatch	<ul style="list-style-type: none"> Prescribing minimum size-at-catch Adopting market approach 	<ul style="list-style-type: none"> Adopting gear modification & mesh size regulation Engaging buyers Incentives to fishers
Minimise the number of turtles in the catch	<ul style="list-style-type: none"> Using bycatch reduction devices where applicable Avoiding turtle nesting season/areas 	<ul style="list-style-type: none"> Arranging supply of free BRDs Training to release live turtles Incentives to fishers to use BRDs, live turtle release and avoiding turtle nesting seasons
Develop value chain	<ul style="list-style-type: none"> Improving post-harvest storage facilities Improving marketing strategy 	<ul style="list-style-type: none"> Providing/ access to ice plants/ processing plants and transportation arrangements Establishing cooperative fish-selling associations Developing value-added products
Increase employment in post-harvest	<ul style="list-style-type: none"> Designing and promoting credit mechanisms 	<ul style="list-style-type: none"> Training to fishers in on-line marketing Arranging marketing channels Creating awareness
Empower women in management	<ul style="list-style-type: none"> Encouraging women to take lead in managerial positions and take decisions 	<ul style="list-style-type: none"> Making women lead the management council to take decisions on planning and implementing EAFM in the FMU
Strengthen compliance and enforcement cooperation	<ul style="list-style-type: none"> Establishing community-based co-management system Developing actions for compliance 	<ul style="list-style-type: none"> Determining the level of power-sharing Establishing a functional group for monitoring compliance and record-keeping

6.2 Developing Communication Strategy

A communication strategy details how the EAFM intends to communicate EAFM-related progress and developments to the diverse stakeholders, with particular relevance to implementation. Once the implementation of the EAFM process is underway, consulting and keeping stakeholders informed at the community level is very important to maintain its functionality and compliance. A short document can be developed outlining how the EAFM team will communicate with all the diverse stakeholders during EAFM implementation. This is especially important in the case of community-based fisheries.

The communication strategy will include informing the successes and challenges of implementation; finding solutions for the present as well as future, the action expected from the stakeholders in return; raising of awareness; and institutional response.

The basic communication strategy will follow a template (Table 7).

Table 7. Preparing communication strategy

Target audience	Communication method	Key messages	Timing

6.3 Conflict Management

Given the extent and scope of the EAFM multi-stakeholder process, and the likely confrontations between different levels of resource users, conflicts are inevitable in EAFM. Conflict need not necessarily be negative. It can facilitate correcting bad fisheries management practice and improve EAFM plan.

The goal of conflict management is to apply skills that help people express their differences and resolve their problems in a win-win outcome. Conflict management is basically a form of facilitated negotiation. One approach to conflict management is to have multi-stakeholder analysis and consensus building meetings prior to the outbreak of conflict by anticipation and collaborative planning. Adopting a participatory co-management approach to planning and implementing EAFM will support such a collaborative process.

Successful EAFM plan implementation is underpinned by:

- Participatory compliance and enforcement by stakeholders through co-management;
- Enforceable legislation and control mechanisms (licenses, vessel registration);
- Extension work (i.e. working with fishers to improve awareness and compliance);
- Adequate resources (personnel and finance);
- Data and information collection system;
- Effective communication system;
- Conflict management; and
- Effective Monitoring and Evaluation.



7. Evaluating and Adapting EAFM (Step 5)

The final step in the EAFM process is to monitor how the EAFM plan management actions are meeting the goals and objectives and to feed this information back into the EAFM process to decide what should be done for improvement (adaptive management). Adaptation and refinement of plans is a normal activity that occurs through experience and acquisition of new information.

7.1 Evaluating EAFM

Monitoring and evaluation can be done at two levels. At first level, it shall be checked how well the implementation aligns and meets with the seven principles of EAFM (Table 8).

