**Bay of Bengal Large Marine
Ecosystem Project Phase II**

Report of the
National Consultative Workshop on
BOBLME Project II Implementation in
India's Bay of Bengal Region
(INDIA-BOBLME)

21 - 23 March 2024
Chennai, India

Report of the National Consultative Workshop on BOBLME Phase II Project Implementation in India's Bay of Bengal Region

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Bay of Bengal Programme
Inter-Governmental Organisation
(BOBP-IGO)
Chennai

International Union for Conservation of
Nature (IUCN),
Asia Regional Office
Bangkok

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Photographs and presentations made at the workshop are available at:

Executive Summary

The Bay of Bengal Large Marine Ecosystem (BOBLME-II) project is a follow-up to the BOBLME-I project, with a focus on managing and protecting the marine environment of the Bay of Bengal. The BOBLME-I had identified key issues such as overexploitation of resources, habitat degradation, and pollution which are affecting the health of the Bay. These findings led to the creation of a Strategic Action Programme (SAP) which is being implemented in the second phase. The project is funded by the Global Environment Facility (GEF) and Norwegian Agency for Development Cooperation (NORAD) and implemented by the Food and Agriculture Organization of United nations (FAO) in collaboration with Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), International Union for Conservation of Nature (IUCN) and Southeast Asian Fisheries Development Center (SEAFDEC).

The National Consultative Workshop for India's Bay of Bengal Region took place from 21 - 23 March 2024, in Chennai, India. The event was collaboratively organized by the BOBP-IGO and IUCN, Asia Regional Office.

The primary objective of the workshop was to initiate activities under the BOBLME project in India. The workshop aimed at disseminating information about the BOBLME project's progress and future plans, prioritizing and planning the implementation of the Ecosystem Approach to Fisheries Management (EAFM) and Marine Managed Areas (MMAs), developing strategies to combat Illegal, Unreported, and Unregulated (IUU) fishing, tackling coastal and marine pollution, and enhancing the livelihoods and resilience of coastal communities. It also sought to strengthen regional cooperation and establish robust partnerships among stakeholders. The expected outcomes of the workshop included prioritization of Fishery Management Units (FMUs) for EAFM and sites for MMA, outline initial plans for addressing IUU fishing and managing marine pollution, and building a strategic framework for enhancing community livelihoods and resilience; all geared towards sustainable management of marine resources in the region.

The workshop had seven sessions. At the inaugural session, Ms Neetu Kumari Prasad, IAS, Joint Secretary, Department of Fisheries (DoF), Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, emphasized the workshop's core objective of fostering sustainable resource management and commended the initiative for its efforts in uniting the stakeholders. The second and third sessions focused on the identification of potential EAFM and MMA sites in India and scoping the selected sites, respectively. Session 4 was on the management of coastal and marine pollution including gear loss and gear marking as well as improved waste management practices in fishing harbours. Session 5 was devoted to reducing catch from IUU fishing. The sixth session was on improved livelihoods as well as building cooperation among the BOBLME countries. At the concluding session, speakers highlighted the ways forward in planning and implementing the BOBLME Project Phase II in India.

The summary of the key decision points is provided in the following section.

1. Selection of EAFM & MMA Sites

A pre-workshop meeting was held with experts wherein six potential sites viz., Pichavaram, Pulicat, South Andaman, Coringa, Gopalpur-Chilika ICZM Site, Digha ICZM site were shortlisted for detailed discussion at the National Workshop to prioritize the project sites for EAFM/ MMA (Component 1.1). In the National Workshop, the experts made detailed presentations on the respective sites. The discussion among the participants contributed to comprehensive understanding of the site characteristics.

Subsequently, the participants were divided into two groups to deliberate and prioritize sites for implementation of EAFM and MMAs.

EAFM Sites

In order to select suitable sites for implementation of project activities related to (EAFM), a detailed group discussion was held on the six sites.

The experts prioritized the following four FMUs based on a set of pre-defined criteria:

1. *Mud-crab Fishery in Pichavaram Mangrove Ecosystem*
2. *Mud-crab/Bivalve Fishery in Coringa Ecosystem*
3. *Grouper Fishery in South Andaman*
4. *Shrimp Fishery in Pulicat Lagoon*

The participants, representing diverse stakeholders discussed in detail each of the four prioritized sites on the following themes viz., (i) identifying & prioritizing issues and threats; (ii) identifying & prioritizing stakeholders and (iii) assessing capacity development needs and training. This will form the basis for the detailed scoping document that will be prepared for the FMUs where the project is implemented.

MMA Sites

In order to select a suitable site for implementation of project activities related to marine managed areas (MMA), a detailed group exercise was held, wherein seven sites *viz.,* Pichavaram, Pulicat, South Andaman, Chilika, Coringa, Palk Bay and Digha & Junput were considered. The group undertook a scoping exercise for MMA plan development and examined the sites from the point of view of site selection, stakeholder map and influence matrix and key interventions.

Accordingly, two sites viz., South Andaman and a cluster site from Pulicat to Chilika were shortlisted for implementation of MMAs.

2. IUU Fishing

For IUU fishing (Component 1.2), participants agreed on the necessity to align the project's initiatives with the National Plan of Action to Prevent, Deter, and Eliminate IUU Fishing (NPOA-IUU). This alignment involves enhancing legal frameworks and enforcement capabilities through the ratification of international measures such as the FAO Port State Measures

Agreement (PSMA). The workshop underscored the need for improved vessel monitoring systems (VMS) and data collection strategies to boost surveillance and compliance, ensuring a more robust response to IUU fishing activities within the region.

3. Pollution control & gear marking

In the session on pollution control, problems of waste management in fishing harbours were discussed and the implementation of targeted waste management improvements and piloting sustainable waste-to-wealth projects in fishing harbours was emphasized.

Under this component, the project provides for preparing Guidelines for Best Practices for Pollution Control in fishing harbours based on sample survey / site visits. Following fishing harbours were discussed as potential sites for the sample survey.

- Pazhayar and Colachel (Tamil Nadu);
- Kakinada and Nizampatnam (Andhra Pradesh);
- Dhamra and Gopalpur (Odisha);
- Sultanpur and Digha II (West Bengal).

The participants recognized that the selection of suitable harbours will require consideration of various factors including consultation with experts and local authorities and it was agreed that the BOBP shall select the harbours for the study as the project is implemented.

Participants called for alignment with the National Action Plan on Marine Plastic Litter, focusing on improving waste management practices in fishing harbours and promoting recycling initiatives for marine plastics. They also called for introduction of gear marking initiatives, supported by the development of a comprehensive regulatory framework to standardize and enforce gear loss assessments and recovery efforts.

Epilogue

The event concluded with a roadmap for future actions. It was agreed to establish National Working Groups to oversee the project's implementation phases and maintain active collaboration with various experts, institutions and governmental bodies to ensure the project's success.

The workshop objectives were met through a systematic approach which also provided an excellent impetus to kickstart the Phase II of the BOBLME Project in India. It helped bring various stakeholder groups together on a common platform to debate, discuss and finalize a set of tasks towards realization of the goal of sustainable fisheries in the BOBLME Region.

Summary of Follow up Actions

For Department of Fisheries, GoI

1. *Endorsement of EAFM Sites: The BOBLME Project has scope for implementing EAFM in two FMUs. The top two prioritized FMUs viz., Mud-crab Fishery in Pichavaram Mangrove Ecosystem and Mud-crab/Bivalve Fishery in Coringa Ecosystem may be endorsed for implementation of the project activities.*

2. *Additional EAFM Sites: During the regional meeting and the GC of BOBP-IGO, it was decided that the National Governments may support additional site(s), where the BOBLME project activities can be implemented simultaneously.*

   Accordingly, the Department may support ONE or TWO additional FMUs in terms of arranging local logistics in the suggested site(s), viz., (i) Grouper Fishery in South Andaman and (ii) Shrimp Fishery in Pulicat Lagoon.

   Based on the direction of the DoF, the BOBLME project team will take up all the THREE / FOUR FMUs for implementation of project activities, simultaneously.

3. **Constitution of the National Working Group for EAFM and IUU**.

For MoEFCC, GoI

The BOBLME Project has scope for implementing MMA in ONE site. While both South Andaman and the cluster sites Pulicat to Chilika were discussed, **South Andaman** was considered the preferred site for implementing the MMA components under the BIOBLME project by the IUCN. Accordingly, MoEFCC approval is solicited for the same for undertaking necessary follow-up actions.

For BOBLME Project Team

1. **Preparation of Scoping Report** on characterization, identification of threats and issues, stakeholders, and capacity development needs for each FMU.

2. Engage a **National Consultant** and work closely with the Department of Fisheries to plan and implement EAFM in the selected FMUs.

3. **Constitution of the National Working Group** for EAFM and IUU in consultation with the Department of Fisheries, Government of India.

4. Work closely with MOEF&CC to **plan and implement MMA** in the selected sites.

5. **Explore and devise methods for reducing pollution** from fishing harbours by undertaking pilot surveys in selected fishing harbours.

6. **Take steps for preparing NPOA and RPOA to prevent IUU fishing** (NPOA/RPOA-IUU)

7. Take initiatives to **enhance local livelihoods, linking with conservation efforts**.

8. **Develop a regional mechanism** for coordination, monitoring and assessment.

Abbreviations

ALDFG	Abandoned, Lost, or otherwise Discarded Fishing Gear
BOBLME	Bay of Bengal Large Marine Ecosystem
BOBP-IGO	Bay of Bengal Programme Inter-Governmental Organisation
EAFM	Ecosystem Approach to Fisheries Management
EPR	Extended Producer Responsibility
ETP	Endangered, Threatened and Protected Species
FGT	Fishing Gear Technology
FMU	Fishery Management Unit
GEF	Global Environment Facility
ICAR	Indian Council of Agricultural Research
ICAR-CIFT	Indian Council of Agricultural Research – Central Institute of Fisheries Technology
ICAR-CMFRI	Indian Council of Agricultural Research – Central Marine Fisheries
IOTC	Research Institute
	Indian Ocean Tuna Commission
IPOA	International Plan of Action (of Food and Agriculture Organization of United Nations)
IUCN	International Union for Conservation of Nature
IUU	Illegal, unreported and unregulated (IUU) fishing
MCS	Monitoring, Control and Surveillance (Marine fisheries)
MMA	Marine Managed Area
NAP	National Action Plan (of Government of India)
NPOA-IUU	National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (India)
PSMA	Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, 2009
RFMO	Regional Fisheries Management Organization
SAP	Strategic Action Programme (of BOBLME I Project)
SBMmP	Sea-Based Marine micro-Plastics
SBMP	Sea-Based Marine Plastics
SBMPL	Sea-Based Marine Plastic Litter
SEAFDEC	Southeast Asian Fisheries Development Center
TDA	Transboundary Diagnostic Analysis (of BOBLME Project)
UN SDG	United Nations Sustainable Development Goals
WTW	Waste to Wealth

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Ms. Maeve Nightingale, IUCN explaining the purpose of the Workshop

Ms Neetu Kumari Prasad, IAS, Joint Secretary (MF), Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Government of India, delivering the inaugural address.

Mr Wren Mishra, Deputy Secretary, Ministry of Environment, Forest & Climate Change, Government of India speaking at the inauguration

Glimpses from the proceedings of the workshop
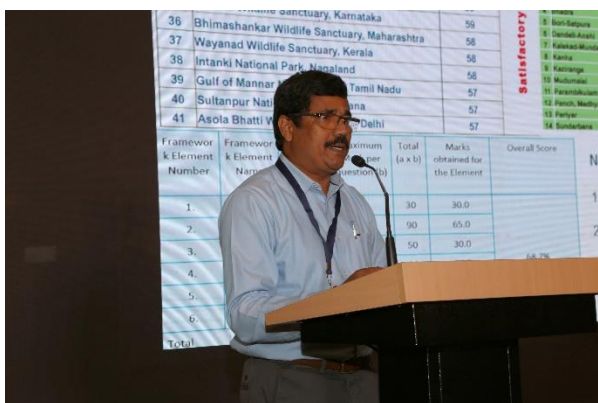
Glimpses from the proceedings of the workshop

Glimpses from the workshop

Overview of the BOBLME Project

1. The BOBLME Project

1.1. Introduction

The Bay of Bengal Large Marine Ecosystem (BOBLME-II) project is a follow-up to the BOBLME-I project and focuses on continuing the efforts to manage and protect the marine environment of the Bay of Bengal. The BOBLME is noted for its rich biodiversity and significant natural resources, which are vital for the social and economic health of the region. Fisheries and aquaculture are especially critical for food security and employment. The initial phase of the project (2009-2015) identified key issues including overexploitation of resources, habitat degradation, and pollution affecting the health of the ecosystem. These findings led to the creation of a Strategic Action Programme (SAP), which is being implemented in the second phase. This project, formally titled "Sustainable management of fisheries, marine living resources, and their habitats in the Bay of Bengal region," seeks to enhance sustainability and benefit coastal communities and states.

1.2. Project Partners

The project is funded by the Global Environment Facility (GEF) and the Norwegian Agency for Development Cooperation (NORAD). It is being implemented by the Food and Agriculture Organization of the UN (FAO), in partnership with three executing agencies *viz.,* International Union for Conservation of Nature (IUCN), Bay of Bengal Programme Inter-Governmental Organizations and Southeast Asian Fisheries Development Center (SEAFDEC).

1.3. Objective and Approach

The project's objective is to contribute to the sustainable management of fisheries, marine living resources, and their habitats in the Bay of Bengal region, to reduce environmental stress and improve environmental status for the benefit of coastal states and communities.

This will be achieved through interlinked project components based on the SAP themes by undertaking country-led programmes and adopting a participatory, bottom-up, integrated focus area approach to planning and implementation at community, sub-national, national, and regional levels to ensure the greatest impact.

1.4. Project Details

Details of the Phase II of the BOBLME project are provided in Table 1.

Table 1. Details of the BOBLME Phase-II

Component	Outcome	Executing Agencies for South Asia*
1. Sustainable Management of Fisheries	**1.1** EAFM institutionalized at the national level, including targeted transboundary fish stocks **1.2** IUU catch in the BOBLME reduced	BOBP-IGO
2. Restoration and conservation of critical marine habitats and conservation of biodiversity	2.1 Coastal and marine managed areas (MMAs) contribute to the conservation of biodiversity 2.2 National MMAs established or strengthened, resulting in improved MMA management effectiveness at the national level 2.3 Regional consensus and agreements reached on reduction of threats to marine biodiversity in coastal and open waters	IUCN
3. Management of coastal and marine pollution to improve ecosystem health	3.1 Improved waste management practices in fishing harbours 3.2 Marking of fishing gears and the development and dissemination of corresponding regional guidelines	BOBP-IGO
4. Improved livelihoods and enhanced resilience of the BOBLME	4.1. Enhanced resilience and reduced vulnerability to natural hazards, climate variability, and change in selected coastal communities 4.2 Enhanced sustainable livelihoods and diversification for selected coastal communities	IUCN
5. Regional mechanism for planning, coordination, and monitoring of the BOBLME	5.1 Strengthened institutional mechanisms at regional and national levels for planning, coordination, and monitoring of the BOBLME 5.2 Adaptive results-based management and sharing of information and lessons learned	IUCN & BOBP-IGO

* Bangladesh, India, Maldives, Sri Lanka

2. India National Consultative Workshop

The National Consultative Workshop on the BOBLME-II Project Implementation in India's Bay of Bengal Region took place from 21 - 23 March 2024, in Chennai, India. The event was collaboratively organized by the BOBP-IGO and the IUCN.

The primary objective of the workshop was to initiate the activities under the BOBLME project in India. Within this broad objective, the specific objectives were to:

   i.   Share information on the BOBLME Project;

   ii. Identify two potential sites each for implementing EAFM and MMA and scoping the sites to develop plans for implementation, while considering national plans/integrated coastal management / Marine Spatial Planning interests/ policies;

   iii. Initiate planning for reducing IUU fishing and management of coastal & marine pollution;

   iv. Initiate planning for enhanced livelihoods and resilience of the BOBLME;

   v.   Establish partnerships with and amongst stakeholders for future collaboration.

The methodology followed was participatory with presentations by resource persons followed by break-out groups discussing on identified themes. The workshop was conducted in English.

The expected outcomes of the workshop included a clear prioritization of FMU for EAFM sites and sites for MMA, initial plans for addressing IUU fishing and managing marine pollution, and a strategic framework for enhancing community livelihoods and resilience, all geared towards sustainable management of marine resources in the region. The programme of the Workshop is given in *Annexure I*.

The workshop was attended by 82 participants representing government, non-government and fishers' organizations, academic and research institutions and from BOBP-IGO and IUCN. The distribution of participants is given in Figure 1.
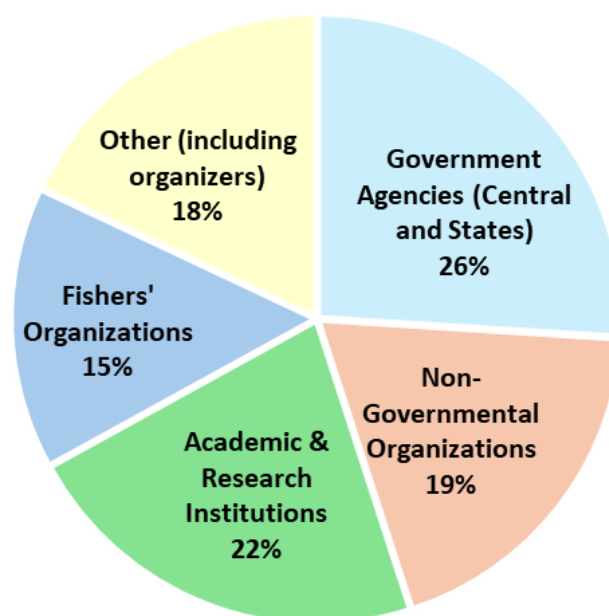
Figure 1: Composition of the Workshop Participants

The list of participants is placed in *Annexure II*. About thirty percent of the participants were women. The expertise and the expectations of the participants were profiled through a Slido survey, and the results are summarized in Table 2.

Table 2: Profile of participants

Profile of participants: Slido Survey Feedback		
Profile of participants		Response
Geographical Experience	Maritime States along the East Coast	Good spread
	Andaman & Nicobar Islands	Good spread
Expertise	Environment, Biodiversity, Conservation	69%
	Fisheries Resource Management	56%
	Livelihood and Gender Issues	24%
Expectations from the Workshop	Establishing Collaboration	Overwhelming response
	Improve Learning	Overwhelming response

The following set of information materials in the form of a booklet was shared with the participants prior to the workshop to ensure engaging discussions:

- Overview of Ecosystem Approach to Fisheries Management and Marine Managed Area
- Methodological Framework for Selection of FMUs (for EAFM) and MMAs
- Identifying & Prioritizing Issues and Threats
- Identifying Stakeholders
- Assessing National Capacity Needs
- Combatting IUU fishing
- Management of Coastal and Marine Pollution
- Improved Livelihoods.

Workshop Report

1. Inaugural Session

The workshop commenced with Ms Maeve Nightingale, Senior Programme Officer, IUCN, Bangkok welcoming the participants. She said that in 2015, the Bay of Bengal Large Marine Ecosystem (BOBLME) strategic action program was established with participation from eight countries marking a significant political process that highlighted the shared interests among these nations concerning the Bay of Bengal. The implementation phase has now commenced and the three-day National Consultation Workshop, jointly organized by the IUCN and BOBP-IGO would discuss the work components. The output from the participants would guide planning and implementation of BOBLME Project Phase II. She said that the project activities would be aligned with India's national priorities and policies and emphasized the need for collaborating with the stakeholders especially in small-scale fisheries management and marine managed areas as part of a human rights-based approach.

Dr P Krishnan, Director, BOBP-IGO set the context for the workshop and provided an overview of the BOBLME Project - a collaborative effort involving seven participating countries and six international organizations, with funding from GEF and NORAD. Phase I of the project (2009-2015) focused on planning and involved extensive workshops and training programs. It identified transboundary issues through comprehensive transboundary diagnostic analysis and developed a Strategic Action Programme (SAP) through consultation. The SAP forms the basis for the project's implementation phase (2023-2028), emphasizing sustainable management of fisheries, marine resources, and habitats. BOBLME-I focused on knowledge building and planning, while BOBLME-II emphasizes operationalization, he said. Since BOBLME is one of the world's large marine ecosystems, characterized by high productivity and geographical significance, the project would focus on key components such as the institutionalization of Ecosystem Approach to Fisheries Management (EAFM), combating Illegal, Unreported, and Unregulated (IUU) fishing, and enhancing coordination, monitoring, and assessment.

Mr Wren Mishra, Deputy Secretary, Ministry of Environment, Forest & Climate Change, Government of India spoke of how climate change and rising sea levels are adversely affecting coastal states and communities. In spite of having the means to mitigate and adapt to climate change, coastal ecosystems like mangroves, seagrasses, seaweeds, saltmarshes, coral reefs continue to be vulnerable. In addition, the livelihoods of coastal communities and the resilience of coastal infrastructure is threatened. Recognizing the importance of coastal ecosystems, Mr Mishra spoke of how the MoEFCC has been implementing coastal regulation zones (CRZs) since 1991 for regulating coastal activities and protecting coastal areas. Upon recommendations made in CRZ notifications, the high tide line and low tide line along the coast had been delineated in addition to the mapping of ecologically sensitive areas (ESA). He also spoke of initiatives such as the Integrated Coastal Zone Management Plan (ICZMP), Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI) and the National Coastal Mission (NCM) under India's Blue Economy development as being directly connected to the objectives of BOBLME, which includes the sustainable management of fisheries, marine

resources and their habitats in the Bay of Bengal for the benefit of coastal states and communities. He envisioned that the national consultative workshop would be highly successful with the collective wisdom of several experts and agencies, creating a common platform for the exchange of knowledge and ideas to develop strategies. He concluded his address by stating how the harmonization of the strategies of BOBLME I and II with existing schemes and programs could lead to the maximum benefit for all stakeholders.

In her inaugural address, Ms Neetu Kumari Prasad, IAS, Joint Secretary (Marine Fisheries), Department of Fisheries (DoF), Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, emphasized the workshop's core objective of fostering sustainable resource management and commended the initiative for its efforts in uniting stakeholders, citing examples of two programs implemented with the support of World Bank that improved the engagement of forest officials with tribal people and livelihood of women. She highlighted one of the project's key objectives which was to bring coastal communities together to raise awareness about issues affecting their livelihood such as climate change, marine pollution and overfishing. She said that the recent initiatives by the government such as *Swachh Bharat Mission* had contributed to coastal cleanliness. She underscored the importance of a bottom-up approach, stressing the need to empower local governance structures, women and youth in partnership initiatives for effective implementation. She cited examples of successful collaborations between government bodies such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY) that aims at enhancing livelihoods sustainably through artificial reefs and mariculture development, the Ministry of Environment, Forest and Climate Change's National Coastal Mission and GEF's program on sustainable aquaculture in Andhra Pradesh. She concluded her address by giving both her and the Ministry of Fisheries' full support for the BOBLME initiative for the successful implementation of BOBLME-II.

The Inaugural Session ended with closing remarks by Dr Nilesh Pawar, Deputy Director, DoF, Government of India.

2. Overview of EAFM and MMA Sites in India

2.1. Overview

An 'Overview of Ecosystem Approach to Fisheries Management' was presented by Dr E Vivekanandan, Senior Consultant, BOBLME Project, BOBP-IGO. He began with a discussion of the various versions of EAFM within the context of BOBLME Phase I. He said that the EAFM recognizes the multifaceted challenges facing fisheries, including overcapacity, overfishing, destructive practices, illegal fishing and pollution, among others. There was a consensus on the need for an inclusive approach to fisheries management that considers both fisheries and non-fisheries factors.

EAFM evolved from this realization, aiming to address the complexities of coastal ecosystems by considering broader ecological and human well-being. It aligns with sustainable development goals emphasizing good governance and balances ecological and human needs. EAFM also integrates with other approaches such as co-management, integrated coastal zone management (ICZM), marine spatial planning, and ecosystem-based management (EBM), contributing to blue economy initiatives.

Key principles of EAFM include good governance, appropriate scale, increased stakeholder participation, addressing multiple objectives, cooperation and coordination, adaptive management, and a precautionary approach. The EAFM process involves defining and scoping the fishery management unit (FMU), identifying and prioritizing issues and goals, developing an EAFM plan, implementation, and monitoring, evaluation, and adaptation.

Co-management is central to EAFM, emphasizing increased stakeholder participation and shared responsibility between local resource users and government. EAFM and Marine Managed Area (MMA) site selection have been completed in Bangladesh and Sri Lanka, focusing on both fishery and location criteria.

EAFM has garnered global endorsement and is recognized as an iterative process that requires time for implementation. Dr Vivekanandan concluded that while many fisheries already incorporate aspects of EAFM, the objective is to expand its scope gradually through small steps over time, acknowledging the time-intensive nature of implementing EAFM effectively.

2.2. EAFM in India: Case Studies

'Case studies on EAFM in India' presented by Dr Sunil Mohamed, Chair, Sustainable Seafood Network of India (SSNI) showed that the country is evincing interest in moving towards implementing EAFM.

He presented three case studies from India. The first case was that of the Ashtamudi Lake dredged short-neck clam fisheries and said it was closest to EAFM in approach. A rapid increase in exploitation from 1981 had resulted in a decline in catches in the 1990s. In 1993, the fishery was closed for three months during the breeding period based on scientific advice from CMFRI and marked the beginning of the scientific management of the fishery. Biomass surveys were conducted at intervals and a Clam Fishery Management Plan was developed and implemented in 2011. A Governance Council was formed with the District Collector of Kollam

District as Chairman and with representation from local fishers, exporters, scientists and other stakeholders. In 2015, when CMFRI's biomass survey indicated poor biomass, the council agreed to an additional day in the week as a fishing holiday (~15% less effort during 2015). Violations were punished. Dr Sunil Mohamed said that in a sense, EAFM was almost fully practiced in this fishery and led to this being the first certified fishery under the MSC certification scheme from India. The Kerala floods in 2017 had impacted the fishery, though it is recovering now.

The Palk Bay gillnet-caught blue swimming crab fishery partly conformed to EAFM principles, said Dr Sunil Mohamed. He said that the Fishery Progress website (https://fisheryprogress.org/) lists all fisheries that are moving towards certification and gives a rating based on what the fishery is doing, how management has improved, status of the stock etc. He gave a list of the harvest control rules such as minimum legal size, ban on landing of berried female berried crabs and soft-shelled crabs, nursery grounds to be declared protected etc. Precautionary measures would be used when the yields increase or decrease by 50% of the Target reference point (TRP) by way of fishery closures.

The third example was the formation of the Kerala Marine Fisheries Co-Management Councils. Dr Mohamed explained the different kinds of co-management and said that Kerala was the first maritime state to make amendments to the MFRA to establish Marine Fisheries Co-Management Councils. He said that Tamil Nadu had passed an executive order in Mar 2019 to form management committees and council based on the advisory from the FIMSUL project. He discussed some key issues such as the fact that many fishers and officers were yet to get a full understanding of how the co-management functions and how to incorporate fisher-led committees that are managing conflicts through self-made rules.

2.3. Marine Managed Area (MMA) – Overview and Scope of Work

Ms Maeve Nightingale made a presentation on the IUCN-led components in the BOBLME project, namely Component 2 on MMA and ETP species protection, Component 4 on resilient coastal communities and Component 5 on regional cooperation.

She explained about the IUCN Green List standard for protected and conserved areas. The four components were 1) Good Governance that allowed legitimacy and voice to achieve transparency and accountability which enabled governance vitality and capacity to respond actively; 2) Sound Design and Planning that helped identify major site values to design for long term conservation including the need to understand threats and challenges to major site values by understanding the social and economic context; 3) Effective Management which called for developing and implementing a long term management strategy to manage ecological conditions within the social and economic context of the area and to manage threats effectively and fairly enforce laws and regulations; and 4) Successful Conservation Outcomes that demonstrate conservation of major natural values, associated ecosystem services and cultural value. She said that green listed sites demonstrate respect for local community through meaningful engagement, design that identifies needs to secure important values of the area, effective management and successful conservation results.

She also listed the criteria for selecting the MMAs – the usefulness of the site as a national MPA learning area, management and governance arrangement, opportunities to support fisheries co-management, commitments by the stakeholders and finance availability, and solvable conflicts in the site.

2.4. MMA in India – Progress and Case Studies

In his presentation titled "Marine Managed Areas Network; Progress, Challenges and Prospects", Prof K. Sivakumar, Department of Ecology and Environmental Sciences, Pondicherry University, elaborated on the Marine Protected Area network in India and its performance for the conservation of coastal and marine biodiversity. He spoke about India's national wildlife action plan 2017-2031 and said that India had a mere 0.33% covered under coastal and marine protected areas.

He explained that the objectives of MMA were to protect and conserve biodiversity, assure livelihoods, promote awareness, education and tourism, and promote research and capacity building. He pointed at the many challenges of managing the MPAs, and the lack of support by local communities as being a major impediment. However, opportunities are great for India to implement MPAs/MMAs/OECMs (Other Effective Area-based Conservation Measures) to achieve Aichi Targets and SDG 14, he said. He also identified the Important Marine Mammal Areas in the EEZ of India and called for effective protection of marine mammals.

The four presentations were followed by interaction and feedback from the participants.

2.5. Potential EAFM and MMA sites in India

To ensure a clear focus and output from the Workshop, the BOBLME Project Team conducted an online pre-workshop preparatory meeting with experts (Site Ambassadors) on 17 & 19 March 2024. In the preparatory workshop, six potential sites (FMUs) were short-listed for detailed discussion in the National Workshop. These identified sites were taken for discussion in the Workshop. A brief output of the preparatory meeting is given in Annexure III.

2.5.1 Grouper Fishery in South Andaman

Resource person: Dr R Kiruba Sankar, Senior Scientist, ICAR-Central Island Agricultural Research Institute, Port Blair, Andaman & Nicobar Islands. As there is demand for groupers in the export market, intense fishing pressure is noticed. Interviews with fishermen reveal that the area is a spawning aggregation site of groupers but a decline in grouper catch is evident. Concerned, the local administration has prioritized this issue to be addressed.

The proposed island sites for EAFM are uninhabited. South Sentinel Island and Rose Island are managed as wildlife sanctuaries, and fishing in the nearby areas of the sanctuaries is permitted. The Directorate of Fisheries and Department of Forests are responsible for monitoring and
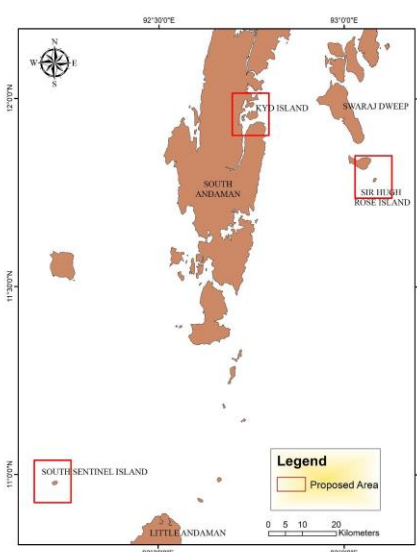
Map 1: South Andaman

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managing the fisheries and the habitats as notified in the Andaman Marine Fishing Regulation Act, 2003. The Department of Fisheries, ICAR institutes, Pondicherry University, and Dakshin Foundation have additional information on the grouper fishery.

Some potential conservation initiatives that could be taken up are co-management of the fishery, closed fishing season, minimum legal size at capture, use of alternate fishing gears during the grouper spawning aggregating season, and engaging fishermen for conservation of ETP species such as turtles.

2.5.2. Mud-crab fishery in Pichavaram Mangrove Ecosystem

Resource Person: Dr A Gopalakrishnan, Associate Professor, Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu

Pichavaram is located between the Vellar estuary in the north and the Coleroon estuary in the south in Cuddalore district, Tamil Nadu. Pichavaram encompasses a total area of 1400 ha, and 12 species of mangroves occupy about half of the area. It was declared a Ramsar site in 2022. The dependent communities live in eight tribal fishing hamlets and six fishermen hamlets. For fishing, cast nets and hooks and lines from motorized motorised boats and non-motorised FRP canoes and catamarans are used. A unique fishery is prevalent for polychaetes. Large numbers of polychaetes are collected by hand-picking and supplied to shrimp hatcheries.

Map 2: Pichavaram Mangrove Ecosystem

The key issues are closure of the bar mouth of the estuary due to poor freshwater inflows leading to poor fish catch. Fishing is unsustainable due to bund fishing and the use of monofilament nets. Polychaete worm fishery is showing stock depletion. The indebtedness of the fishers to money lenders is a major issue. There is often conflict between resource users (traditional vs tribal fishers). Fishers are often seriously injured due to unsafe fishing practices. Marketing facilities are poor and monopolized by buyers. The addition of more boats after the 2004 tsunami has added to fishing pressure. Bivalves like clams, mussels, cockles and oysters are available, but not fished due to poor demand. Initiatives that need to be taken are the promotion of fishery-based livelihood interventions, strengthening grass-root financial institutions to reduce the money lender menace, establishing market linkages to avoid monopoly in the fish trade, diversifying the market for clams, skill training to the tribal fisherwomen, and establishing
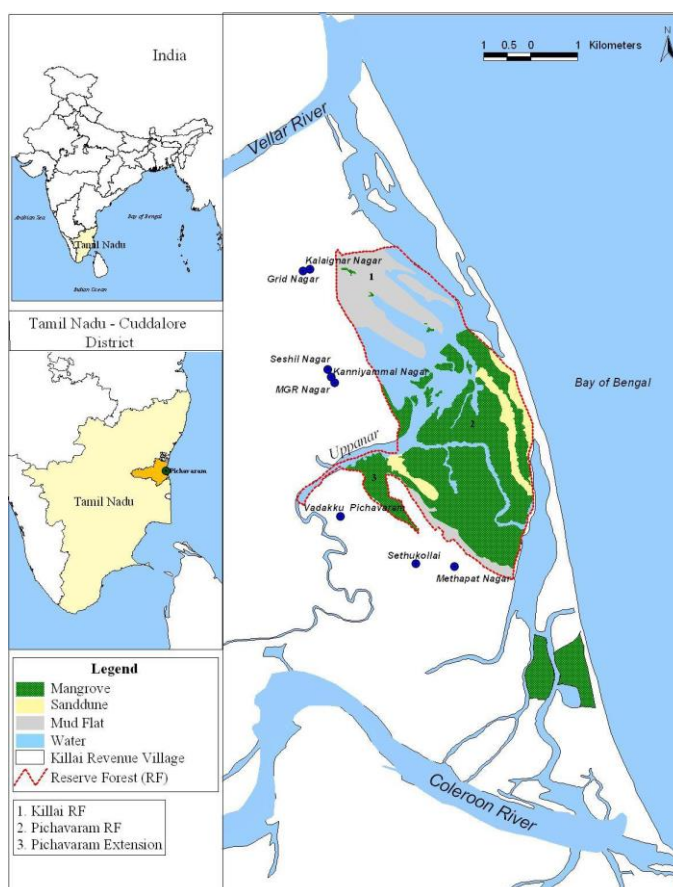
need-based grass-root institutions. Panchayati Raj institutions, line departments, NGOs like MSSRF, mangrove governance councils and CAS in Marine Biology, Annamalai University are reported to be working on the mangrove ecosystem. He also said that while institutions such as NGOs, Federations and Councils are prevalent, they are not active.
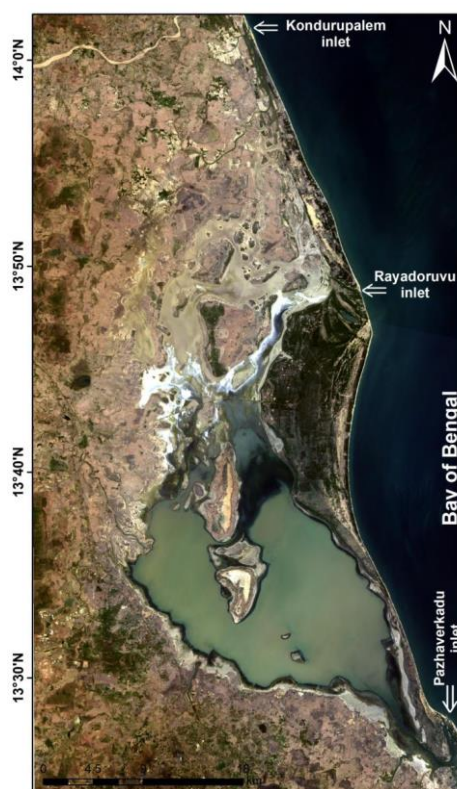
2.5.3 Pulicat Lagoon

Resource Person: Dr K. Ramu, National Centre for Coastal Research, Chennai

Pulicat is a shallow lagoon with a length of 60 km and an area of 670 sq. km spread across the states of Tamil Nadu and Andhra Pradesh. The lagoon is a wintering ground for 31 species of migratory birds like flamingos, storks and pelicans. Artisanal fishing is practiced from small motorised (3342) and non-motorised (240) boats. Shrimps contribute about 45% to the fishery followed by crabs and finfishes like the mullets. Sixty fishing hamlets with 12,370 fishermen are dependent on the lagoon. Data shows that the shrimp and fish catch has decreased over the last 15 years.

Map 3. Pulicat Lagoon

The key issue is the shrinking of the water-spread area from 670 km^2 to 350 km^2 due to low water exchange and seasonal closure of water inlets for eight months in a year. As freshwater inflow and seawater incursion have reduced due to heavy siltation, a large part of the lagoon has become dry and salty. In addition, industrial

expansion, pollution, urbanization and overfishing have degraded the ecosystem. Many initiatives have been taken up and include research activities (ecosystem services assessment), government and non-government projects (ecosystem restoration and livelihood enhancement like providing motor boats, and training in sustainable fishing practices), and public-private partnerships (improvement of infrastructure in fishing villages like cold storage, fish processing units). Some potential interventions to revive the ecosystem and livelihoods are opening of the inlets; effective regulation on mesh size and fishing gear; alternative livelihoods to fishing; edible oyster farming in the northern sector; Artemia cyst production in the central sector and mud crab farming/ fattening.

2.5.4 Coringa Sanctuary

Resource Person: Dr U S Panda, National Centre for Coastal Research, Chennai

Coringa is the second largest mangrove ecosystem on the east coast of India nestled within the Godavari River delta and bordering Kakinada Bay in Andhra Pradesh. It is a Wildlife Sanctuary with a protected area of 235 km^2. Several shrimp hatcheries and farms, processing

plants and a fleet of 4645 fishing boats are operating in the area outside the sanctuary. The ecosystem has 35 species of mangroves and diverse fish species. Mud crabs and clams contribute to the fishery, and many species are overexploited.

The regulatory issues are: overexploitation and juvenile capture; open access and unsustainable fishing practices; IUU fishing; capture of berried crabs; weak enforcement and compliance; and inadequate marketing and infrastructure facilities.

The ongoing programmes are restoration of mangroves (by Forest Department), pilot projects on ecosystem, biodiversity and mangroves by various Government agencies, research institutes, NGOs and universities;

Map 4. Coringa Mangroves

ecological monitoring to understand climate change vulnerability (by USAID-India); and assessment and accounting of ecosystem services (by NCCR). The institutions work with eco-development committees (EDC) and are undertaking many welfare measures for villagers; initiatives to educate local people; panels to prepare for UNESCO World Heritage Site tag; mangrove planting; anti-poaching patrols; awareness campaigns; ecotourism development; research and monitoring; and rehabilitation facility for injured wildlife.
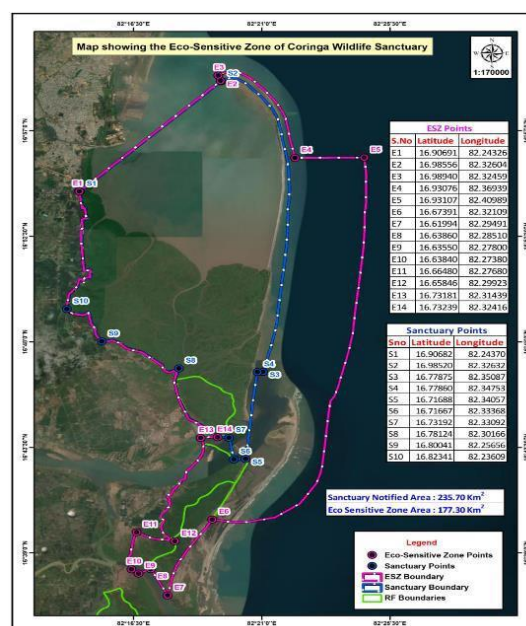
Currently, conservation and management are the immediate steps to be taken for protection of the keystone species like the mud crabs and bivalves. This can be achieved by developing a set of criteria and indicators to evaluate the ecosystem, including ecological significance, socio-economic importance, governance capacity, stakeholder support, and establishing co-management arrangements.