The performance of management can be assessed based on the answers to the questions in Table 8. No management system is going to get it right all the time. Human behaviour dictates that whatever rules and regulations are put in place, fishers and other stakeholders will find ways to circumvent them. There may also be unexpected consequences that were not envisaged in the planning phase. As long as these are recognised and acted on, no harm will be done in the long-term.

At the second level, the performance will be tracked from the specific objectives, indicators and benchmarks that have been already chosen to cover the important ecological, social, economic and governance issues. Assessing the status of each indicator against its benchmark will provide a snapshot of how well management is performing at the ecosystem level. For this, data collection and analysis of management performance are necessary.

For example, for the specific task of registering and licensing fishing boats, the performance can be assessed against the following benchmarks in three steps:

1. Fishers, boats and fishing gears registration and licensing system established
 - *Fishers, fishing boats, and fishing gear registration procedure established*
 - *Registration and licensing initiated*
 - *Fisheries registration and licensing data base developed*
2. Fishers, boats, and fishing gears registration and licensing system implemented and enforced
 - *Registration and licensing database functional; and registration and licensing data stored and analyzed*
 - *Registration and licensing system fully functional*
3. Fishers, boats, and fishing gears registration and licensing system implementation sustained and information from the database made available
 - *Database fully functional and information used to determine and monitor fishing effort*
 - *Fisheries and registration and licensing information used to revise and improve plans and policies on fisheries management.*

Table 8. Checklist to align implementation with EAFM principles

Principle 1. Good Governance	No	Partially	Yes
Is there sufficient legal back-up?			
Plan and implementation by stakeholders?			
Are effective compliance and enforcement arrangements in place?			
Principle 2. Appropriate scale			
Is management at appropriate ecological scale?			
Is management at appropriate human scale?			
Is management at appropriate governance scale?			
Principle 3. Increased participation			
How is co-management/participation working?			
Principle 4. Addressing multiple objectives			
Have the different objectives for management been considered and trade-offs made?			
Principle 5. Coordination and co-operation			
Is coordination and cooperation among different organisations taking place?			
Principle 6. Adaptive management			
Arrangements made for monitoring and evaluation of management performance?			
Can the management system adapt based on monitoring and evaluation?			
Principle 7. Precautionary approach			
Is management progressing in spite of lack of data/information?			
Is management actions more conservative when there is uncertainty?			

This approach of M&E will

- Allow management to identify, replicate, and maximize successful activities while concurrently understanding why some activities fall short of anticipated results;
- Promote and facilitate accountable and effective evidence-based decision making;
- Provide an opportunity to assess capacity-building results against established targets;
- Identify non-performance areas through systematic early warning to address problems proactively; and
- Provide data, information, analysis, and learning for the stakeholders.

7.2 Adapting EAFM

The EAFM plan should be adapted periodically, based on the M&E results. Regular reviews are an important element of the EAFM process. This involves using the results of the monitoring and periodic evaluations to improve the plan and with the purpose of assessing the performance of the management actions in achieving the objectives. Such reviews should be carried out under guidance from, and while making regular reports to, the EAFM team.

Short-term reviews are part of an annual cycle. The results should be summarized in an annual report that is easy to understand and that links with the fishery co-management process. In general, the report will contain:

- Performance assessments; and
- Fishery management responses.

From this assessment, it could be determined which aspects of the plan are working; if some aspects are not, it is necessary to find out why. It may then be necessary to adapt the plan by going back over the plan and its components to make modifications and move forward.

Long-term reviews should also be conducted once every three to five years, preferably by an independent third party audit. Ideally these reviews should be planned to feed into broader strategic processes. These reviews should include consideration of the full management arrangements including the high priority issues.

To summarize, the annual evaluations will trigger adaptive responses in the management (if they are not working very well) and in the compliance and enforcement (MCS) activities. In long-term reviews, the issues, goals and objectives shall be examined.