2.5.5 Gopalpur-Chilika ICZM Site

Resource Person: Dr A K Prusty, Associate Professor, Berhampur University, Berhampur, Odisha.

Gopalpur-Chilika stretch is located in the state of Odisha along India's east coast. This stretch harbours remarkably diverse biodiversity and ecologically sensitive sites (CRZ – I) with several ETP species including migratory birds, Irrawaddy dolphin (in Chilika lagoon), the mass nesting site of Olive Ridley turtles (near Rushikulya estuary), Ramsar site (Tampara lake) and Marine Protected Area (Nalaban bird sanctuary). The stretch is experiencing rapid economic development activities like port development, tourism, industries, fisheries and aquaculture. Many types of fishing craft and gear are operated by the fishermen and a mix of marine and estuarine fishes are harvested.
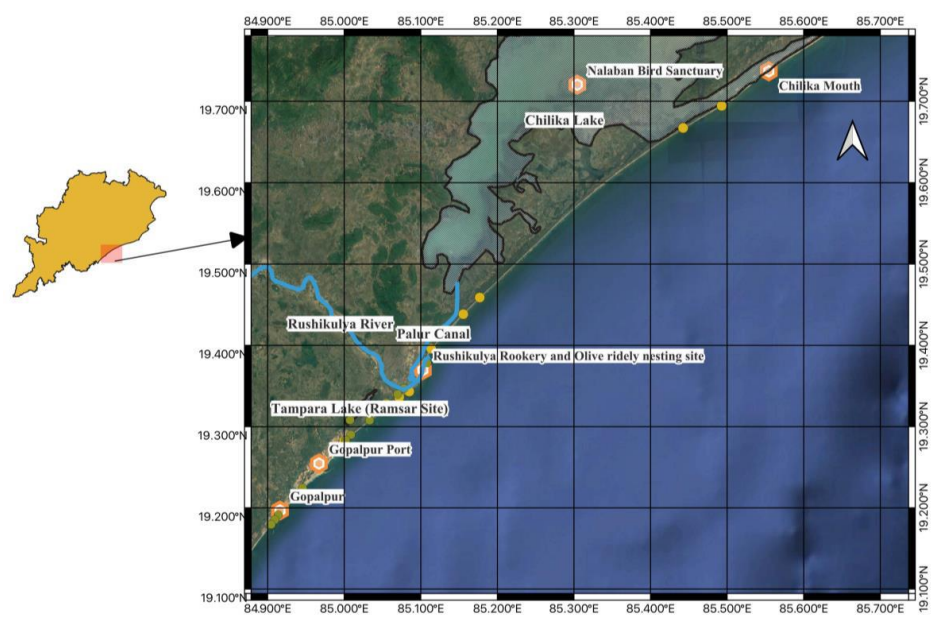
Map 5. Gopalpur-Chilika ICZM Site

Discharge of chemical effluents and wastewater from urban areas and aquaculture farms are major issues. Unsustainable fishing activities, littering of abandoned and discarded fishing gear on the beaches and beach erosion are the other issues. These human activities seriously affect the habitats of nesting turtles and migratory birds. The stretch is prone to climate-related disasters.

A community-based participatory approach for the conservation of Olive Ridley turtles, cetaceans and coastal vegetation is required by capacity building, awareness campaigns and empowering the communities. Upgradation of fish landing centres, assistance for deep sea fishing and livelihood support to fishers during the fishing ban period are required. Diversification of income sources, improving the value chain and promoting ecotourism are also required. Line departments of central and state governments, and a number of academic and research institutions and civil society organisations are executing various schemes and projects for the conservation of habitats and resources.

2.5.6 Digha ICZM Site

Resource person: Dr S Balakrishnan, Zoological Survey of India, Digha

The Digha ICZM site is a 67.4 km long stretch between the Subarnarekha and Rasulpur river mouths in the state of West Bengal. It has sensitive habitats like mangroves, turtle nesting grounds, sand dunes and mudflats, and is a habitat for the rare horseshoe crab. The site has the Bichitrapur Mangrove Sanctuary and is an Ecologically Sensitive Area (CRZ I).

The site experiences intense fishing activity and Digha is a major fish landing centre. Overfishing, bycatch and incidental capture of protected species, frequent cyclones, sea level rise, coastal flooding, sea erosion, unregulated coastal tourism and coastal pollution are major issues. Many government and community organisations are engaged in habitat and resource conservation at the site and include the Digha Sankarpur Development Authority, West Bengal Department of Fisheries, Development and Planning Department of the Government of West

Bengal, Digha Development Scheme, Digha Fishermen and Fish Traders Association, Fish trawler owner associations, and thirty-four registered NGOs. Research organisations like the Zoological Survey of India and ICAR-Central Marine Fisheries Research Institute are executing projects here. The ICZM plan has Sustainable Livelihoods Management (Fisheries) and Conservation Management as its main components.

Map 6. Digha ICZM Stretch

The above six presentations evinced a lot of interest among the participants and generated lively discussion. Additional information was added by the participants on each site during the discussion. They reacted to the views and opinions of the Site Ambassadors and the discussions paved the way for a better understanding of the characteristics of the sites for selection as EAFM/MMA.

In general, the six sites are ecologically sensitive habitats with diverse habitats and rich biodiversity but are exposed to several anthropogenic impacts. Issues like unsustainable fishing, pollution, habitat degradation and climate change are common to all the sites, but there are also specific issues like unplanned ecotourism and sea erosion in some sites. Research and management interventions are being implemented by the government, non-government and research organisations, but the performance and effectiveness of these measures have not been measured. Stakeholder participation in the management of habitats and resources is taking place, but in an informal way. Overall, it is understood that targeted interventions would maximise the recovery of vulnerable biota, expand habitat management and improve the livelihood of local communities. The entry point of the BOBLME project would be to identify the specific interventions in the prioritized sites and gain the confidence of the governments and communities to execute the EAFM/MMA activities.

3. Prioritization and Scoping of EAFM Sites / FMUs

3.1. Prioritizing the EAFM Sites/FMUs

While all the six sites deserve to be considered as candidates for implementing EAFM/MMA, they had to be short-listed and prioritised for implementation under the BOBLME project. For short-listing and prioritizing the sites, the participants were divided into two groups, one for EAFM and another for MMA.

The EAFM group had 37 participants. At an earlier consultation with EAFM experts, the BOBLME project team developed a set of criteria for selecting the Fishery Management Units (FMUs) in EAFM with a focus on implementation potential. The list of selected criteria and their application potential for implementation were explained by Dr E. Vivekanandan. The criteria and explanation for their application are given in Table 3.

Table 3. Criteria for selecting Fishery Management Units

#	Criteria	Weightage	Explanation for application
1	Stakeholder participation	0.374	FMU where stakeholders are highly receptive and willing to participate to improve management measures may be prioritized. For e.g., in FMUs where a formal or informal co-management arrangement already exists, the implementation would be smoother and successful.
2	Government participation	0.312	FMU with high levels of government interest and investment and will be acceptable to the governments for implementing EAFM will have priority.
3	Technical & Institutional Capacity	0.180	FMU where institutions are already working and have good knowledge and capacity to provide an impetus to the entire process, will have priority.
4	Scale	0.064	FMU have to be prioritized based on the potential of the project to implement within practical scales and boundaries.
5	Issues in the FMU	0.044	Potential of the project to find and implement solutions to the issues considering the limited human and monetary resources and time availability, need to be considered.
6	Information/Data Availability	0.026	FMU having enough data/information are in an advantageous position to begin action. They will have priority over others.

After the explanation of the criteria, the participants discussed and characterized the FMUs for effective comparison by adding a specific fishery of dominance in each of the shortlisted sites, as given in Table 4.

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Table 4. The EAFM Sites

	Fisheries Management Unit in the EAFM Site
1	Mud-crab Fishery in Pichavaram Mangrove Ecosystem
2	Shrimp Fishery in Pulicat Lagoon
3	Mud-crab/Bivalve Fishery in Coringa Ecosystem
4	Gopalpur-Chilika ICZM Site
5	Digha ICZM Site
6	Grouper Fishery in South Andaman

Subsequently, the participants engaged in an opinion poll using the Slido platform to short-list and prioritize the FMUs by selecting two FMUs on a criterion-by-criterion basis.

For stakeholder participation, for example, each participant selected two FMUs where, in their opinion, the stakeholders are highly receptive and willing to participate in the management process, and where a formal or an informal co-management arrangement already exists. The presentation by the Site Ambassadors and discussions earlier in the session helped the participants to cast their opinion.

After the selection, the weightage as determined by the experts for each criterion was applied to derive the cumulative score and finalise the prioritized list of FMUs. The result from the opinion poll for each criterion is given in Table 5 (maximum score for each criterion: 3.0).

Table 5. Scoring the FMU using the criteria

FMU	Stakeholder participation (n = 32)	Government participation (n = 31)	Technical & Inst. Capacity (n = 33)	Scale (n = 31)	Issues in the FMU (n = 35)	Data availability (n = 32)
1. Mudcrab Fishery in Pichavaram Mangrove Ecosystem	0.66	0.39	0.79	0.71	0.63	0.81
2.Mudcrab/Bivalve Fishery in Coringa Ecosystem	1.06	0.48	0.64	0.61	0.66	0.81
3. Grouper Fishery in South Andaman	0.41	1.13	0.64	0.68	0.74	0.59
4. Shrimp Fishery in Pulicat Lagoon	0.34	0.16	0.33	0.61	0.37	0.34

FMU	Stakeholder participation (n = 32)	Government participation (n = 31)	Technical & Inst. Capacity (n = 33)	Scale (n = 31)	Issues in the FMU (n = 35)	Data availability (n = 32)
5. Gopalpur-Chilika ICZM Site	0.28	0.48	0.33	0.16	0.31	0.22
6. Digha ICZM Site	0.25	0.36	0.27	0.23	0.29	0.22

The overall scores obtained from the Slido survey for the site-specific FMUs are shown in Figure 2.
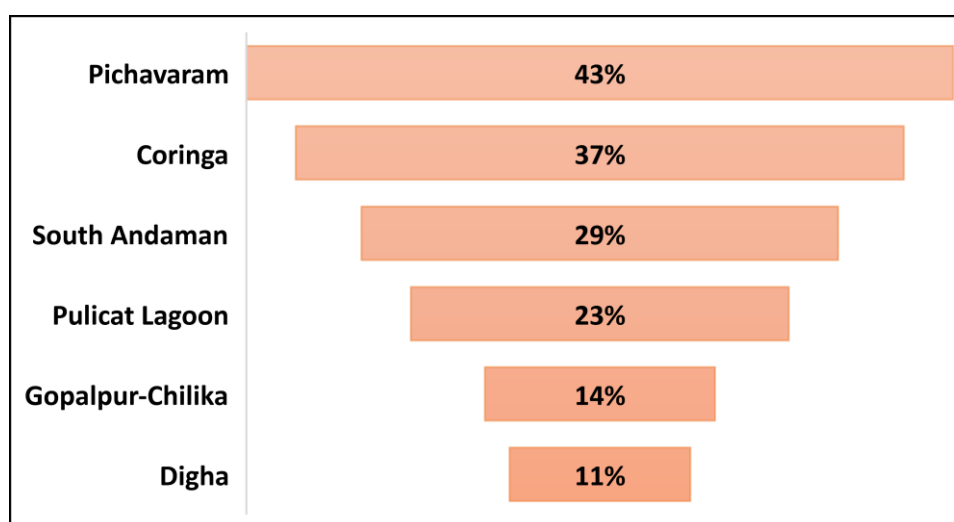
Figure 2. EAFM Group participants' preferences for the different EAFM sites

The above process allowed the participants in the group to select the FMUs based on the uniqueness, issues, prevailing management measures, opportunities and EAFM implementation potential.

The following four sites were prioritized based on the cumulative score derived during the consultative process.

1. Mud-crab Fishery in Pichavaram Mangrove Ecosystem

2. Mud-crab/Bivalve Fishery in Coringa Ecosystem

3. Grouper Fishery in South Andaman

4. Shrimp Fishery in Pulicat Lagoon

3.2. Scoping Selected EAFM Sites/FMUs

On Day 2, a scoping exercise for EAFM plan development and implementation in the selected sites was carried out. The EAFM group was further divided into four FMU groups of 8-9 participants each, and each group discussed one of the selected FMUs. Participants were placed in each FMU group depending on their knowledge and familiarity with the respective FMU. The purpose of the breakout group discussion was to (i) identify the issues and opportunities; (ii) identify the stakeholders; and (iii) assess the capacity development and training needs and training for each FMU.

Before commencing the breakout group discussion, Dr E. Vivekanandan explained the procedure for undertaking the activity. The groups were supplied with flip charts and colour cards to help in taking points during the discussion. For each FMU, the participants recorded the outputs from the internal discussion in the relevant forms distributed for the purpose.

After completing the group exercise, the EAFM and MMA groups converged and the outputs from the two groups were presented and discussed in the plenary. The outputs from the group discussions are presented below.

EAFM Group 1. Mud-crab/Bivalve fishery in Coringa

Identifying issues and opportunities

In the case of the Mud-crab/Bivalve fishery of Coringa, critical ecological challenges such as overfishing, juvenile exploitation, and the loss of breeding grounds due to habitat and biodiversity loss and decreased water flows were identified (Table 6). These issues threaten the ecological well-being of the area. Conversely, there are opportunities for improvement, including the enhancement of data collection on fisheries and ecosystem changes, better execution of existing measures, empowerment of communities, and increased lobbying for pollution control. Additionally, while human well-being is affected by gender disparities and reduced incomes, there are opportunities to establish women-based organizations, ensure minimum wages, promote ecotourism, and encourage the shift to motorized FRP boats for improved livelihoods.

Table 6. Issues and Opportunities, Coringa Mangroves

EAFM Components	Impacting Issues	Opportunities to address issues under the project
Ecological Well-being	- Overfishing - Juvenile exploitation - Loss of breeding grounds - Habitat & biodiversity loss - Reduced water flows	- Improved data collection on fisheries, climate change and ecosystem changes - Improved implementation of existing measures - Increased participation and empowerment of communities - -Lobbying for pollution control
Human Well-being	- Gender disparity - Reduced incomes	- Establishing women-based organisations

EAFM Components	Impacting Issues	Opportunities to address issues under the project
		- Ensuring minimum wages, decent livelihoods - Promoting ecotourism as alternate livelihood - Encouraging fishing to move out from creeks; and from non-motorised boats to motorised FRP boats.
Good Governance	- Weak resource management - Weak institutional capacity	- Recognising informal management system and mainstream into formal system - Promoting MCS with people's participation - Revisiting policies and institutional processes - Strengthening afforestation programmes - Introducing appropriate technologies for ecological and economic benefits

Identifying stakeholders

A comprehensive stakeholder analysis revealed entities such as the Pollution Control Board, Fish Processors, Panchayats, Fishermen Cooperatives, and Academic Institutions as having high importance yet low influence (Figure 3). In contrast, individuals like the Executive Engineer of the Irrigation Department and the Assistant Director of Fisheries were identified as having both high importance and influence. The Tourism Department and NGOs were seen as having low importance and influence, whereas the Assistant Engineer of the Irrigation Department and Forest Section Officer were classified as having low importance but high influence.
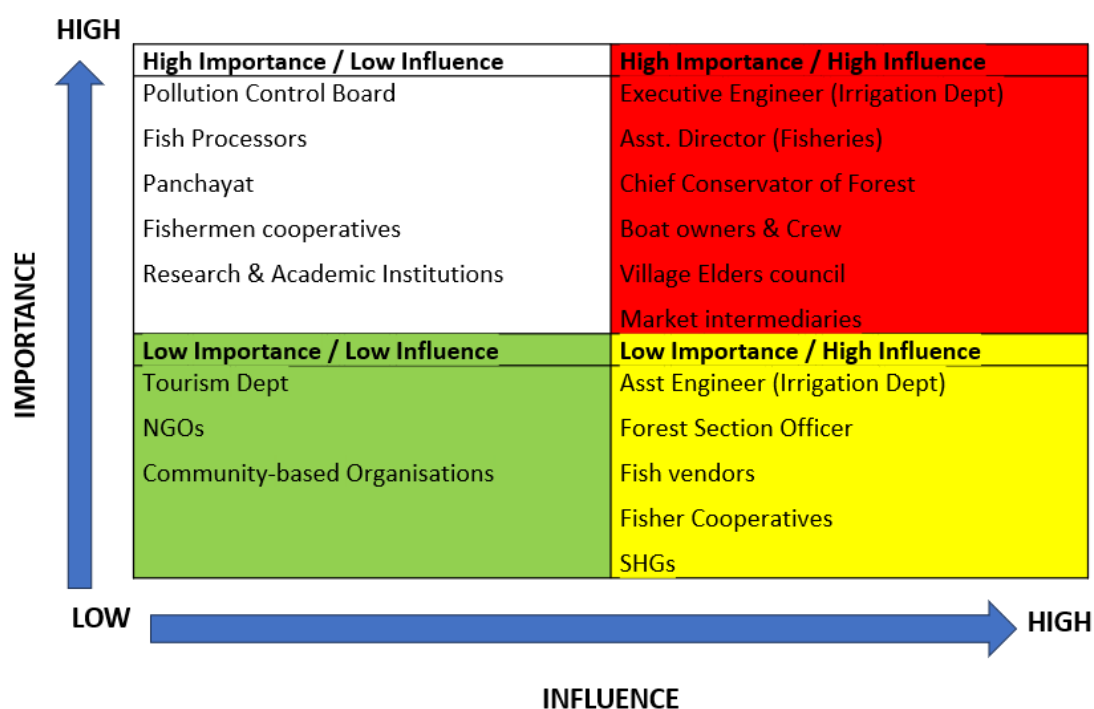
HIGH

IMPORTANCE ↑

High Importance / Low Influence	High Importance / High Influence
Pollution Control Board	Executive Engineer (Irrigation Dept)
Fish Processors	Asst. Director (Fisheries)
Panchayat	Chief Conservator of Forest
Fishermen cooperatives	Boat owners & Crew
Research & Academic Institutions	Village Elders council
	Market intermediaries
Low Importance / Low Influence	**Low Importance / High Influence**
Tourism Dept	Asst Engineer (Irrigation Dept)
NGOs	Forest Section Officer
Community-based Organisations	Fish vendors
	Fisher Cooperatives
	SHGs

LOW → HIGH

INFLUENCE

Figure 3. Stakeholder importance and influence, Coringa Mangroves

Assessing stakeholder capacity

The capacity of stakeholders varied significantly. Mid-level managers, research institutions, academia, NGOs, and senior leaders displayed a range of knowledge, decision-making ability, and implementation skills. Knowledge utilization was generally moderate to good within research institutions and academia, but there was a recognized need to enhance evidence-based decision-making and stakeholder involvement (Table 7). The attitude, cooperation, and communication across stakeholders was generally moderate, with NGOs displaying a good level of attitude and cooperation, indicating potential areas for capacity development to bolster stakeholder engagement effectiveness.

Table 7. Stakeholder Capacity Assessment, Coringa Mangroves.

Capacity	Mid-level Managers	Research Institutions/ Academia	Non-government Organisations	Senior leaders, Executives, Decision makers
Knowledge				
• *Knowledge-base*	Poor	Good	Poor	Moderate
• *Use of knowledge*	Poor	Moderate	Poor	Moderate
• *Access to knowledge*	Moderate	Good	Poor	Good
Decision-making				
• *Evidence-based?*	Moderate	Good	Poor	Moderate
• *Involvement of stakeholders*	Poor	Moderate	Good	Moderate

Capacity	Mid-level Managers	Research Institutions/ Academia	Non-government Organisations	Senior leaders, Executives, Decision makers
• *Uptake of advice*	Poor	Poor	Moderate	Moderate
• *Transparency*	Moderate	Good	Moderate	Moderate
Implementation				
• *Attitude*	Moderate	Moderate	Good	Moderate
• *Cooperation*	Moderate	Moderate	Good	Moderate
• *Communication*	Moderate	Poor	Good	Moderate

A.

EAFM Group 2. Mud crab fishery, Pichavaram

Identifying issues and opportunities

In the assessment of the Mud crab fishery in Pichavaram, several key concerns were identified by Group 2, impacting both ecological and human well-being, as well as governance efficacy. The ecological challenges include IUU fishing, pollution and the depletion of vital species such as crabs and polychaetes (Table 8). Opportunities lie in the conservation of habitat and biodiversity, and the implementation of ranching practices. Human well-being is affected by inadequate health infrastructure, community conflicts, and nutritional deficiencies. These indicated opportunities to enhance healthcare and nutrition, improve the infrastructure for fish quality, increase awareness of the scope of exploitation of molluscan resources as a supplementary activity, and strengthen marketing facilities. On the governance front, the fishery suffers from weak resource management and poor economic development. There are opportunities to establish co-management frameworks, promote effective MCS systems, encourage alternative livelihoods, and bolster Self-help Groups to address the governance challenges.

Table 8: Issues and Opportunities, Pichavaram

EAFM Components	Impacting Issues	Opportunities to address issues under the project
Ecological Well-being	- IUU fishing - Pollution - Depletion of crabs and polychaetes	- Conserving habitat and biodiversity - Ranching
Human Well-being	- Poor health & health infrastructure - Conflicts among communities - Nutritional deficiencies	- Improving health infrastructure & nutritional improvements - Improving infrastructure for fish quality - Raising awareness on molluscan resources - Strengthening marketing facilities
Good Governance	- Weak resource management; - Poor economic development	- Establishing co-management; - Promoting effective MCS; - Encouraging alternate livelihood options; - Strengthening Self-help Groups

Identifying stakeholders

In the stakeholder analysis for the mud-crab fishery in Pichavaram, a diverse array of entities was categorized based on their importance and influence over the fishery's management and operations (Figure 4). Research & Development institutions like the Centre for Advanced Studies in Marine Biology, along with traditional and Irula community associations and the Tourism Department, were identified as having high importance but low influence. Conversely, key persons such as the Assistant Director of Fisheries, Forest Ranger, Town Panchayat Councillor, leaders of fishermen associations, leaders of boat owner associations, and local legislators (MLA & MP) were noted to wield both high importance and influence. Stakeholders with low importance and influence included net menders and manufacturers. In contrast, NGOs such as MSSRF, SARPAM, traders, and middlemen, though less influential in day-to-day operations, hold significant sway due to their economic and community roles.
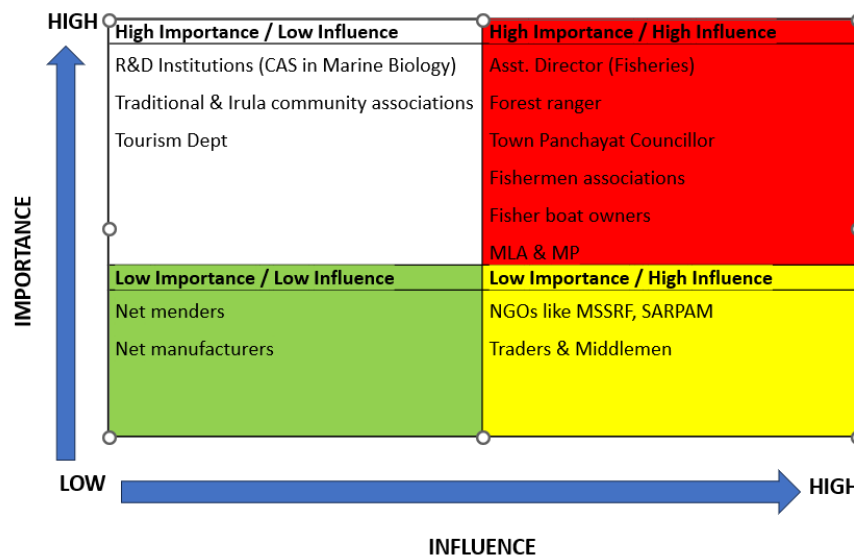

Figure 4. Stakeholder importance and influence, Pichavaram

Assessing stakeholder capacity

The capacity assessment for stakeholders involved in the mud-crab fishery in Pichavaram revealed a range of capabilities across mid-level managers, research institutions/academia, non-governmental organizations, and senior leaders/executives (Table 9). Research institutions and academia exhibit a robust knowledge base and effective utilization of knowledge, complemented by excellent access to information. NGOs are similarly well-positioned, with strong evidence-based decision-making and stakeholder involvement. However, senior leaders and executives, despite having moderate to good access to knowledge, show deficiencies in using this knowledge effectively and maintaining transparency in their processes. The overall attitude and cooperation among all groups are moderate to good, but there is a noticeable variance in communication skills and the implementation of advice, which are areas that could benefit from targeted improvements to enhance overall management efficacy in the fishery sector.

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Table 9. Stakeholder Capacity Assessment, Pichavaram

Capacity	Mid-level Managers 1	Research Institutions/ Academia 2	Non-government Organisations 3	Senior leaders, Executives, Decision makers
Knowledge				
• *Knowledge base*	Moderate to Good	Good	Moderate to Good	Moderate
• *Use of knowledge*	Good	Good	Moderate to Good	Poor
• *Access to knowledge*	Moderate to Good	Good	Moderate to Good	Good
Decision-making				
• *Evidence-based?*	Poor to Good	Good	Good	Moderate
• *Involvement of stakeholders*	Moderate to Good	Good	Good	Good
• *Uptake of advice*	Moderate to Good	Good	Good	Moderate
• *Transparency*	Moderate	Good	Moderate to Good	Poor
Implementation				
• *Attitude*	Moderate to Good	Good	Moderate to Good	Moderate
• *Cooperation*	Moderate to Good	Good	Moderate to Good	Moderate
• *Communication*	Moderate to Good	Good	Moderate to Good	Moderate

1: Asst Director, Fisheries; Forest ranger; Dept of Tourism; 2: CAS in Marine Biology; 3: MSSRF, SARPAM.

EAFM Group 3. Shrimp Fishery in Pulicat Lagoon

Identifying issues and opportunities

Ecologically, challenges such as habitat loss, siltation, and reduced freshwater influx threaten biodiversity and stock levels of important species (Table 10). However, opportunities exist to address these issues, including government intervention to reopen river bar mouths and regulations on fishing gear mesh size. Additionally, awareness campaigns targeting stakeholders can promote resource conservation. On the human front, territorial conflicts among fisher groups and inadequate health infrastructure in fishing villages pose challenges. Yet, there are opportunities to improve human well-being by implementing insurance schemes, promoting alternate livelihoods, and enhancing marketing avenues for shrimps through ecolabelling and skill development initiatives.

Table 10. Identifying Issues and Opportunities, Pulicat Lagoon

EAFM Components	Impacting Issues	Opportunities to address issues under the project
Ecological Well-being	- Habitat & biodiversity loss - River bar mouth closure - Siltation - Reduced freshwater influx - Salinity increase - Fish & bivalve stock reduction - Excessive harvest of polychaetes	- Opening of bar mouth by the government - Regulating mesh size of fishing gear - Awareness building of stakeholders on resource conservation
Human Well-being	- Territorial conflict among fisher groups - Poor health infrastructure in fishing villages - Natural hazards	- Popularising insurance scheme - Promoting alternate livelihood - Developing better marketing and market chain for shrimps - Ecolabelling of shrimps - Need-based skill development
Good Governance	- Lack of coordination between departments and states	- Define boundaries of rights & responsibilities of each stakeholder - Develop incentives/disincentives for sustainable/ unsustainable practices - Improve the capacity of communities in decision-making process

Identifying stakeholders

Stakeholders in the Pulicat Lagoon shrimp fishery vary in importance and influence, with some holding more sway over decisions than others. Key stakeholders include governmental bodies like the Fisheries Department and local leaders, and entities like fisher associations and the Coast Guard (Figure 5). Each stakeholder group possesses varying degrees of influence and importance, necessitating tailored approaches to engagement and collaboration. For instance, while the Fisheries Department may have high importance and influence, research institutions and academic bodies, though potentially less influential, still play a vital role in providing expertise and guidance.
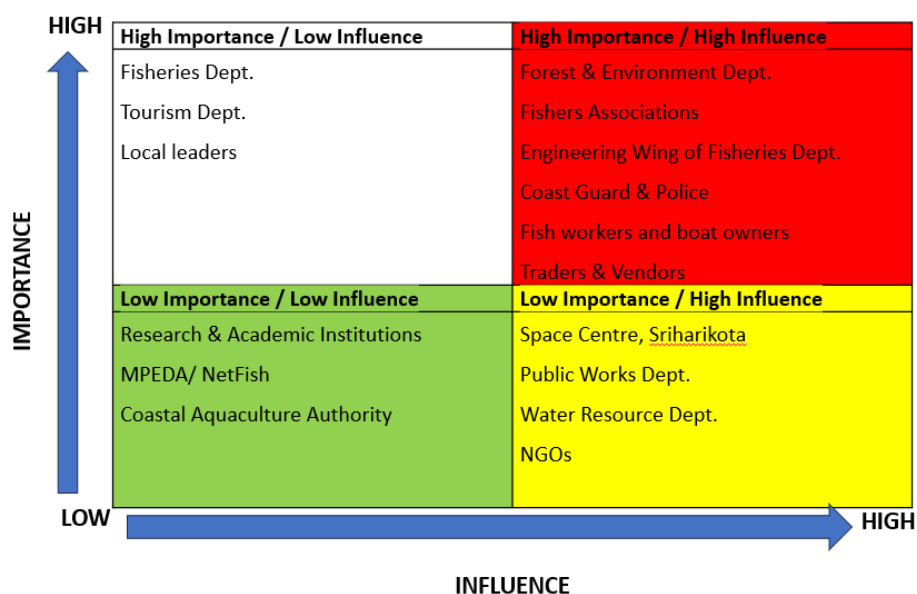
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HIGH
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 |  ┌─────────────────────────────────┬─────────────────────────────────┐
 |  │ High Importance / Low Influence │ High Importance / High Influence │
 |  │                                 │                                  │
 |  │ Fisheries Dept.                 │ Forest & Environment Dept.       │
 |  │                                 │                                  │
 |  │ Tourism Dept.                   │ Fishers Associations             │
 |  │                                 │                                  │
 |  │ Local leaders                   │ Engineering Wing of Fisheries Dept. │
 |  │                                 │                                  │
 |  │                                 │ Coast Guard & Police             │
IMPORTANCE                            │                                  │
 |  │                                 │ Fish workers and boat owners     │
 |  │                                 │                                  │
 |  │                                 │ Traders & Vendors                │
 |  ├─────────────────────────────────┼─────────────────────────────────┤
 |  │ Low Importance / Low Influence  │ Low Importance / High Influence  │
 |  │                                 │                                  │
 |  │ Research & Academic Institutions│ Space Centre, Sriharikota        │
 |  │                                 │                                  │
 |  │ MPEDA/ NetFish                  │ Public Works Dept.               │
 |  │                                 │                                  │
 |  │ Coastal Aquaculture Authority   │ Water Resource Dept.             │
 |  │                                 │                                  │
 |  │                                 │ NGOs                             │
 |  └─────────────────────────────────┴─────────────────────────────────┘
LOW ──────────────────────────────────────────────────────────────→ HIGH

                              INFLUENCE
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Figure 5. Stakeholder importance and influence, Pulicat Lagoon

Assessing stakeholder capacity

The capacity of stakeholders in the Pulicat Lagoon shrimp fishery ranges from mid-level managers to senior leaders and decision-makers across different sectors (Table 11). Research institutions and academia boast good knowledge bases with access but lack effective utilization. NGOs demonstrate good knowledge access and utilization but struggle with evidence-based decision-making. Senior leaders and executives, while exhibiting good knowledge bases, face challenges in evidence-based decision-making and stakeholder involvement. Overall, there's room for improvement in transparency, stakeholder involvement, and the uptake of advice across all levels of capacity, that highlights the need for collaborative efforts to enhance decision-making and implementation processes.

Table 11. Stakeholder capacity assessment, Pulicat Lagoon

Capacity	Mid-level Managers 1	Research Institutions/ Academia 2	Non-government Organisations 3	Senior leaders, Executives, Decision makers
Knowledge				
• *Knowledge base*	Moderate	Good	Poor	Moderate
• *Use of knowledge*	Poor	Poor	Moderate	Moderate
• *Access to knowledge*	Poor	Good	Poor	Good
Decision-making				
• *Evidence-based?*	Poor	Poor	Poor	Poor
• *Involvement of stakeholders*	Poor	Poor	Poor	Poor

Capacity	Mid-level Managers 1	Research Institutions/ Academia 2	Non-government Organisations 3	Senior leaders, Executives, Decision makers
• *Uptake of advice*	Poor	Poor	Poor	Poor
• *Transparency*	Poor	Poor	Poor	Poor
Implementation				
• *Attitude*	Moderate	Poor	Good	Moderate
• *Cooperation*	Moderate	Good	Good	Poor
• *Communication*	Moderate	Good	Good	Moderate

B.

EAFM Group 4. Grouper Fishery in South Andaman

Identifying issues and opportunities

In the analysis of the Grouper Fishery in South Andaman by EAFM Group 4, various ecological, and human well-being issues were identified, along with opportunities to address them (Table 12). Ecologically, challenges such as overfishing, biodiversity loss, and pollution threaten the sustainability of the fishery. Opportunities to mitigate these issues include implementing input controls like identifying spawning aggregation sites and establishing catch monitoring systems. Additionally, measures such as implementing closed seasons and conserving habitats can aid in sustaining grouper populations. On the human front, unprofitable fishing and poor access to technical advancements and health infrastructure present challenges. However, opportunities exist too to improve human well-being by enhancing price transparency, promoting better storage methods, and the entry of women into fisher councils to ensure inclusive decision-making.

Table 12. Identifying issues and opportunities, South Andaman

EAFM Components	Impacting Issues	Opportunities to address issues under the project
Ecological Well-being	- Overfishing - IUU fishing - Biodiversity loss - Pollution - Climate change	- Reducing overfishing - Identifying spawning aggregation sites of groupers and applying input controls - Establishing catch monitoring/logbooks - Implementing species-specific minimum legal sizes - Implementing closed and open seasons - Encouraging alternative fishery during lunar phases (PFZ-based) - Conserving habitat/biodiversity - Monitoring coral reefs status w.r.t bleaching patterns - Monitoring sea turtles/dugong - Monitoring pollution in remote islands - Assessing and reducing ALDFG

EAFM Components	Impacting Issues	Opportunities to address issues under the project
		- Promoting citizen science to protect ETP species
Human Well-being	- Unprofitable fishing - Climate change issues and natural disasters - Technical advancement not accessible/not known - Poor health infrastructure	- Reducing fish loss - Improving price transparency in the value chain - Enhancing better storage, sanitation/preservation methods - Including women in fisher informal Councils - Using satellite-based communication tools to promote two-way communication - Developing options to adapt to extreme events and natural disasters - Using mobile applications and tools - Improving access to health services for fishers
Good Governance	- Weak resource management - Economic development *vs* conservation - Lack of stakeholder - participation and co-management - Poor compliance and enforcement	- Strengthening MCS - Constituting co-management councils with fishers and other stakeholders - Promoting fishermen watch groups for resource monitoring - Exploring gear marking options - Monitor poaching/IUU - Constituting co-management committees - Investing in infrastructure development in sanitation, landing centre, marketing - Strengthening institutional capacity - Capacity building, awareness raising

Identifying stakeholders

Stakeholders in the Grouper Fishery in South Andaman vary in importance and influence, ranging from research institutions and fishermen to government officials and industry bodies (Figure 6). While research institutions and fishermen hold high importance and influence, entities like the Director of Fisheries Department and the Principal Chief Conservator of Forests wield significant authority in decision-making. Meanwhile, stakeholders like health departments and national development boards, though important, may have lower influence levels. Effective engagement and collaboration with stakeholders across all levels of importance and influence are crucial for sustainable fisheries management in the region.
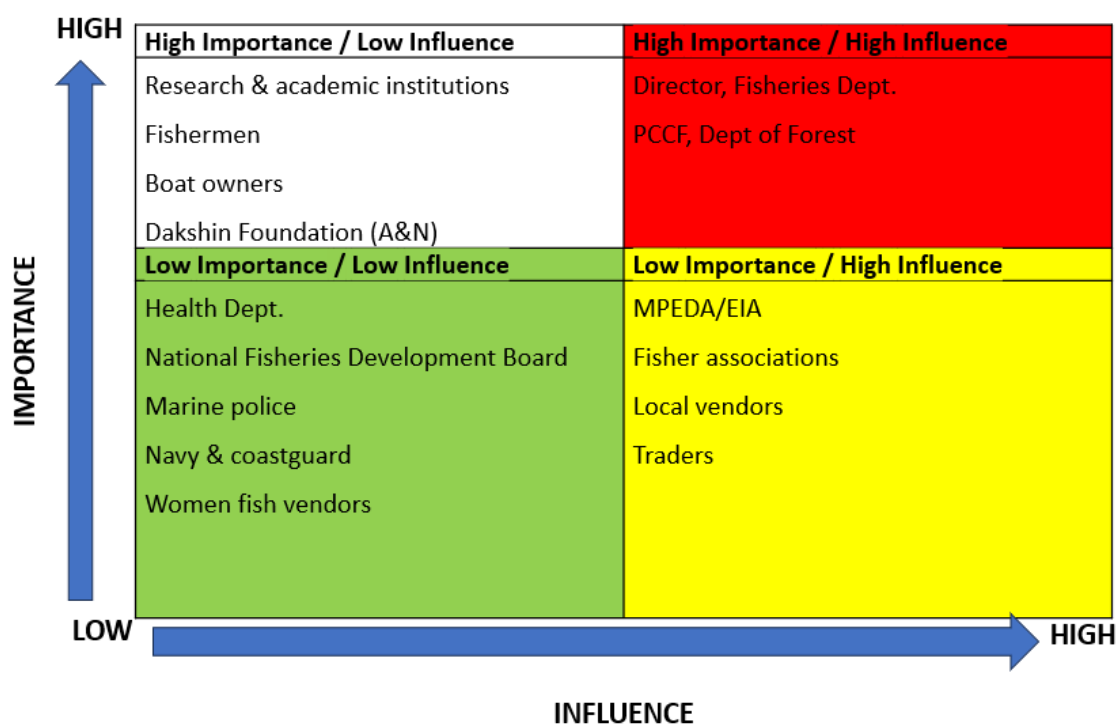
Figure 6. Stakeholder importance and influence, South Andaman

Assessing stakeholder capacity

The capacity of stakeholders in the Grouper Fishery in South Andaman varies across different sectors and roles (Table 13). Research institutions and academia demonstrate good knowledge bases but struggle with knowledge utilization and transparency. Non-governmental organizations exhibit moderate levels of knowledge and decision-making capabilities but require improvement in transparency. Senior leaders and decision-makers possess good knowledge bases and evidence-based decision-making skills but may lack transparency in implementation. Overall, stakeholders show moderate to good levels of cooperation and communication, highlighting opportunities across the board for taking up capacity-building initiatives to enhance decision-making processes and transparency.

Table 13. Stakeholder capacity assessment, South Andaman

Capacity	Mid-level Managers	Research Institutions/ Academia	Non-government Organisations	Senior leaders, Executives, Decision makers
Knowledge				
• *Knowledge base*	Moderate	Good	Good	Poor
• *Use of knowledge*	Moderate	Moderate	Moderate	Poor
• *Access to knowledge*	Moderate	Moderate	Moderate	Moderate
Decision-making				
• *Evidence-based?*	Moderate	Good	Good	Moderate

Capacity	Mid-level Managers	Research Institutions/ Academia	Non-government Organisations	Senior leaders, Executives, Decision makers
• *Involvement of stakeholders*	Moderate	Moderate	Good	Moderate
• *Uptake of advice*	Moderate	Moderate	Good	Good
• *Transparency*	Poor	Moderate	Moderate	Moderate
Implementation				
• *Attitude*	Moderate	Good	Good	Moderate
• *Cooperation*	Moderate	Good	Good	Moderate
• *Communication*	Moderate	Good	Good	Good

The above exercise on scoping the FMU at the EAFM sites provided valuable information on the issues and opportunities, identifying potential stakeholders and assessing capacity development needs. Many issues such as overfishing and related issues, pollution, habitat and biodiversity loss, climate change impacts, weak resource and habitat management, reduced incomes and weak infrastructure are common to all the FMUs. The major categories of stakeholders are almost identical. However, major differences are observed in the prioritization of stakeholders and capacity development needs. This was not surprising as the exercise was based on qualitative opinion of the participants, and individual bias could have led to the differences. Detailed scoping studies will be carried out by the BOBLME project team by undertaking field visits and consultations in the finalized FMUs to validate the opinions of the participants of the workshop.