Finally, it is important to systematically document the EAFM process that was followed and the results that were achieved at each step along the way. The practical experiences of the science, policy, stakeholder interface and response in relation to EAFM need to be described. This kind of documentation will help the learning process and avoid making mistakes in the future.



8. Institutionalising EAFM

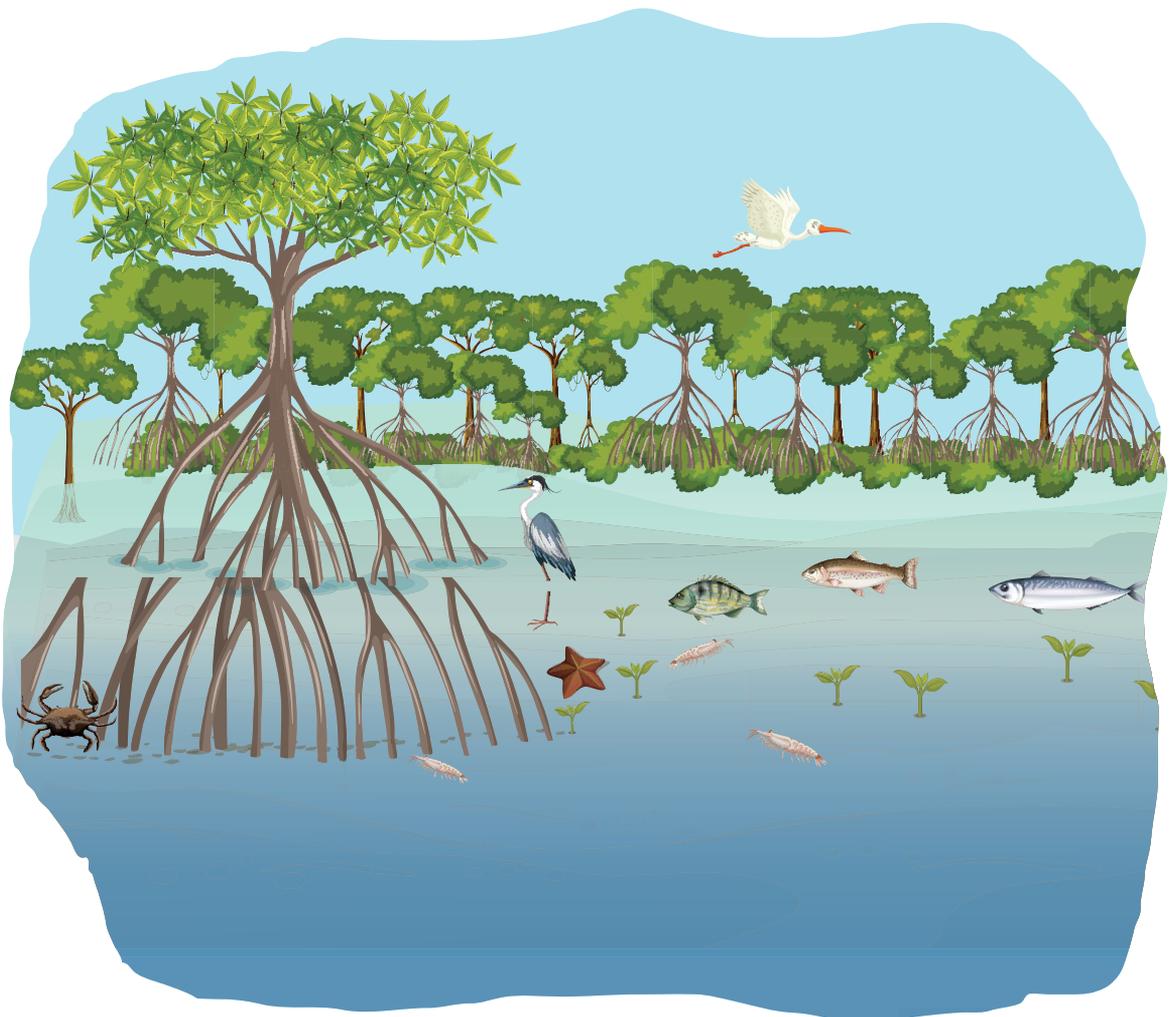
When the EAFM process is complete, it is essential to institutionalize EAFM to ensure that the process is sustained in the long-term. Institutionalization needs mechanisms to ensure monitoring, coordination, delegation of roles and responsibilities, and accountability. A plan for institutionalising EAFM will be prepared to ensure that the achievement of the project goals and objectives is not jeopardized. The main objectives of the plan are to 1) identify, prioritize, and institutionalize key activities and mechanism to strengthen the capability of partners and stakeholders to take over; and 2) prepare key partners and other stakeholders to plan and implement the prioritised activities sustainably after the project.

At the national level, the project will support developing a framework that will include EAFM. This requires conducting reviews of existing laws, policies and regulations, and identifying and recommending implementation of needed reforms and actions across all relevant sectors. At a broad level, a common framework would include (but not limited to) the following elements:

- Incorporation of internationally recognized definitions, principles and elements of EAFM into legislation, policies, and regulations;
- Incorporation of the precautionary approach into legislation, policies, and regulations, and greater recognition of data gaps and ways to operate;
- Integration of EAFM into relevant sectoral plans / policies (e.g., fisheries management plans) and cross sectoral plans / policies (e.g., integrated coastal zone management plans) and strengthened capacities (e.g., technical, scientific, enforcement) to effectively implement such plans;
- Institutionalizing EAFM within the government, including (i) building EAFM into corporate and strategic plans of relevant ministries and (ii) establishing fisheries management committees (or other appropriate bodies) to provide expert advice and analysis on the implementation of EAFM;
- Adoption of market-based and other economic instruments and incentives that promote the sustainable management of fisheries and EAFM, including addressing economic barriers impeding sustainable fisheries and EAFM;
- Establishment of national and sub-national stakeholder forums to promote dialogue on sustainable fisheries management and EAFM;
- Greater collaboration between national fishery management, environmental management and enforcement authorities;
- Improved bilateral and multilateral communications among the governments in the Bay of Bengal region concerning fisheries issues;

- Regulation of fishing industry activities, and promotion and engagement of private sector collaboration around EAFM; and
- Monitoring and evaluation of established, time-bound objectives.

It would be a long pathway to secure support and institutionalise EAFM through institutional structures. Nevertheless, the institutionalization process needs to be constructed to scale-up and roll-out EAFM initiatives undertaken in the BOBLME project.



9. Suggested Reading with Annotation

APFIC. 2009. APFIC/FAO Regional consultative workshop “Practical implementation of the ecosystem approach to fisheries and aquaculture”, RAP Publication 2009/10. Bangkok, Thailand. FAO Regional Office for Asia and the Pacific. 96pp. <https://www.fao.org/4/i0944e/i0944e00.htm>

This report is the proceedings of a regional consultative workshop on practical implementation of the ecosystem approach to fisheries and aquaculture. Enables readers to familiarize with ecosystem approaches to management and explore how these planning and management frameworks can be applied to the complex issues facing fisheries and aquaculture systems that are typical of South Asia, Southeast Asia and East Asia.

BOBLME. 2014. Essential EAFM. Handbook. Ecosystem Approach to Fisheries Management Training Course. Bay of Bengal Large Marine Ecosystem (BOBLME) Project, Food and Agriculture Organization of the United Nations and US-Coral Triangle Initiative, National Oceanic and Atmospheric Administration. 151p. http://www.boblme.org/eafm/course_materials.html

A handbook for practical application of EAFM in Bay of Bengal region. The materials for preparation of this present publication were largely drawn and adapted from the Essential EAFM Training Course materials developed by the BOBLME Project Phase I. These materials themselves evolved from and closely followed the EAF guidelines and tools produced by FAO from 2003. This handbook offers a practical and realistic approach to addressing capacity development for EAFM.