4. Prioritization and Scoping of MMA Sites in India

4.1. Prioritizing the MMA Sites

The MMA group had 36 participants. The group agreed that India is notable within South Asia for its commitment to marine conservation, with protected areas playing a critical role. However, the management of these MMAs/MPAs faces several significant challenges. There is a pressing need for comprehensive data and clearly defined boundaries to effectively manage and protect these areas. Additionally, there is a notable deficiency in capacity and inter-sectoral coordination among various stakeholders. Local communities often lack support for Protected Areas (PAs) and enforcing regulations and integrating marine conservation efforts with local and national policies remains a complex task.

The group discussion on Day 1 focused on identifying and evaluating potential sites for Marine Managed Areas (MMAs) under the BOBLME project. The emphasis was on strategic capacity development at the regional level, ecological threat assessments, and management system considerations.

In terms of management systems and environmental considerations, coastal management systems are primarily focused on addressing coastal erosion and habitat loss, especially significant during the monsoon season (Table 14). These measures are applicable to sites like Pichavaram and Pulicat. On the other hand, open water management systems aim to manage the impacts of climate change, cyclones, and fisheries in open water areas, making them relevant for sites such as South Andaman, Digha and Junput.

When considering site selection criteria and recommendations, Coringa stands out due to its strong institutional setup and active government involvement. Its strategic potential is deemed viable owing to its established management framework, despite previous project setbacks that can be mitigated with robust planning. Similarly, Pulicat is selected for its potential to build upon existing projects despite complex governance challenges. The site's high strategic potential is attributed to historical interventions and ongoing projects, although environmental challenges necessitate coordinated efforts across multiple government entities. Palk Bay is identified for its transboundary and ecological significance, presenting valuable opportunities for international collaboration and significant conservation impacts. However, effective management of transboundary ecological threats is crucial for its successful implementation as an MMA site.

Based on the discussions and conclusions of the Day 1, the potential Marine Managed Area (MMA) sites are as follows:

1. Chilika:
   - Already designated as a Marine Protected Area (MPA)
   - Institutional setup is robust, which is crucial for effective management.
   - Consideration should be given to the sustainability of the project over the next 3-5 years.
2. South Andaman:
   - High biodiversity, including sharks, making it one of the top remaining ecosystems.
   - Existing co-management practices with Indonesia, indicating potential for collaboration and shared management strategies.

Table 14: Comparison of MMA Sites

Site	Pichavaram	Pulicat	South Andaman	Chilika	Coringa	Palk Bay	Digha and Junput (Discussed but not primary)
Characteristics	Small site with unique ecological features.	Site with a history of conservation activities.	Diverse ecosystems and strategic importance within the BOBLME framework	India's vast brackish water lagoon, boasts rich biodiversity and serves as a vital resource for local communities.	Potential to build on existing projects, complex governance challenges	Transboundary and ecological significance	Traditional fishing areas with established facilities.
Strategic Potential	High potential for strategic capacity development due to its biodiversity.	Significant potential to build on previous interventions and ongoing projects.	Ideal for large-scale experimental projects that amplify BOBLME's strategic message.	Recognized as an MMA, Chilika presents significant opportunities for sustainable management and biodiversity conservation efforts.	High due to historical interventions and ongoing projects	Valuable for international collaboration and significant conservation impacts	
Threats	Habitat degradation and human activity impact.	Recent cyclones, increased salinity levels, species-specific issues.	Impacts from climate change and human activities.	Pollution, overfishing, and climate change are putting Chilika's ecosystem at risk, threatening its	Environmental challenges, requiring coordinated multi-government efforts	Management of transboundary ecological threats.	Depletion and stress in fishing activities

Site	Pichavaram	Pulicat	South Andaman	Chilika	Coringa	Palk Bay	Digha and Junput (Discussed but not primary)
				balance and biodiversity.			
Management Needs	Continuous monitoring and management to maintain ecological integrity.	Addressing multiple challenges and developing seaweed culture potential.	Extensive research and conservation activities to set a precedent for other regions.	To protect Chilika's future, we need to adopt sustainable fishing methods and involve the community in conservation efforts.			Leverage existing training centers and local fishing operations for future conservation efforts.

The discussions highlighted Pulicat, and S. Andaman as primary candidates for MMAs under the BOBLME project, with Coringa and Palk Bay also considered for their strategic potential. Each site was evaluated based on its unique characteristics, strategic capacity development potential, ecological threats, and management needs. By focusing on these sites, the BOBLME project aims to enhance regional strategic capacity, address critical ecological threats, and promote sustainable management practices across the Bay of Bengal region.

Considering the unique characteristics and potential of each site, BOBLME efforts should focus on establishing governance mechanisms that ensure harmony among stakeholders, maintain fisheries resources, and preserve cultural values. The final site selection will be completed and endorsed by the MOECC focal points.

4.2. Scoping MMA Plan Development and Implementation

The group kept in mind the development adage of scanning globally, regionally and locally, and then contextualizing to the local needs. During the discussion, the group also kept in mind sustainability outcomes; in other words, what would happen after the second phase of the BOBLME project ended. There were three steps: Site selection, Stakeholder map & influence matrix and Key Interventions (Figure 7). Highlights from their presentation are given below.
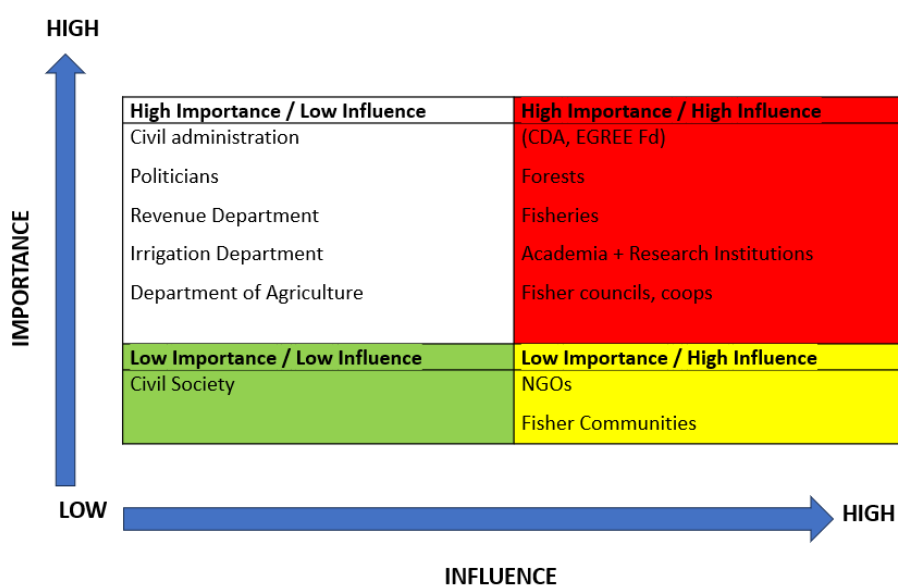
Figure 7: Stakeholder importance and influence: MMA Sites

The group identified four key areas for intervention to ensure the sustainable management and development of fisheries and related sectors:

- Capacity Development,
- Evidence-Based Interventions,
- Sustainable Livelihoods, and
- Inter-sectoral Cooperation.

The suggested interventions for each of these areas were tailored to the unique needs of the three study sites: Pulicat, Godavari, and Chilika, as outlined in Table 15. Key interventions across all sites included hydrological corrections, minimizing threats to biodiversity,

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addressing gender and youth concerns, capacity building, promoting sustainable fisheries, eco-tourism, pollution management, awareness programs, and alternative livelihoods. Specific measures such as conflict resolution between traditional merchandise, strengthening fish breeding through artificial reefs, and mud crab fisheries were prioritized for Pulicat. In contrast, co-management and recovery of threatened fauna were emphasized for Godavari and Chilika. These targeted interventions aim to enhance the ecological health, socio-economic stability, and collaborative governance of these critical coastal regions.

Table 15. Suggested interventions for the potential MMA sites

Interventions	Pulicat	Godavari	Chilika
Hydrological Correction	✋	✋	✋
Conflicts between traditional merchandise	✋		
Artificial reefs (strengthening fish breeding)	✋		
Mud crab fisheries/ catches	✋		
Minimize threats to biodiversity	✋	✋	✋
Address gender/ youth concerns	✋	✋	✋
Capacity building	✋	✋	✋
Promote co-management		✋	✋
Focus on recovering of threatened fauna	✋	✋	✋
Promote sustainable fisheries (regulations on catch etc.)	✋	✋	✋
Promote eco-tourism (additional livelihoods)	✋	✋	✋
Pollution management (water, plastics)	✋	✋	✋
Awareness programmes	✋	✋	✋
Alternative livelihoods	✋	✋	✋
Strengthen fishermen cooperatives, self-help groups, etc.	✋	✋	✋
Governance (top to bottom)	✋	✋	✋
Involve community in conservation measures (alternative livelihoods) e.g. seagrass	✋	✋	✋
Habitat restoration for critical Species (SPP) e.g. Coringa, etc	✋	✋	✋
Alternative livelihoods during closed season	✋	✋	✋
Better marketing chain for fishers	✋	✋	✋
SEA Ranching of community important spp	✋	✋	✋
Strengthen existing grass root institutions (CSO, NGO, etc)	✋	✋	✋
Formulization Traditional fishing rights	✋	✋	✋
Mangrove conservation	✋	✋	✋
Seagrass management	✋	✋	✋

Some other suggestions include the transboundary movement of fishing vessels, conducting science and technology research, and establishing a social science group as a platform for science and research.

The focus is on identifying sites for clustering, such as Pulicat-Godavari-Chilka or a single site in South Andaman, while considering transboundary sites like Palk Bay, prioritized by Sri Lanka. If the project selects the site cluster concept, the goal is to select three or four sites to create a network and build capacity.

It's essential to involve relevant departments, including the Revenue Department and the Irrigation Department, in the site selection process. Their actions, such as water effluent management and ecosystem impact assessments, can significantly influence conservation outcomes. Additionally, partnerships with fishing councils and cooperatives should be strengthened, considering the limitations faced by NGOs. The involvement of external projects like BOBLME is crucial, and coordination with agencies like the Port Department, Coast Guard, and Navy is necessary, especially in sites like Coringa with port infrastructure. Lastly, building on the foundations laid by organizations like Chilika Development Authority (CDA) and The East Godavari River Estuarine Ecosystem (EGREE) will be instrumental in achieving conservation objectives.

The team also spoke on the various dimensions of capacity development including at the site level, at the state level, at the network level and at the country level. The process of capacity building was pictured as given in Figure 8.
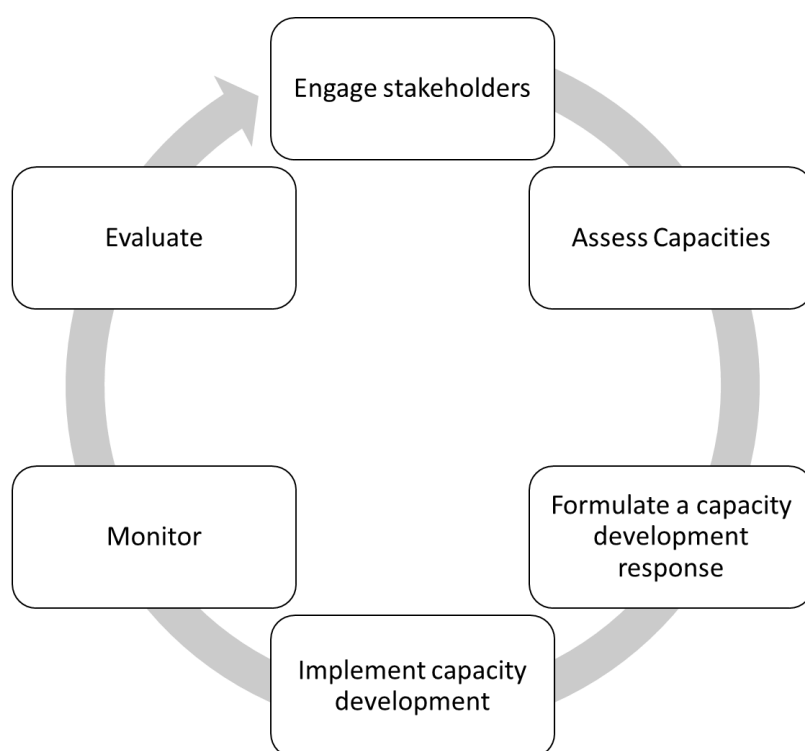
Figure 8. Process of capacity building

Follow-Up Actions

1) Confirm Site Selection:
- Hold a meeting with MOEFCC to confirm the site selection.
- Inform and get endorsement from MOEFCC focal points for the proposed MMA site of South Andaman for project implementation.

2) Data Collection and Boundary Definition:

- Conduct comprehensive surveys to collect data on marine biodiversity, (especially conservation values), socio-economic conditions (including Gender Analysis) and ecosystem health.
- Establish clear boundaries for MMAs and ensure they are effectively communicated to all stakeholders.
- Conduct diagnostic ("gap") analysis of the MPA using the IUCN Green List Standard for Protected and Conserved Areas to identify priority areas for improving MPA management effectiveness.

3) Capacity Building and Coordination:
- Develop and implement training programs for local communities, government officials, and other stakeholders to build capacity in MMA/MPA management.
- Facilitate regular inter-sectoral coordination meetings to align conservation efforts across different ministries and sectors.

4) Policy and Enforcement:
- Strengthen enforcement mechanisms for existing marine conservation regulations.
- Integrate marine conservation objectives into broader national and regional policies. Promote alternative livelihoods for local communities to reduce dependence on fishing and other activities that impact MMAs.
- Enhance community-based management practices and integrate traditional knowledge into conservation strategies.

5) Stakeholder Engagement and Advocacy:
   - Engage with a broad range of stakeholders, including local communities, NGOs, and government agencies, to foster collaborative management.
   - Advocate for increased funding and policy support for marine conservation initiatives.

6) Transboundary Collaboration:
   - Explore opportunities for transboundary collaboration, particularly in areas like the Gulf of Mannar, which have ecological and conservation significance beyond national borders.
   - Coordinate with neighbouring countries to manage shared marine resources effectively.

7) Observation and Next Steps:
   - It has been noted that while both South Andaman and the cluster site from Pulicat to Chilika were discussed, follow-up actions for MMA site selection will focus solely on obtaining MOEFCC approval for the South Andaman site.

These follow-up actions are critical for ensuring the long-term sustainability and success of MMAs in India, contributing to the broader goals of biodiversity conservation and sustainable development in the region.

5. Management of Coastal and Marine Pollution

5.1. Status report on harbour management practices and gear marking in India/ NAP on Marine Pollution

The first presentation in Session 4 was by Dr Nilesh Pawar, Deputy Director, DoF, Government of India on "Status Report of Harbour Management Practices and Gear Marking in India". Dr Pawar spoke about the non-availability of potable water and inadequate cleaning facilities in fishing harbours leading to post-harvest losses and low unit value realization. He outlined the requirements for upgrading fishing harbours including improvement of auction halls to internation standards, strengthening of wharfs, jet washing system, proper drainage system, proper test area with lockers, 3-phase power supply, vessel monitoring station and related infrastructure. He said that in 2021, under PMMSY 26 fishing harbours and 20 fish landing centres had been taken up for construction and modernization.

In his overview, he explained India's National Action Plan on Marine Pollution from Sea-based Sources (SBMPL). The NAP aims at actions related to Legal, policy and enforcement reforms; Institutional capacity and reforms; Education and outreach; Regional and global cooperation; and Private sector engagement.

Dr Pawar said that the NAP aims to achieve several key outcomes, including the reduction and control of SBMPL, particularly from shipping and fishing activities, as well as addressing Abandoned, Lost, or otherwise Discarded Fishing Gear (ALDFG). Infrastructure development in fishing harbours and fish landing centres is targeted to facilitate the collection, storage, and disposal of SBMPL for reuse and recycling. The NAP also seeks to assess the extent and hotspots of SBMPL along the Indian coasts and remove approximately 10 tonnes of SBMPL from Indian seas annually. Moreover, it aims to establish a comprehensive database on the sources and sinks of Marine Plastic Litter (MPL), including ALDFG, and develop effective mitigation measures. Additionally, the plan focuses on assessing the impact of SBMP/SBMmP on marine organisms and promoting innovations in alternative biodegradable materials for Fishing Gear Technology (FGT) to encourage reuse and recycling. With a target of reducing marine plastic debris by 70% by 2026, the NAP aligns with the UN Sustainable Development Goal 14.1, reflecting the nation's commitment to marine conservation and sustainable development.

A National Task Force was to be constituted with representatives from all maritime states and Union Territories. Dr Pawar said that Component 3 of the BOBLME project on the management of coastal and marine pollution aligns very well with the NAP. Under the National Coastal Mission, it was proposed to undertake activities on the Development of Marine Litter Management Practices including removal of ghost nets, and environmental education and outreach programmes, he said.

5.2. Gear loss & Gear Marking in India: Findings from CIFT Studies

Dr V R Madhu and Dr N Manju Lekshmi, ICAR-Central Institute of Fisheries Technology made a presentation on "Gear Loss and Gear Marking in India". They explained that gear marking

included anything to identify gear/craft such as barcode, QR code, tags, print information on hooks, coded wire tags that go into the rope or are injected into it, traps attached to ports etc. Gear marking was essential to cut down on gear loss, ghost fishing and overfishing.

They narrated the results of the study done by ICAR-CIFT on gear loss and abandoned fishing craft and gear in beaches. According to them, 90% fishers report loss of parts of trawl nets and 100-300 kg of webbing was replaced each year. Abandoned, Lost and Discarded gillnets amounts to 29% of the total gear used by a vessel. They spoke about the initiative by the Government of Kerala where fishermen bring the waste they encounter in the sea which was cleaned and repurposed into bitumen for laying roads.

They said that while government and non-government agencies have taken up initiatives to reduce plastic pollution in beaches, there was still a long way to go. Gear marking, they said, is not prevalent in the country, as there are many challenges. Solutions proposed by them include gear registration, raising awareness, and implementing standardized marking practices. They said that stakeholder engagement and supportive policies are also vital to combat gear loss and plastic pollution.

To promote gear marking, they suggested the following activities:

- *Registration of fishing gear, creation of awareness among fishermen on the requirements and the use of a marking system;*
- *Providing gear manufacturers with guidelines for marking the gear, including all necessary specifications;*
- *Encouraging operation of only marked gear by registered fishing vessels;*
- *Making mandatory the logbook entry of specific details of each gear;*
- *Encrypting a Unique Identification Code in which all the details of the gear can be machine-read; and*
- *Finding ways for cheap and easy methods to mark gears.*

5.3. Improving waste management practices in fishing harbours & fishing gear marking – Scope in BOBLME Project

In his presentation titled "From Pollution to Solution", Mr Rajdeep Mukherjee, BOBP-IGO, explained the scope and the expected output and outcomes from Component 3 of BOBLME project on improving waste management practices in selected fishing harbours and fishing gear marking. He said that the approach of the project envisages (i) Setting up National Working Groups (NWG) for pollution management; (ii) Reviewing the status of waste disposal and best practices for clean harbours; (iii) Studying gear marking practices to develop innovative options and assess their feasibility; (iv) Developing guidelines, plans and capacity development plans; and (v) Developing knowledge products (reports, awareness material, etc). He concluded by saying that the project also envisages cooperation with the GloLitter project by assisting countries in participating in the GloLitter project.

5.4. Group Discussion

To cater to the requirements of Component 3 of the BOBLME project, the views of the participants were sought on five thematic areas by dividing the participants into five groups. After the group discussion, representatives from each group made a presentation, summarized below.