BOBLME. 2014. Essential EAFM. Toolkit. Bay of Bengal Large Marine Ecosystem (BOBLME) Project, Food and Agriculture Organization of the United Nations and US-Coral Triangle Initiative, National Oceanic and Atmospheric Administration. 96 p. http://www.boblme.org/eafm/course_materials.html

Includes a selection of tools that are useful throughout the EAFM process. EAFM requires a high level of stakeholder participation and involvement, from the planning, through implementation, to monitoring and evaluation. Appropriate use of these tools will ensure enhanced consultation and involvement of all parties in the EAFM process. The Technical Toolkit includes a selection of techniques, tools and resources.

BOBLME. 2019. Essential EAFM Case Studies. SEAFDEC, <http://repository.seafdec.or.th/handle/20.500.12067/1620>

Six case studies on EAFM implementation in southeast Asia.

Coral Triangle Initiative. 2013. Coral Triangle Regional Ecosystem Approach to Fisheries Management (EAFM) Guidelines. Honolulu, Hawaii. The USAID Coral Triangle Support Partnership, 74p. https://www.coraltriangleinitiative.org/sites/default/files/resources/Guidelines_int.pdf

This document first describes EAFM as a management paradigm differing from conventional fisheries management in its scale, scope, and approach. While the primary audiences of this document are senior officials and practitioners in the Coral Triangle region's fisheries management institutions—local, provincial, national, and regional—it is also applicable to the marine, coastal, and climate institutions and communities with specific authority over and stake in components of the Coral Triangle's fisheries ecosystems. It provides an EAFM framework for the region, therefore integrates the steps for an EAFM at the community level, with the more conceptual level and larger geographic scale. In doing so, the EAFM Guidelines strive to enable successful coordination, planning, and implementation of an EAFM within and across regional, national, provincial, and local levels in the Coral Triangle region.

Coral Triangle Initiative. 2013. Incorporating climate change and ocean acidification into an ecosystem approach to fisheries management (EAFM) plan. The USAID Coral Triangle Support Partnership, 66p. <https://reefresilience.org/wp-content/uploads/Heenan-et-al.-2013-Incorporating-CC-and-OA-into-EAFM-Plan.pdf>

The purpose of this publication is to highlight how the potential impacts of climate and ocean change can be integrated into the EAFM planning process. It is useful in identifying whether the impacts of climate and ocean change are priority issues for a particular Fisheries Management Unit or geographic area. If so, climate adaptation and mitigation actions can then be included in the EAFM plan.

European Commission. 2022. The implementation of ecosystem-based approaches applied to fisheries management under the Common Fisheries Policy. Final Report. <https://op.europa.eu/en/publication-detail/-/publication/a60305d4-3892-11ed-9c68-01aa75ed71a1>.

Provides a state-of-play of the implementation of EAFM in the North and Baltic Seas, Western Atlantic and Outermost Regions. At the core of this assessment, the study has identified three types of “EAFM challenges” that need to be addressed in order to advance EAFM.

FAO. 2003. The ecosystem approach to fisheries. Issues, terminology, principles, institutional foundations, implementation and outlook. *FAO Fisheries Technical Paper. No. 443*, 71 p. <https://openknowledge.fao.org/server/api/core/bitstreams/ab44d5f1-1368-4c09-9740-7651a72f988f/content>

One major difficulty in defining EAF lies in turning the available concepts and principles into operational objectives from which an EAF management plan would more easily be developed. The paper discusses these together with the types of action needed to achieve them. It is argued, in conclusion, that the future of EAF and fisheries depends on the way in which the two fundamental concepts of fisheries management and ecosystem management, and their respective stakeholders, will join efforts or collide.

FAO. 2003. The Ecosystem Approach to Fisheries No. 4, Suppl. 2. Rome, Italy. FAO. 112pp. <https://www.fao.org/in-action/globefish/publications/details-publication/en/c/346126>.

This guideline attempts to make EAF operational by recognizing that this approach is a way to implement many of the provisions of the Code of Conduct for Responsible Fisheries and

achieve sustainable development in a fisheries context. It provides guidance on how to translate the economic, social and ecological policy goals and aspirations of sustainable development into operational objectives, indicators and performance measures. EAFM is not seen as a replacement for, but rather an extension of, current fisheries management practices that need to be broadened to take into account the biotic, abiotic and human components of ecosystems in which fisheries operate.

FAO. 2005. Putting into practice the ecosystem approach to fisheries. Rome, Italy. FAO. 76pp. <https://openknowledge.fao.org/bitstreams/3efc30bb-2022-42ac-b3b3-0f64fa47384d>.

This booklet provides an overview of EAF and its benefits; considers what is required to implement EAF; considers the range of management measures available; provides an overview of the management process; outlines outstanding research requirements; and lists the main threats to the implementation of EAF.

FAO. 2008. The Ecosystem Approach to Fisheries. G. Bianchi & H.R. Skjoldal, eds. CABI Publishing and FAO. 363pp

This priced-book covers both theoretical and applied aspects of implementing the Ecosystem Approach to Fisheries, with a particular emphasis on practical experiences in the form of case studies from around the world, and tools for solutions.

FAO. 2009. Fisheries management. 2. The ecosystem approach to fisheries. 2.2 Human dimensions of the ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 2, Add. 2. Rome, Italy. FAO. 88pp <https://www.fao.org/documents/card/en?details=788a516f-7e39-5668-bb1a-092ed5666017>

As implementation of EAF is a human pursuit and takes place in the context of societal goals and aspirations, the human forces at play need to be understood and considered - these include policies, legal frameworks, social structures, cultural values, economic principles, institutional processes and any other relevant expression of human behaviour. This guideline has been developed on the practical adoption and application of EAF, with a special focus on its human dimensions.

FAO. 2012. EAF Toolbox: the ecosystem approach to fisheries. Rome, Italy. FAO. 172pp. <https://www.fao.org/3/cc6834en/cc6834en.pdf>.

The EAF Toolbox is aimed at national and local fisheries management authorities, including fishery managers, scientists and stakeholders looking for practical solutions they can apply given their circumstances and resources.

FAO. 2014. Essential EAFM. Ecosystem Approach to Fisheries Management Training Course. Volume 3 – Course presentations. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand, RAP Publication 2014/13, 294 pp. <https://openknowledge.fao.org/server/api/core/bitstreams/68bcde39-b2a9-4d80-89d8-141e1259f29f/content>

This is part of the Essential EAFM training package, readers will become equipped with the planning, analytical and people skills to develop and implement an EAFM Plan, based on more structured and informed management processes. This will assist current and future

fisheries managers ensure their approach to fisheries management will be ecologically sound and properly account for human needs while promoting good governance.

FAO. 2019. Ecosystem approach to fisheries management training course (Inland fisheries) – Volume 1: Handbook for trainees. <https://openknowledge.fao.org/server/api/core/bitstreams/341bda85-3c16-4eb3-b789-d2c9d2b7522a/content>

This handbook is part of a training course for the sustainable management of inland fisheries using the ecosystem approach. It is targeted at middle-level fishery and environment officers, extension workers, facilitators and other stakeholders engaged in the planning and management of inland fisheries. It is designed to be applicable to many inland fishery contexts around the world (including overlapping freshwater fishery/aquaculture systems and also intended to be adapted to suit specific local contexts.

Fletcher W.J. 2008. A guide to implementing an ecosystem approach to fisheries management (EAFM) within the western and central Pacific Region - version 5 (March 2008). Honiara, Solomon Islands. Pacific Islands Forum Fisheries Agency. <http://www.fisheries-esd.com/a/pdf>.