Group 1. Identifying sites for assessing waste management practices

In accordance with the parameters delineated by this group for the identification of sites conducive to assessing waste management practices, specifically, the availability of fishing-related infrastructure facilities such as boat berthing, the presence of management bodies overseeing waste management, and the inclination of governmental entities to establish such management bodies, the group recommended eight harbours for consideration. These are Pazhayar and Colachel in Tamil Nadu and Kakinada and Nizampatnam in Andhra Pradesh. In addition, Dhamra and Gopalpur in Odisha and Sultanpur and Digha II in West Bengal were also proposed as potential sites for evaluating waste management practices within the fishing sector.

Group 2. Establishing synergy between India's NAP and BOBLME - Assessing National Capacity Needs & Constitution of Working Group

The scope of this group discussion was on evaluating the integration between India's National Action Plan (NAP) on Marine Litter and the BOBLME initiatives. The discussion aimed to assess the alignment of the NAP's goals with BOBLME objectives, the direct contributions of specific NAP components to BOBLME efforts, and existing capacity gaps within India's framework for managing sea-based marine plastics. It also explored the additional resources needed, ways to optimize infrastructure to support both initiatives, criteria for an effective working group, and strategies to enhance private sector engagement and regional cooperation. The group observed that while NAP and BOBLME have a complimentary relationship in terms of plastic litter from fishing activities, the NAP also includes the shipping sector which is not considered in BOBLME (Figures 9 & 10) and BOBLME includes all wastes generated by the fishing sector. Therefore, they each have their own merits to pursue. However, progress in one will contribute to the progress in the other to a significant extent. The group also identified several challenges including significant gaps in capacity and research and development underscoring the urgency for targeted investments and improvements. Moderate scores in areas such as infrastructure, resource availability, private sector integration, and regional cooperation highlighted the need for substantial enhancements to fully utilize existing frameworks and resources. Additionally, the average scores in monitoring and decision-making emphasized the critical need to bolster data-driven evaluation methods to ensure the effectiveness and adaptability of implemented strategies. This analysis clearly pointed to an imperative for bolstering institutional capacities, fostering deeper collaborations, and committing to infrastructural investments to effectively advance the environmental goals shared by the NAP and BOBLME.
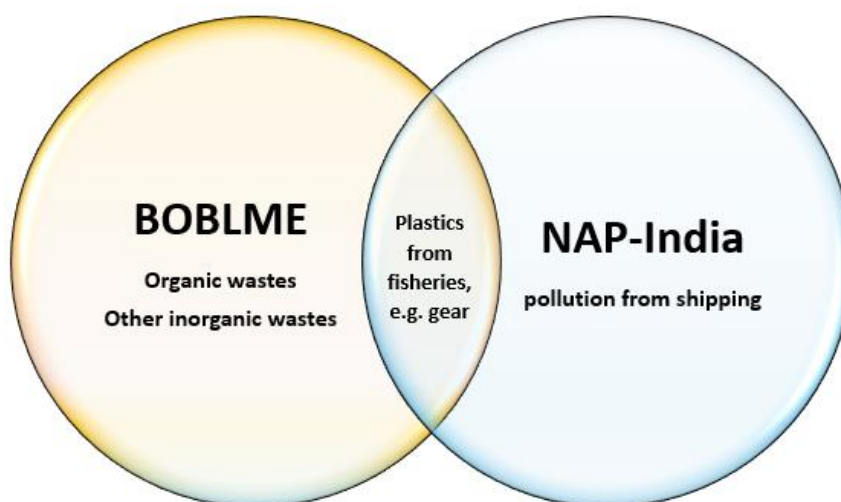
Figure 9. Relationship between NAP and BOBLME Project
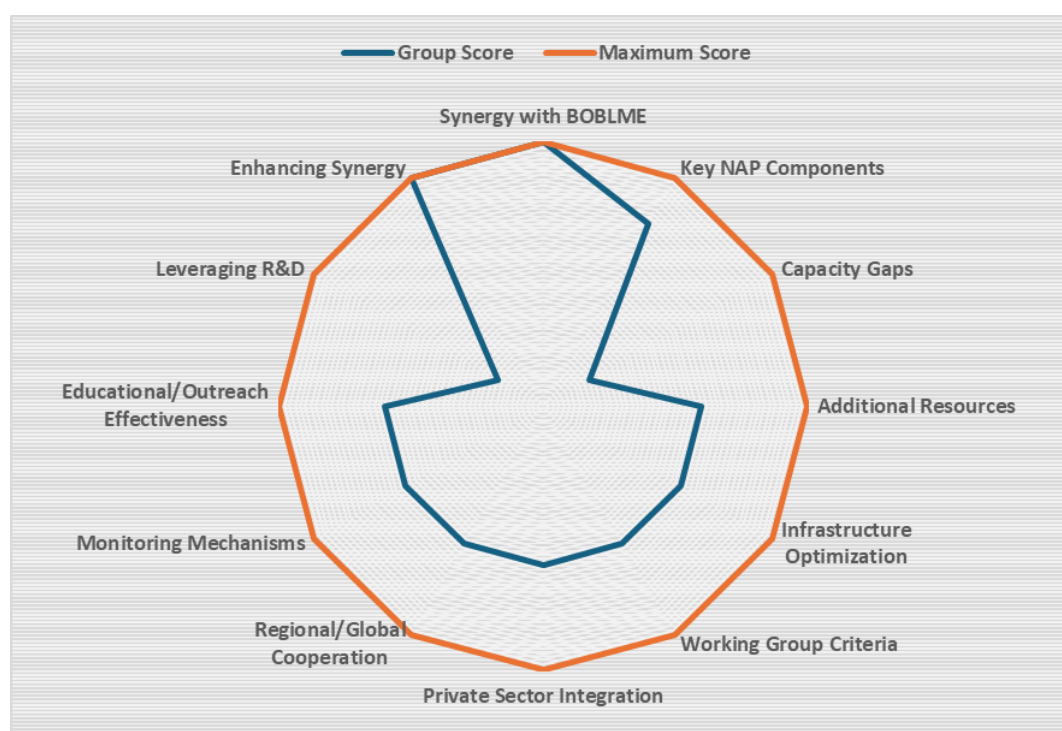
Figure 10. Synergy between BOBLME and NAP

Group 3. Promoting good waste management practices

(Upgrading infrastructure and sanitation, Strengthening management and Capacity building needs and methods)

The group identified various waste streams in fishing harbours that hold potential for conversion into wealth, including liquid wastes (both organic and inorganic), solid wastes such as netting, plastics, and fish wastes, as well as heavy metals, pesticides, and oil and hydrocarbons. To capitalize on these waste streams, existing technologies and methods like incentive-based plastic collection and recycling, sewage/effluent treatment, and material

recovery facilities can be utilized. Successful models such as the Neendakara (Kerala) model for plastic recycling, and the material recovery facility at Gopalpur (Odisha) were highlighted as scalable for fishing harbours (Table 16).

Table 16. Waste-to-wealth (WTW) models identified by the participants.

Waste-to-Wealth Model	Description	Location	Key Features
Incentive-based Plastic Collection and Recycling	Encourages local communities to collect and recycle plastics.	Neendakara, Kerala	Utilizes incentives to promote local recycling activities.
Sewage Treatment	Processes wastewater to remove contaminants and recover resources.	Not specified	Focuses on treating sewage to meet environmental standards.
Material Recovery Facility (MRF)	A facility that sorts out recyclable materials from waste to sell them as new products.	Gopalpur, Odisha	Helps in reducing landfills, and promotes recovering valuable materials.

Key challenges in implementing Waste to Wealth (WTW) projects include scaling and economic viability, regulatory hurdles, financial constraints, lack of local participation, and inadequate monitoring mechanisms. Engaging local communities and stakeholders through managed programs and participatory approaches, exemplified by the Chennai harbour case study, is crucial for ensuring the sustainability and effectiveness of WTW initiatives. However, the potential environmental, economic, and social impacts of establishing WTW systems in fishing harbours are significant. These include hygienic handling of waste, reduced contamination, secondary livelihood opportunities, enhanced environmental cleanliness, and improved ecosystem services which contribute to human well-being. Overcoming challenges and maximizing the scope of WTW initiatives will require robust partnerships and collaborations, with emphasis on financial support, stakeholder involvement, capacity building and research.

Group 4. Selection of gear types for loss assessment & marking strategies for promoting gear marking

The group prioritized gear types such as Bottom Set Gill Nets and Drift Gill Nets, identified as most prone to loss due to their extensive use and operational characteristics. However, the group noted significant complications in the alignment between the prioritization for loss assessment and the feasibility of implementing gear marking strategies (Table 17). High-priority gear types such as Bottom Set Gill Nets and Drift Gill Nets, which are most prone to loss and hence in greater need of effective management strategies, are marked as the least implementable for gear marking practices. This mismatch indicates a challenging scenario where the gears that most urgently require intervention to mitigate loss are also the ones for which practically effective solutions are hardest to apply. On the other hand, gear types that have been assigned a lower priority for loss assessment, such as Traps/Pots, Beach Seines, Bag nets, Stake nets, and Cast Nets, score high on implementability, suggesting that while it is

easier to apply gear marking strategies to these types, they might not significantly impact the overall goal of reducing gear loss as they are not the primary contributors to ALDFG. This disparity highlights the need for targeted research and development efforts to devise feasible marking and management solutions for high-priority gear types, ensuring that the strategies developed are both practical and effective where they are most needed.

Table 17. Feedback on susceptibility of fishing gear to loss and implementability of gear marking

Gear Type	Priority for Loss Assessment (Score)	Implementation Feasibility (Score)
Bottom Set Gill Nets	High Priority (5)	Least Implementable (1)
Drift Gill Nets	High Priority (5)	Least Implementable (1)
Monofilament Seine	Medium Priority (3)	Moderately Implementable (3)
Hook and Line	Low Priority (1-2)	Moderately Implementable (3-4)
Traps / Pots	Low Priority (1-2)	Most Implementable (5)
Beach Seines	Low Priority (1-2)	Most Implementable (5)
Bag nets	Low Priority (1-2)	Most Implementable (5)
Stake nets	Low Priority (1-2)	Most Implementable (5)
Cast Nets	Low Priority (1-2)	Most Implementable (5)

Note: Gear Type: This column lists the types of fishing gear discussed.

Loss Assessment Priority (Score): This column indicates the priority level of each gear type based on its propensity to be lost or contribute to ALDFG. The score ranges from 1 to 5, where a higher score (5) indicates a higher priority due to greater susceptibility to loss, and a lower score (1-2) indicates a lower priority.

Implementation Feasibility (Score): This column assesses how feasible it is to implement gear marking strategies on each gear type. The score also ranges from 1 to 5, where a score of 5 indicates that implementation strategies are highly feasible and easy to execute (Most Implementable), a score of 3 indicates moderate feasibility (Moderately Implementable), and a score of 1 suggests significant challenges in implementation (Least Implementable).

In terms of gear marking practices adaptable to local contexts, Tags and Cable Tags were highlighted as effective solutions, supported by robust scoring in supportive technologies (Table 18). These markings were noted for their practicality in enhancing the traceability and accountability of fishing gear. Addressing innovations, the group recognized the potential of technologies such as QR codes and RFID tags, despite some limitations, to support effective marking and tracking of fishing gear. However, significant barriers such as cost, regulatory challenges, and stakeholder resistance were identified, which impede the implementation of gear marking and retrieval systems.

Table 18. Best Practices and the Supportive Technologies for Gear Marking

Tools/ Gear parts	Rope	Sinkers	Float	Webbing	Support Level
Tags	4	4	4	4	Highly Supported (5)
RFID Tags	1	X	X	X	Least Supported (1)
Colour coding	X	1	3	1	Moderately Supported (3-4)
QR code	2	X	X	2	Moderately Supported (3-4)
Bird Rings	3	X	X	5	Moderately Supported (3-4)
Embossing	X	4	4	X	Moderately Supported (3-4)
Coded Wire	4	X	X	X	Moderately Supported (3-4)
Cable Tags	5	5	5	5	Highly Supported (5)

Notes:

Scores: 1 – 5: 1: Ineffective; challenging or unfeasible to implement with minimal or no reliable outcome…5: Highly effective; the gear marking strategy provides excellent reliability and ease of application. X: Not applicable or not assessed for this type of marking.

Enhancing stakeholder engagement emerged as a critical theme, with discussions focusing on incentives for fishermen, training programs, and awareness campaigns to foster broader community involvement and support. The group suggested implementing several strategic actions, including developing comprehensive training programs tailored for fishermen and multi-level stakeholders, which would equip them with the necessary skills for effective gear marking and retrieval practices. Additionally, the creation of awareness materials and conducting demonstration projects on a pilot scale were highlighted to visually underscore the benefits and practical applications of gear marking. Such initiatives aim to increase local community involvement and support. The group also recommended organizing exposure visits for stakeholders to locations where successful gear marking and retrieval systems have been implemented, providing real-life examples of the effectiveness of these practices. Furthermore, a 'Training of Trainers' approach was proposed to create a knowledgeable base within the community that can continuously educate and encourage others, thereby fostering a self-sustaining culture of best practices in gear usage and management. These efforts are supported by proposed incentives that reward compliance and active participation, creating a conducive environment for the widespread adoption of gear-marking initiatives. Lastly, policy measures were emphasized as crucial for supporting the adoption of gear marking practices, with recommendations for mandatory gear marking regulations, incentives for retrieval, and non-penal regulatory mechanisms to encourage compliance and participation.

Group 5. Issues and challenges in gear marking: Identification of supporting organisations and their strengths and opportunities.

This group's focus on identifying supporting organizations beyond direct stakeholders such as the Department of Fisheries (DOF), Ministry of Shipping, MOEF&CC, BOBP-IGO, and IUCN, led to an evaluation of a range of entities capable of supporting the BOBLME project and the NAP on marine pollution. The analysis shows the broad scope of activities and potential contributions that different types of organizations can make to marine conservation efforts. Each organization's scope encompasses specific actions that align with the overarching goals of protecting marine environments.

The typology of the Organisations considered, and their generic role was as follows (Table 19).

Table 19. Typology of Organizations discussed

Type	Example Organization	Generic Scope in Marine Conservation
Research and Development Institutions	ICAR-Central Institute of Fisheries Technology (CIFT)	Conduct cutting-edge research to inform conservation policy, develop sustainable fishing technologies, and support the science-based management of marine ecosystems.
Statutory Regulatory Bodies	Pollution Control Boards (PCB)	Enforce environmental regulations, monitor marine pollution levels, and ensure compliance with marine conservation laws and standards.
Fisheries Cooperatives and Federations	Fish Coop Federation (FISHCOPFED)	Advocate for sustainable fishing practices, support the economic and social interests of fishing communities, and facilitate collective action in marine resource management.
Non-Governmental Organizations (General)	M.S. Swaminathan Research Foundation (MSSRF)	Engage in multidisciplinary initiatives, including community development, advocacy for sustainable practices, and capacity building in coastal regions.
Fisheries-Specific Non-Governmental Organizations	Participatory Learning Action Network & Training (PLANT), South Indian Federation of Fishermen Societies (SIFFS)	Focus on fisheries management and conservation, protect marine biodiversity, and implement community-led conservation projects and education programs.

Type	Example Organization	Generic Scope in Marine Conservation
Trade and Industry Associations	Net Manufacturers, Trawl Fisher Association	Represent the economic interests of the fisheries industry, promote sustainable trade practices, and engage in dialogue about industry regulations affecting marine health.
Self-Help and Grassroots Organizations	Women's Self-Help Groups (SHGs)	Empower local communities to engage in conservation actions, promote environmental stewardship at the grassroots level, and enhance community resilience to marine ecosystem changes and alterations.

Alignment with BOBLME and NAP Objectives: ICAR-CIFT and FISHCOPFED were identified by the group as having strong alignment with BOBLME and NAP objectives. This denotes that their missions and activities are in complete harmony with the aims of the initiatives, suggesting they are well-positioned to champion the objectives of marine pollution reduction and ecosystem management. Other organizations like the women's Self-Help Groups and MSSRF, an NGO, demonstrate a moderate fit, implying some alignment but with room for closer integration.

Unique Strengths: ICAR-CIFT and the FISHCOPFED, scoring highly, are recognized for possessing distinct strengths that are crucial in addressing the gaps within the BOBLME project and NAP. CIFT's technical expertise and the Federation's extensive grassroots network could prove vital in amplifying research and community engagement efforts. Women's Self-Help Groups were also noted for their advocacy power and grassroots connections, reflecting the potential to make significant contributions to community-based initiatives.

Additional Opportunities: The Pollution Control Board (PCB) and women's SHG, with scores indicated high additional opportunities. In the case of PCBs, their regulatory and sanctioning power could be a good support for the project. In case of the SHGs, involving them in the waste management value chain could provide a win-win solution.

Challenges or Barriers: The Net Manufacturers faced the most significant challenges in partnering, as indicated by their lower score. The group discussed the Extended Producer Responsibility (EPR) for gear makers, which is a policy approach that holds producers accountable for the entire lifecycle of their products, especially at the end-of-life stage. This includes the responsibility for collecting, recycling, and disposing of products and packaging once consumers have finished using them. The goal of EPR is to encourage producers to design products that are less resource-intensive and more easily recycled or disposed of in an environmentally friendly way. It shifts the cost and management of product waste from governments and consumers to the producers themselves, creating an incentive for producers to develop more sustainable products and packaging. The hurdles may include aligning their commercial objectives with the conservation goals of the BOBLME and NAP, which could involve substantial shifts in their operational practices. Similarly, trawl boat associations or

gillnetter associations may also show inertia in buying-in gear marking due to various reasons, for example, as documented during the promotion of turtle excluder devices.

Values Alignment: Nearly all organizations scored highly on values alignment, signifying a shared ethos and commitment to the long-term goals of marine conservation and pollution reduction. This indicates that the values of these organizations are well-aligned with those of the BOBLME project and NAP, providing a solid foundation for collaborative endeavours and ensuring that joint efforts will resonate deeply with their core principles and objectives.

In conclusion, the group noted that organizations such as ICAR-CIFT and fisheries cooperatives and federations through FISHCOPFED have good alignment with the goals of the BOBLME and NAP, and they can contribute significantly through R&D, advocacy, and awareness efforts. In particular, ICAR-CIFT, with its technological expertise and research strength, and FISHCOPFED through its grassroots reach could be the changemakers. In addition, Group 5 underscored the critical role of communication and strategic partnerships, envisioning coalitions that can operate across various levels to tackle marine pollution more comprehensively.

6. Reducing Catch from IUU Fishing

6.1. National Policies and measures to combat IUU Fishing/Draft NPOA-IUU

Illegal, Unreported and Unregulated (IUU) fishing is known to contribute to the overexploitation of fish stocks and is a clear hindrance to the management and recovery of overexploited fish populations and ecosystems. The session started with a presentation from Dr Nilesh Pawar, DoF. He emphasized the critical need for robust national policies and measures to tackle this pervasive problem, which, according to global estimates, accounts for one in every five fish caught, with 34% of the world's fisheries already being overfished. Dr Pawar articulated the various dimensions of IUU fishing, including illegal activities by both national and foreign vessels that breach state laws and international conservation measures under different Regional Fisheries Management Organizations (RFMOs). He underscored the significant challenges posed by unreported and unregulated fishing, contributing to the overexploitation of marine resources.

Central to Dr Pawar's discussion was that national initiatives need integration with international regulatory frameworks effectively. He pointed out that India is actively working towards bolstering its legislative and regulatory frameworks to combat IUU fishing, although it has not yet ratified the Port State Measures Agreement (PSMA), which is instrumental in enhancing port state controls to curb IUU activities. Moreover, he noted the ongoing development of a National Plan of Action (NPOA-IUU) designed to outline comprehensive strategies for addressing the multifaceted issues of IUU fishing and ensuring alignment with global standards. Dr Pawar also highlighted implementation and enforcement challenges, including limited resources and the need for better coordination among various enforcement agencies. He stressed the importance of enhancing infrastructure and technology to improve monitoring and control efforts. Additionally, he mentioned government initiatives like 'Sagar Parikrama' aimed at promoting sustainable fishing practices by fostering direct engagement with fishing communities and enhancing the dissemination of crucial information regarding government schemes.

In conclusion, Dr Pawar called for increased transboundary cooperation, engagement with distant water fishing nations, and capacity building among fisheries managers and legal staff to effectively combat IUU fishing. He reiterated India's commitment to implementing comprehensive national policies and measures to ensure the sustainability of marine resources for future generations.

Following his presentation, representatives from various Indian states and Union Territories took part in a panel discussion to share their experiences and actions against IUU fishing.