This guide is part of an initiative of the Forum Fisheries Agency to introduce EAFM to the management of fisheries to the Pacific Region, especially the tuna fisheries of the western and central Pacific Region (WCPFC). The guideline provides the tools to help put into practice by covering issues related to target species, non-target species, other dependent species within the ecosystem, minimising waste and pollution, endangered species, biodiversity, optimum utilisation, the welfare of the various states involved including the interests of artisanal and subsistence fishers.

Islam, M.M. et al., 2022. Status and Potential of Ecosystem Approach to Fisheries Management (EAFM) in Bangladesh. <https://www.sciencedirect.com/science/article/pii/S0964569122000436>

This study investigates the present status, future potentials for the development of a framework of the EAFM for the sustainable coastal and marine resource development of Bangladesh.

Pomeroy R. et al., 2015. Moving towards an ecosystem approach to fisheries management in the Coral Triangle region. *Marine Policy*, 51: 211-219. <https://doi.org/10.1016/j.marpol.2014.08.013>

This paper presents progress of the six Coral Triangle countries toward implementation of an EAFM. The results of a country analysis of the existing institutional, policy and legal frameworks in terms of the ability of each country to align with EAFM principles is presented. Challenges to effective implementation of an EAFM in the Coral Triangle region are discussed and recommendations to overcome some of the key challenges are provided.

Shen, H. and Song, L. 2023. Implementing Ecosystem Approach to Fisheries Management in the Western and Central Pacific Fisheries Commission: Challenges and Prospects. *Fishes*, 8: 198. <https://doi.org/10.3390/fishes8040198>.

This paper explores how the Western and Central Pacific Fisheries Commission (WCPFC), which manages tuna fisheries, has incorporated the ecosystem approach into its management and decision-making system.

SPC. 2010. A community-based ecosystem approach to fisheries management: guidelines for Pacific Island Countries. Compiled by the Secretariat of the Pacific Community. 65pp. <https://coastfish.spc.int/component/content/article/58-a-community-based-ecosystemapproach-to-fisheries-management-guidelines-for-pacific-island-countries>

This report describes how an EAF can be merged with community-based fisheries management (CBFM). This merger of approaches is referred as the community-based ecosystem approach to fisheries management (CEAFM), and represents a combination of three different perspectives; namely, fisheries management, ecosystem management and community-based management. CEAFM is the management of fisheries, within an ecosystem context, by local communities working with government and other partners.

Weerawat, P. 2022. Fostering Ecosystem Approach to Fisheries Management in the Southeast Asian Region through SEAFDEC. Southeast Asian Fisheries Development Centre, Fish for the People, 20: 14-22. <https://repository.seafdec.org/bitstream/handle/20.500.12066/7077/6.1.2.1.pdf>

Experience of conducting EAFM training and implementation in pilot sites in southeast Asia is narrated.





Bay of Bengal Large Marine Ecosystem (BOBLME)

The Bay of Bengal Large Marine Ecosystem Project II (BOBLME-II: 2023-28) builds on the success of BOBLME-I (2009-15).

It strives to promote sustainable management of fisheries and marine life while conserving their habitats in the Bay of Bengal, with ecosystem services of approximately USD 240 billion over the next 25 years that will be protected and sustained. Funded by the Global Environment Facility (GEF) and the Norwegian Agency for Development Cooperation (NORAD), the project is being implemented by the Food and Agriculture Organization of the United Nations (FAO). The International Union for Conservation of Nature (IUCN), the Southeast Asian Fisheries Development Center (SEAFDEC), and the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO) are the executing partners.

The BOBP-IGO is executing the project in South Asia for the benefit of its member countries.



BOBP

**Bay of Bengal Programme
Inter-Governmental Organisation**

91, Saint Mary's Road, Abhiramapuram, Chennai - 600 018, India
Tel: #91 44 42040024; www.bobpigo.org; Email: info@bobpigo.org