6.2. Dealing with Domestic IUU Fishing: Experience of States & Union Territories

Dr K. Gopal from the Andaman and Nicobar Islands Department of Fisheries opened the state-specific discussions by detailing the unique challenges faced by the region. He said that since many islands in the Andaman and Nicobar archipelago are uninhabited, this makes them

vulnerable to IUU fishing activities, primarily by vessels from neighbouring countries. He highlighted the extensive use of Junglighat Wharf for docking confiscated boats, illustrating the scale of illegal activities in the area. The persistent threat from foreign vessels, mainly over the last 15 years, has seen them illegally exploit marine resources, including sea cucumbers and crustaceans.

Ms T. Sumalatha from the Andhra Pradesh Department of Fisheries discussed the efforts under the Andhra Pradesh Marine Fishing (Regulation) Act to tackle IUU fishing. She pointed at specific challenges such as the illegal operation of purse seines, which are difficult to monitor and regulate effectively. Ms Sumalatha emphasized the necessity of amending existing regulations, like adjusting mesh sizes in fishing nets to reduce bycatch and ensuring better registration of nets and vessels.

Mr K Deivasigamani, Joint Director, Department of Fisheries and Fishermen Welfare, Government of Puducherry, spoke on the actions taken in Puducherry under the Marine Fishing Regulation Act. He outlined the registration of approximately 5,000 fishing vessels operating within Puducherry's waters and the introduction of mechanized boats and fishing harbours to improve monitoring capabilities. Despite these efforts, challenges persisted, particularly with the enforcement of regulations around purse seine nets and managing the post-tsunami influx of migrants from Kerala with 110 boats equipped with these nets. He also highlighted issues such as inconsistent enforcement of fishing hours and the migration of local fishing boats to the Andhra Pradesh region, complicating regional IUU fishing challenges.

The panel underscored the urgent need for enhanced inter-regional cooperation and stricter enforcement of existing laws to effectively combat IUU fishing. The participants agreed that addressing IUU fishing requires a concerted and coordinated effort from all stakeholders, including local and national governments, to develop and enforce policies that protect marine ecosystems while simultaneously supporting the livelihoods of communities dependent on fisheries. Each speaker highlighted the need for comprehensive management strategies, better resource allocation, and the utilization of advanced technology to monitor and control IUU activities effectively. These combined efforts are crucial for ensuring the long-term sustainability of marine resources and adhering to international conservation commitments.

6.3. IUU Fishing: Scope of BOBLME Project

Following the panel discussion, Mr. Rajdeep Mukherjee, Consultant (IUU Fishing) made a presentation on the scope of the BOBLME project in combating IUU fishing. He highlighted the critical role of the BOBLME project under Component 1 "Sustainable Fishing," aiming to reduce IUU fish catch by 20% in the region. This ambitious target is supported by several key outputs as listed below.

Regional Cooperation: The implementation of a Regional Plan of Action (RPOA) on IUU fishing, encourages BOBLME countries to join and align their efforts against IUU fishing. This plan is crucial for fostering regional collaboration and enhancing the effectiveness of measures against IUU fishing. The scope for regional cooperation in implementing NPOA-IUU of the BOBLME project countries includes engaging with Regional Fisheries Bodies for improved regional fisheries management, establishing bilateral agreements with neighbouring

countries, and fostering initiatives for regional capacity building including MCS and joint research.

Strengthening National Efforts: National Plans of Action-IUU (POAs-IUU) and national IUU Monitoring, Control, and Surveillance (MCS) systems, including the strengthening of Vessel Monitoring Systems (VMS) need strengthening to combat IUU. These efforts are essential for improving national capabilities to monitor and regulate fishing activities effectively.

Best Practices and Tools: The development and implementation of tools is to be enhanced by promoting best practices to combat IUU, which encompass MCS, Port State Measures (PSMA), traceability, and policies. This also includes national actions within pilot or investment projects aimed at curbing IUU fishing.

Capacity Building: A Regional Capacity Building Program on port inspections, MCS, and traceability is to be implemented. This program aims to enhance the skills and knowledge of personnel involved in fisheries management across the BOBLME countries, ensuring they are well-equipped to implement IUU measures effectively.

Mr. Mukherjee also spoke about the role played by BOBP-IGO/FAO in promoting enhanced safety, decent work, and social protection in the fisheries sector of the BOBLME region through the BOBSAFE programme. This initiative, he said, is critical for improving the working conditions and safety standards within the fisheries sector, further supporting the sustainable management of fisheries. He added that adhering to the working standard of the crew is gaining importance and its violation is broadly within the gambit of illegal fishing.

He then outlined the tasks for the groups, to seek collective expertise and insights of the participants, aiming to strengthen the BOBLME project's approach to combating IUU fishing and ensuring sustainable fisheries management in the region. He also requested for inputs to provide direction to prepare a status paper on IUU fishing in India.

6.4. Group Discussion on IUU work-plan

Group 1: Measures for Strengthening India's Draft NPOA-IUU from a participatory perspective

This group was tasked with considering how to involve a wide range of stakeholders, including fishers, traders and exporters, to effectively combat IUU fishing. The focus was also on integrating EAFM and MMA approaches, and how to involve women more effectively in these efforts.

The group underscored the importance of involving various stakeholders, particularly focusing on markets and traders, to scrutinize the entire value chains affected by IUU fishing. A proactive suggestion involved incentivizing these stakeholders to engage actively in combatting IUU fishing and integrating them more effectively into fishery management processes. Moreover, there was a significant emphasis on enhancing the role of women in decision-making processes within the fisheries sector, recognizing the need to bolster gender inclusivity in governance structures that have traditionally been *male-dominated*.

In terms of establishing a national IUU status paper, the group proposed a structured approach to define the objectives clearly. These objectives are centred around ensuring sustainability, preserving ecosystem health, and improving socio-economic conditions for communities reliant on fisheries. The scope of IUU fishing estimation was recommended to focus specifically on the motorized and mechanized sectors, targeting species and regions most impacted by IUU fishing. The suggested timeframe for these studies was set to ten years, aiming to provide a comprehensive overview and effective monitoring of IUU activities, including issues like fishing without a license, using prohibited gear, and catching undersized fish. Challenges highlighted included dealing with discrepancies in data availability between different institutions, ensuring the sustainability of any incentivization mechanisms introduced, and addressing the complex power dynamics within the fisheries sector. These factors are crucial for formulating robust policies and ensuring effective enforcement and compliance, paving the way for a sustainable management framework to combat IUU fishing effectively.

Group 2: Integrating Research into IUU Policy and Practice

This group was asked to discuss how research could inform and enhance the efficacy of India's IUU fishing policies and monitoring, control, and surveillance (MCS) strategies. The group evaluated current and emerging research and technologies that could significantly reduce IUU fishing practices and provided a comprehensive approach towards integrating academic research into improving India's IUU fishing policies and Monitoring, Control, and Surveillance (MCS) strategies.

Advanced Research and Technological Integration: The group highlighted several advanced initiatives to update and refine IUU fishing monitoring and enforcement strategies. They advocated for recording onboard vessels to ensure transparency and accountability. The integration of AIS technology, AI tools, and drones was emphasized to enhance the precision and reach of monitoring systems. To facilitate effective data gathering and sharing, they suggested establishing a centralized database system, direct research programs, and government-funded data collection that includes maintaining records of migrant labour. They also recommended strengthening vessel monitoring systems (VMS) and developing more specific guidelines for action plans. Importantly, the group proposed the creation of a dedicated IUU focus body or council to streamline and coordinate research and policy efforts across the region.

Institutional Capacity and Community Engagement: For the study to estimate the magnitude and impacts of IUU fishing in the region, the group outlined a comprehensive approach starting with strengthening institutional capacity and raising community awareness about the impacts of IUU fishing. They emphasized aligning sustainable fisheries management with the Sustainable Development Goals (SDGs), ensuring decent working conditions in line with International Labour Organization (ILO) standards, and improving the reliability of stock assessments for adopting better conservation policies. The approach included better targeting and monitoring of MCS resources to enhance their effectiveness and continuously monitoring changes and extent in IUU fishing activities over time.

Scope of Estimation of IUU Fishing: The scope of the IUU fishing estimation as defined by the group covers all fisheries, with specific focus areas to be determined through secondary review and analysis. This would identify key species and sectors for focused interventions. They proposed that after regional segregation, four to six major fishing harbours could be identified for detailed study, with a span of approximately one year excluding the time needed for reviewing literature. They suggested examining major fish landing centres in each state concerned with various IUU activities such as unlicensed fishing, use of prohibited gear, and non-compliance with reporting requirements.

By leveraging both technological advancements and rigorous research, this group's proposals aimed to significantly fortify India's capabilities to effectively combat IUU fishing. Their emphasis on a multi-faceted approach involving technology, appropriate policy advocacy, and community engagement provides a robust framework for sustainable fisheries management and resource conservation efforts in the region.

Group 3: Role of Central and State Governments and Capacity Building Needs.

This group was asked to identify gaps in the current framework and suggest reforms aligned with international best practices. They were tasked with discussing the division of responsibilities and collaboration between central and state governments in tackling IUU fishing and identifying specific capacity needs at various governmental levels.

This group's report thus focused on the crucial roles of central and state governments in India and the necessary capacity-building measures to enhance IUU fishing governance and enforcement. Their analysis identified significant gaps in the current framework and proposed comprehensive reforms aimed at tightening IUU fishing controls and enhancing safety measures.

Legal and Policy Reforms: The group underscored the urgent need for an EEZ Fisheries Conservation Management Act tailored to India's context, where 75% of fish catches come from the EEZ. They stressed the importance of ratifying the FAO Port State Measures Agreement to strengthen international cooperation and compliance. Furthermore, they recommended ratifying the ILO Work in Fishing Convention (C188) to elevate Indian labour laws in the fishing sector to international standards. This includes developing a legal authorization mechanism for Indian vessels to operate responsibly in Regional Fisheries Management Organization (RFMO) areas, such as IOTC and WCPFC, and aligning state Marine Fisheries Regulation Acts (MFRA) with global fisheries instruments like the CCRF, SSF Guidelines, and UNFSA.

Operational and Jurisdictional Adjustments: The group suggested delegating the jurisdiction of Monitoring, Control, and Surveillance (MCS) to state governments, allowing them to authorize vessel operations within the EEZ. This decentralization aims to make states the operational arms for central mandates, enhancing responsiveness and enforcement capabilities at the local level. They also highlighted the need for creating fishery management areas managed by regional bodies, drawing on models from the US and Japan for co-management frameworks.

Capacity Building and Safety Enhancements: For capacity building, Group 3 proposed initiating certificate courses for fishers on safety methods and legislation, with experienced fishermen providing training to peers. They also called for government official training on various environmental and safety management protocols. The establishment of a 'Safety Wing' within the Department of Fisheries was recommended to address the high incidence of accidents at sea, advocating for inclusive legislation under the Merchant Shipping Act with enhanced safety mechanisms for fishing vessels, including requirements for bio-toilets, lights, and flags on larger vessels.

Community and Stakeholder Engagement: Finally, the group emphasized the need for ongoing dialogues between conservationists, fisheries resource managers, and community livelihood advocates to ensure that policies are comprehensively addressing the needs and challenges of all stakeholders.

These proposals highlighted a proactive and structured approach to discourage IUU fishing practices, emphasizing legal compliance, local empowerment, safety, and sustainable fisheries management within India's jurisdiction. This comprehensive strategy aims to significantly reduce IUU activities and promote the sustainability of marine resources in alignment with international standards and commitments.

In the lively discussion that followed the group presentations, it was emphasized that India should ratify the PSMA to accept IPOA and NPOA-IUU fishing. Indian boats should register with IOTC. Ratification of PSMA will allow the Indian boats to register and fish in the jurisdiction of other RFMOs like the Western and Central Pacific Fisheries Commission.

7. Improved Livelihoods, Building Cooperation

7.1. Livelihoods & Regional Cooperation: Scope under BOBLME and Managing ETP Species: Scope of Project

Ms Maeve Nightingale, IUCN spoke on the scope of the BOBLME project on Livelihoods and Regional Cooperation. Under Component 4 "Improved livelihoods and enhanced resilience of the BOBLME", the expected outcomes are: "Enhanced resilience and reduced vulnerability to natural hazards, climate variability and change of selected coastal communities"; and "Enhanced sustainable livelihoods and diversification for selected coastal communities". Ms Nightingale stressed the importance of gender mainstreaming by making women actively involved in fisheries management and marine managed area management. This could be achieved by capacity development; gender mainstreaming in EAFM and MMA management; analysis for coastal communities on gender equity and equality; gender responsive planning; and monitoring, evaluation and reporting by developing gender-based indicators. The EAFM cycle and Green List framework could be used for gender and gap analysis, highlighting how to engage local communities and support livelihoods. There is a need to improve capacity in gender issues and data collection. The workshop highlighted the ambition to establish regional mechanisms with robust governance structures designed to secure continuous funding beyond the project's completion.

Under Component 5, "Regional mechanism for coordination, monitoring and assessment", the expected outcome is "Strengthened institutional mechanisms at regional and national levels for planning, coordination and monitoring of the BOBLME". The major task is to establish a "Consortium for Conservation and Restoration (CCR-BOBLME)" - a regional mechanism to coordinate action on BOBLME. The other tasks are:

- *Establishing national multi-stakeholder mechanisms.*
- *Agreeing upon financing partnerships.*
- *Establishing national inter and intra ministerial committees.*
- *Developing and implementing BOBLME monitoring system; and*
- *Establishing gender balance at project completion.*
- C.

7.2. Livelihood concerns of coastal communities: Status Report

Dr Ahana Lakshmi, BOBP-IGO presented a status report on "Livelihood Concerns of Coastal Communities", based mainly on the reports of BOBLME Project Phase I and FIMSUL project (Fisheries Management for Sustainable Livelihoods, a coordinated project involving the FAO and Governments of Tamil Nadu and Puducherry). She said that the characteristics of coastal and marine livelihoods are the dependence on open-access or common property resources by a wide range of stakeholders, who are influenced by several policies and policy processes, often relating to different sectors. Declining access to fish resources, limited knowledge of the range of management interventions available, developing, but still weak organizations, and limited skills, options and experiences for diversification are major issues. Access and tenure rights, pollution and climate change disasters are the increasingly challenging livelihoods.

Among women, many have time and high aspirations, but lack the capacity to identify and explore opportunities. Some strategies that help women are providing leadership, building capacity in business management, establishing self-help groups and fish marketing societies, and vocational training. She suggested that one way forward was the application of SSF Guidelines as a Framework for improved fisheries-based livelihoods.

In the discussion that followed, the importance of gender-based budgeting was emphasized by the participants. It was also stressed that social protection and the well-being of fishers are essential for sustainable fisheries.

8. Concluding Session

The three-day National Consultation Workshop concluded with remarks from Dr Nilesh Pawar, DoF and Mr Wren Mishra, MOEF&CC. Both the speakers concurred that the BOBLME components are synergistic with various schemes of the two Ministries, like PMMSY, sustainable fisheries, Blue Economy, Marine Spatial Planning and coastal habitat protection. The officials appreciated that the workshop was well-organised with detailed discussions and focused outputs.

In his closing remarks, Dr P. Krishnan, Director, BOBP-IGO spoke about the next steps in planning and implementing the BOBLME Project Phase II in India. He said that the EAFM FMU, MMAs and fishing harbours as well as other activities identified in the Workshop would be finalised by the BOBLME project team in consultation with the Government of India. While preparing the detailed scoping document, issues, stakeholders and capacity development needs for different components of the project would be finalised. The constitution of National Working Groups for the components would be finalized in consultation with the Government. He assured the participants that communication with experts, institutions and government would be taken up for active follow-up of the project activities.

Workshop Highlights

- **Broad Stakeholder Engagement:** Information on the BOBLME Project Phase II was disseminated widely among stakeholders, effectively leveraging the support of various ministries and institutions across India. This widespread engagement provided a solid foundation for the commencement of Phase II.

- **Strategic Planning and Site Selection:** The workshop served as a crucial platform to jumpstart Phase II of the BOBLME Project in India, aiding identification of potential actions and understanding pertinent issues and threats. Key activities included the shortlisting of provisional sites for implementing the Ecosystem Approach to Fisheries Management (EAFM) and Marine Managed Areas (MMAs).

- **Pilot Projects and Pollution Reduction:** Fishing harbours were selected as pilot locations to explore and devise methods for reducing pollution derived from fishing activities. This initiative is part of a broader effort to enhance environmental stewardship within the fishing industry.

- **Enhanced Gear Management:** The workshop provided insights into the assessment of fishing gear loss and the implementation of gear marking techniques, which are crucial for reducing ghost fishing and improving accountability within fisheries management.

- **Progress on IUU Fishing:** Clarity was achieved regarding the steps towards preparing the National Plan of Action to Prevent, Deter, and Eliminate Illegal, Unreported and Unregulated Fishing (NPOA-IUU), highlighting the workshop's role in refining strategic approaches to combat IUU fishing.

- **Collaborative Efforts:** There was a recognized need to strengthen collaboration and cooperation among stakeholders to ensure the effective planning and implementation of the project. Identifying mutually beneficial opportunities and emphasizing the importance of engagement were noted as key factors for success. Establishment of a robust framework for ongoing collaboration among governmental bodies, NGOs, academic institutions, and community groups to support sustainable marine resource management in the region was discussed.

- **Active Participation and Knowledge Sharing:** Participants showed full cooperation and focus on the consultation process, contributing valuable insights and expertise, which facilitated productive discussions and the development of a cohesive action plan aimed at achieving the project's objectives.

- **Gender Mainstreaming:** Implementation of gender-sensitive approaches across all project components, ensuring equitable participation and benefits for women, and inclusion in training programs and decision-making processes was recognised.

- **Livelihood Enhancement and Resilience:** Development of initiatives linking conservation efforts to local livelihood enhancement, such as promoting eco-tourism, diversifying aquaculture, and facilitating community-led resource management was emphasised.

Annexures

Annexure I

Workshop Programme

Day 1: 21 March 2024

Date & Time	Agenda Item	Speaker
0930 - 1100	*Session 1: Inaugural Session / BOBLME Overview*	
0930 – 1000	Registration	BOBP-IGO
1000 – 1010	Opening Remarks	Ms Maeve Nightingale, IUCN
1010 – 1020	Workshop Context & Overview of the BOBLME Project	Dr P. Krishnan, BOBP-IGO
1020 - 1030	Self-Introduction of participants	
1030 – 1040	Remarks from MoEFCC, India	Mr Wren Mishra, MoEFCC
1040 – 1055	Inaugural Address	Ms Neetu Kumari Prasad, IAS JS (Fisheries), MFAHD
1055 – 1100	Closing Remarks	Dr Nilesh Pawar, DoF, GoI
1100 – 1130	*High tea*	
1130 – 1715	*Session 2: Overview & Identifying Potential EAFM & MMA Sites in India*	
1130 - 1145	EAFM: An Overview & Scope of Work	Dr. E Vivekanandan, BOBP-IGO
1145- 1200	EAFM in India: Case Studies	Dr. K. Sunil Mohamed, Principal Scientist (Retd.), CMFRI
1200 - 1215	Marine Managed Area (MMA) – Overview & Scope of Work	Ms Maeve Nightingale, IUCN
1215 -1230	MMA in India: Progress and Case Studies	Dr. K. Sivakumar, Pondicherry University, Puducherry
1230 – 1300	Interaction	BOBP-IGO/ IUCN/ participants
1300 – 1400	*Lunch*	
1400 – 1520	Presentations on potential EAFM & MMA sites by Site Ambassadors	
1400 - 1410	South Andaman	Dr R. Kirubasankar, ICAR- CIARI
1410 - 1420	Pichavaram Mangrove Ecosystem	Dr A. Gopalakrishnan, CAS (Marine Biology), Annamalai University
1420 - 1430	Pulicat Lagoon	Dr Ramu, MoES-NCCR
1430 - 1440	Coringa Mangrove Ecosystem	Dr US. Panda, MoES-NCCR
1440 - 1450	Gopalpur – Chilika ICZM site	Dr Anjan Kumar Prusty, Berhampur University, Odisha
1450 - 1500	Digha ICZM site	Dr Balakrishnan, ZSI, Digha Centre
1500 - 1520	Interaction	Participants
1520 - 1540	*Idea Cafe & Recharging*	
	(EAFM & MMA Groups to do concurrent Group exercise)	

Date & Time	Agenda Item	Speaker
1540 – 1530	Criteria for Site selection EAFM MMA	Dr E Vivekanandan, BOBP-IGO Ms Maeve Nightingale, IUCN
1600 - 1645	Site selection for EAFM & MMA – Group Exercise	Two separate groups for EAFM and MMA
1645 - 1715	Group Presentation: Finalising Potential Sites for EAFM & MMA	EAFM divided in to 4 Breakout Groups & 1 FGD for MMA
	Deliverable: Potential EAFM & MMA sites shortlisted	

Day 2: 22 March 2024

Date & Time	Agenda Item	Speaker
0930- 0945	Recap of Day 1	Participants
0930 - 1300	*Session 3: Scoping MMA & EAFM Plan Development & Implementation in Selected Sites*	
EAFM & MMA Groups to continue Group exercise		
0945 - 1115	• Identifying & Prioritising Issues and Opportunities – Group Exercise (2 Groups) • Identifying stakeholders	Two separate groups for EAFM and MMA EAFM divided in to 4 Break-out Groups & 1 FGD for MMA
1115 – 1145	*Idea Cafe & Recharging*	
1145 - 1300	• Assessing Capacity Development Needs and Training – Group Exercise (2 Groups) • Identifying Institutions & Individuals for Constitution of Working Groups – Group Exercise (2 Groups) • Presentation of Group Reports	Two separate groups for EAFM and MMA EAFM divided in to 4 Break-out Groups & 1 FGD for MMA
1300 – 1400	*Lunch*	
1400 - 1615	*Session 4: Management of Coastal and Marine Pollution*	
1400 – 1415	Status report on harbour management practices and gear marking in India/ NAP on Marine Pollution	Dr Nilesh Pawar, DoF, GoI
1415 – 1430	Gear loss & Gear Marking in India: Findings from CIFT Studies	Dr Madhu, ICAR-CIFT
1420 – 1445	Improving waste management practices in fishing harbours & fishing gear marking – Scope in BOBLME Project	Mr Rajdeep Mukherjee, BOBP-IGO

Date & Time	Agenda Item	Speaker
1445 - 1545	• Selection of sites (fishing harbours) for assessing waste management practices (WMP) • Establishing synergy between India's NAP and BOBLME - Assessing National Capacity Needs & Constitution of Working Group • Ways to promote good WMP- Scope and Challenges in establishing waste to wealth in Fishing Harbour • Selection of gear types for loss assessment & ways to promote gear marking- Scope and Challenges in Reducing ALDFG and Gear Marking • Identification of supporting organisations and their strengths and opportunities	Four break-out groups
1545 - 1615	*Idea Cafe & Recharging*	
1615 - 1715	Presentation of Group Reports	Four break-out groups
1715 - 1730	Consolidation of 2 days' Workshop Output	IUCN/BOBP-IGO

Day 3: 23 March 2024

Date & Time	Agenda Item	Speaker
0945- 1300	*Session 5: Reducing Catch from IUU Fishing*	
1000 - 1020	National Policies and measures to combat IUU Fishing/ Draft NPOA-IUU	Dr Nilesh Pawar, DoF, GoI
1020 - 1030	IUU Fishing: Scope of BOBLME Project	Mr Rajdeep Mukherjee, BOBP-IGO
1030 – 1115	Dealing with Domestic IUU Fishing: Experience of States & UTs	• Andaman & Nicobar Islands • Andhra Pradesh • Puducherry
1115 – 1130	*Idea Cafe & Recharging*	
1130 - 1230	Parallel Group Discussion on IUU work-plan: Gr. A: Evaluating India's Draft NPOA-IUU Gr. B: Integrating Academic Research into IUU Policy and Practice Gr. C: Centre -State Government Roles and Capacity Building	Five break-out groups. Discussion points for each group are provided

Date & Time	Agenda Item	Speaker
	Gr. D: Regional Collaboration and Capacity Development in the BOBLME	
	Gr. E: Participatory Approaches to IUU Fishing Management	
1230 – 1300	Presentation of Group Reports	
1300 1345	*Session 6: Improved Livelihoods, Building Cooperation*	
1300 - 1315	Livelihoods & Regional Cooperation: Scope under BOBLME	Ms Maeve Nightingale, IUCN
1315 -1330	Livelihood concerns of coastal communities: Status Report	Dr Ahana Lakshmi, BOBP-IGO
1345 1430	*Session 7: Concluding Session*	
	Closing Remarks	Dr Nilesh Pawar, DoF, GoI Mr Wren Mishra, MOEFCC Dr P Krishnan, BOBP-IGO
1430	*Lunch and Parting Café*	

List of Participants

No.	Name	Designation	Organization
Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India			
1	Ms Neetu Kumari Prasad	IAS, Joint Secretary (Marine Fisheries)	Department of Fisheries, GoI, New Delhi
2	Dr Nilesh Anil Pawar	Deputy Director (Aquatic Quarantine)	Department of Fisheries, GoI, New Delhi
3	Dr Prithvi Rani	Research Officer	Department of Fisheries, GoI, New Delhi
4	Dr P Sankara Rao	Director	Coastal Aquaculture Authority of India, Chennai
5	Mr S Ramesh Kumar	Officer	Coastal Aquaculture Authority of India, Chennai
6	Mr M. Jayachandran	Faculty	Central Institute of Fisheries Nautical Engineering & Training, Kochi
7	Mr R. John Peter	Scientist	Fishery Survey of India, Chennai
8	Dr Yosuva Mariasingarayan	Scientist	Fishery Survey of India, Chennai
Ministry of Environment, Forests and Climate Change, Govt. of India			
9	Mr Wren Mishra	Deputy Secretary	MoEFCC, GoI, New Delhi
10	Mr P. Raghavan	Scientist B	MoEFCC, New Delhi
State Governments			
11	Mr Dipti Kumar Mohapatra	Deputy Director of Fisheries	Odisha
12	Mr K. Deivasigamani	Joint Director of Fisheries	Department of Fisheries and Fisherman Welfare Fishing Harbour Complex, Puducherry
13	Ms T. Sumalatha	Assistant Director of Fisheries	Kakinada, Andhra Pradesh
14	Ms Selvi Glory	Green Fellow	Department of Environment and Climate Change, Chennai
Research Institutions and Universities			
15	Dr A. Gopalakrishnan	Associate Professor, CAS in Marine Biology	Annamalai University, Tamil Nadu

No.	Name	Designation	Organization
16	Dr S. Bragadeeswaran	Associate Professor, CAS in Marine Biology	Annamalai University, Tamil Nadu
17	Dr S. Kumaresan	Associate Professor, CAS in Marine Biology	Annamalai University, Tamil Nadu
18	Dr B. Anjan Kumar Prusty	Associate Professor & Head, Dept. of Environmental Science	Berhampur University, Odisha
19	Dr K. Madhavi	Associate Professor	Department of Aquatic Environment Management, College of Fishery Science, Andhra Pradesh
20	Dr N. Jesintha	Faculty	College of Fishery Science, Andhra Pradesh
21	Dr S. Sabu	Director & Associate Professor	Cochin University of Science & Technology, Kochi
22	Dr Kiruba Shankar	Senior Scientist	ICAR-CIARI, Port Blair
23	Dr M. Jayanthi	Principal Scientist	ICAR-CIBA, Chennai
24	Dr Abuthagir Iburahim	Scientist, Fisheries Resource, Harvest & Post Harvest Division	ICAR-CIFE, Mumbai
25	Dr Amiya Kumar Sahoo	Senior Scientist	ICAR-CIFRI, Barrackpore
26	Dr Dibakar Bhakta	Senior Scientist	ICAR-CIFRI, Barrackpore
27	Dr V. R. Madhu	Principal Scientist	ICAR-CIFT, Kochi
28	Dr Manju Lekshmi N	Senior Scientist	ICAR-CIFT, Kochi
29	Dr Shoba Joe Kizhakudan	Principal Scientist & Head, Finfish Fisheries Division	ICAR-CMFRI, Kochi
30	Dr A. P. Dineshbabu	Principal Scientist & Head Shellfish Fisheries Division	ICAR-CMFRI, Kochi
31	Dr K. Vinod	Principal Scientist & Head	Mandapam Regional Station, ICAR-CMFRI, Mandapam, Tamil Nadu
32	Dr Loveson Edward	Senior Scientist	Regional Centre of ICAR-CMFRI, Visakhapatnam
33	Dr Anand Kumar	Assistant Professor	School of Management Studies, Nalanda University, Bihar
34	Dr Amali Infantina J	Scientist	National Centre for Sustainable Coastal Management (MoEFCC), Chennai

No.	Name	Designation	Organization
35	Dr Asir Ramesh	Scientist	National Centre for Sustainable Coastal Management (MoEFCC), Chennai
36	Dr Priya P	Scientist	National Centre for Sustainable Coastal Management (MoEFCC), Chennai
37	Dr Tune Usha	Scientist G	National Centre for Coastal Research, Chennai
38	Dr Uma Shankar Panda	Scientist	National Centre for Coastal Research, Chennai
39	Dr K Ramu	Scientist	National Centre for Coastal Research, Chennai
40	Prof K. Sivakumar	Professor	Department of Ecology and Environmental Sciences, Pondicherry University, Puducherry
41	Dr P. M. Mohan	Professor	Department of Ocean Studies & Marine Biology (A & N Campus), Pondicherry University
42	Dr C. Sudhan	Assistant Professor	Tamil Nadu Dr Jayalalitha Fisheries University, Chennai
43	Ms S. Aruna	Assistant Professor	Tamil Nadu Dr Jayalalitha Fisheries University, Chennai
44	Dr Raman Kumar Trivedi	Professor	West Bengal University of Animal & Fisheries Science, West Bengal
45	Dr Rajkumar	Scientist	Zoological Survey of India, Chennai
46	Dr Bineesh	Scientist	Zoological Survey of India, Chennai
47	Dr S. Balakrishnan	Scientist E	Zoological Survey of India, Digha, West Bengal
NGOs and Other Organizations			
48	Mr Arjili Dasu	General Secretary	District Fishermen's Youth Welfare Association, Visakhapatnam

No.	Name	Designation	Organization
49	Mr Aaron Lobo	Conservationist	Wildlife Conservation Society (WCS), New Delhi/Goa
50	Dr Arun Padiyar P	WorldFish Lead-India	Odisha
51	Dr Avadhoot Velankar	Scientist	Wildlife Conservation Society (WCS), New Delhi
52	Mr C. M. Muralidharan	Regional Coordinator	Indonesian Sea LME, Jakarta/Chennai
53	Mr Jeremiah Pandian	Founder	PLANT, Chennai
54	Mr K. Kalaivendhan	Member	ATREE Foundation, Bangalore
55	Dr Murugan	Scientist	M S Swaminathan Research Foundation, Chennai
56	Ms Madhuri Mondal	Senior Programme Officer	Dakshin Foundation, Bangalore
57	Dr R. T. John Suresh	Founder & Executive Director	PLANT, Chennai
58	Dr Ramachandra Bhatta	Ex-Emeritus Scientist	NCSCM, Mangalore
59	Dr Sivaja Nair	Scientist	RISE-UP, New Delhi
60	Dr Sourabh Kumar Dubey	Project Coordinator	World Fish, Odisha
61	Dr Sunil Mohamad	Chair	Sustainable Seafood Network of India, Kochi
62	Mr Sebastian Mathew	Executive Director	ICSF, Chennai
63	Mr V. Venkatesan	Expert	FAO/BOBP, Retired Director, MPEDA, Chennai
64	Mr Venkatesh Salagrama	Former FAO/ODA/BOBP Consultant	Kakinada
65	Mr Vincent Jain	Executive Member	South Indian Federation of Fishermen Societies, Thiruvananthapuram
Organizers			
66	Ms Archana Chatterjee	Project Manager	IUCN, New Delhi
67	Mr Yash Veer Bhatnagar	Country Representative	IUCN, New Delhi
68	Mr Mohammad Kalid Sayeed Pasha	Coordinator Regional Protected and Conserved Areas, Science and Strategy Group	IUCN, Bangkok
69	Ms Maeve Nightingale	Senior Programme Officer, Marine and Coastal	IUCN Asia Regional Office, Bangkok

No.	Name	Designation	Organization
70	Ms Yumi SON	Coordinator, Regional coordinating unit (RCU)	IUCN, Bangkok
71	Dr P Krishnan	Director	BOBP-IGO, Chennai
72	Dr E Vivekanandan	International Consultant	BOBLME, BOBP-IGO, Chennai
73	Mr Rajdeep Mukherjee	Policy Analyst	BOBP-IGO, Chennai
74	Dr Ahana Lakshmi	Consultant	BOBP-IGO, Chennai
75	Ms V Cheryl	Sr. Secretary	BOBP-IGO, Chennai
76	Mr V Sreenivasan	Administrative Officer	BOBP-IGO, Chennai
77	Dr S. Jayaraj	Publications Officer	BOBP-IGO, Chennai
78	Mr M Krishna Mohan	Secretary	BOBP-IGO, Chennai
79	Ms Sakshi Venkateswaran	Intern	BOBP-IGO, Chennai
80	Ms Shweta Biswas	Intern	BOBP-IGO, Chennai
81	Ms Shruthi	Intern	BOBP-IGO, Chennai
82	Ms Dhivya	Intern	BOBP-IGO, Chennai

A Brief report of the Pre-Workshop Meeting

India, being a country with a long coastline, varied geographical features, biological and anthropogenic characteristics as well as governance diversities, it is a challenge to select a limited number of the right candidate sites for EAFM and MMA for the BOBLME Project. To ensure that by identifying a broad list of potential sites the National Consultation Workshop would be focused, the BOBLME Project Team conducted an on-line pre-Workshop preparatory meeting on 17 & 19 March 2024 with "Site Ambassadors" identified for the purpose. The Site Ambassadors were requested to make presentations on the prospective EAFM/MMA sites based on the following criteria:

o   Characteristics of the site/ecosystem
o   Geographical area/extent
o   Uniqueness (in terms of biodiversity/critical habitat/ETP species/biological productivity),
o   Fisheries (major species, craft/gear/unique fisheries)
o   Dependent human population (number of villages/sources of livelihood)
o   Governance structure (sanctuary/MPA/biosphere/Ramsar site/stakeholder participation/informal co-management arrangements)

In the two-day preparatory meeting, presentations on the following prospective sites were made by the Site Ambassadors:

1. **South Andaman**: Dr Kiruba Shankar, Senior Scientist, ICAR-Central Island Agricultural Research Institute, Port Blair
2. **Pichavaram Mangrove Ecosystem**: Dr A Gopalakrishnan, Associate Professor, Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai, Tamil Nadu
3. **Pulicat Lagoon**: Dr K. Ramu, National Centre for Coastal Research, Chennai
4. **Coringa Sanctuary**: Dr U S Panda, National Centre for Coastal Research, Chennai
5. **Gopalpur-Chilika ICZM Site**: Dr A K Prusty, Associate Professor, Berhampur University, Berhampur, Odisha
6. **Digha ICZM Site**: Dr K R Abhilash, National Centre for Sustainable Coastal Management, Chennai.

The preparatory meeting was attended by fisheries and environmental experts, and the BOBLME Project Team of BOBP-IGO and IUCN. The presentations were followed by active discussions. At the end of the two-day meeting, it was decided to incorporate the suggestions of the experts and take forward the six sites for discussion and prioritisation in the National Consultative Workshop.

Annexure IV
Participants in the group discussions

	EAFM Group		
1.	Dr. Nilesh Anil Pawar	21.	Dr. A. Gopalakrishnan
2.	Mr. K. Deivasigamani	22.	Dr. S. Kumaresan
3.	Ms. T. Sumalatha	23.	Dr. S. Sabu
4.	Mr. Dipti Kumar Mohapatra	24.	Dr. N. Jesintha
5.	Dr. Shoba Joe Kizhhakudan	25.	Dr. B. Anjan Kumar Prusty
6.	Dr. A. P. Dineshbabu	26.	Dr. Anand Kumar
7.	Dr. Loveson Edward	27.	Mr. Arjili Dasu
8.	Dr. V. R. Madhu	28.	Dr. Ramachandra Bhatta
9.	Dr.Manju Lekshmi N	29.	Dr. Sunil Mohammed
10.	Dr. Abuthagir Iburahim	30.	Mr. Vincent Jain
11.	Dr. Amiya Kumar Sahoo	31.	Mr. C. M. Muralidharan
12.	Dr. Dibakar Bhakta	32.	Dr. V. Venkatesan
13.	Dr. Kiruba Sankar	33.	Dr. Sourabh Kumar Dubey
14.	Dr. Sankara Rao	34.	Mr. Venkatesh Salagrama
15.	Dr. Yosuva Mariasingarayan	35.	Dr. P. Krishnan
16.	Dr. Rajkumar	36.	Dr. E. Vivekanandan
17.	Dr. Amali Infantina J	37.	Dr. Ahana Lakshmi
18.	Dr. K. Ramu	38.	Dr. Sri Hari M
19.	Dr. Jayachandran	39.	Ms. Divya
20.	Ms. S. Aruna	40.	Ms. Shweta Biswas
	MMA Group		
1.	Mr. Wren Mishra	19.	Dr. Arun Padiyar P
2.	Mr. P. Raghavan	20	Dr. Murugan
3.	Dr. Prithvi Rani	21.	Mr. Sebastian Mathew
4.	Ms. Selvi Glory	22.	Dr. Bineesh
5.	Dr. K. Vinod	23.	Ms. Shivaja
6.	Dr. M. Jayanthi	24.	Mr. K Kalaivendhan
7.	Mr. R. John Peter	25.	Ms. Madhuri Mondal
8.	Dr. S. Balakrishnan	26.	Mr. Jeremiah Pandian
9.	Dr. Uma Sankar Panda	27.	Dr. Aaron Savio Lobo
10.	Dr. Asir Ramesh	28.	Dr. R T John Suresh
11.	Dr. Priya P	29.	Dr. Avadhoot Velankar
12.	Dr. C. Sudhan	30.	Mr. Bhatnagar Yash Veer
13.	Dr. S. Bragadeeswaran	31.	Mr. Mohammad Kalid Sayeed Pasha
14.	Dr. S. Saravana Kumar	32.	Ms. Yumi SON
15.	Dr. K. Madhavi	33.	Ms. Maeve Nightingale
16.	Dr. Raman Kumar Trivedi	34.	Mr. Rajdeep Mukherjee
17.	Prof. K. Sivakumar	35.	Ms. Sruthi
18.	Dr. P. M. Mohan	36.	Ms. Sakshi Venkateswaran

EAFM Groups for FMU Selection

Group 1 - Coringa

1. Mr. Venkatesh Salagrama
2. Dr. Loveson Edward
3. Ms. T. Sumalatha
4. Mr. Arjili Dasu
5. Dr. Dibakar Bhakta
6. Dr. Anand Kumar
7. Dr. Sabu
8. Mr. C. M. Muralidharan
9. Dr. Ahana Lakshmi

Group 2 - Pichavaram

1. Dr. Shoba Joe Kizhakudan
2. Dr. A. Gopalakrishnan
3. Dr. S. Kumaresan
4. Dr. Abuthagir Iburahim
5. Dr. Manju Lekshmi N
6. Dr. Sourabh Kumar Dubey
7. Mr. K. Deviasigamani
8. Dr. Sunil Mohammed
9. Ms. Shweta Biswas

Group 3 - Pulicat

1. Dr. K. Ramu
2. Ms. S. Aruna
3. Dr. N. Jesintha
4. Dr. Amali Infantina J
5. Dr. Nilesh Anil Pawar
6. Dr. Rajkumar
7. Dr. Ramachandra Bhatta
8. Dr. Sankara Rao
9. Ms. Divya

Group 4 - South Andaman

1. Dr. Rajkumar
2. Dr. Kiruba Sankar
3. Dr. K. Gopal
4. Dr. Amiya Kumar Sahoo
5. Dr. Dipti Kumar Mohapatra
6. Dr. V Venkatesan
7. Dr. V.R. Madhu
8. Dr. A.P. Dineshbabu
9. Dr. Yosuva Mariasingarayan
10. Dr. Sivaja

Group Activity: Management of Coastal and Marine Pollution

	Group 1: Identifying sites for assessing waste management practices
1.	Mr. Wren Mishra
2.	Mr. P. Raghavan
3.	Dr. V. Venkatesan
4.	Dr. Prithvi Rani
5.	Mr. K. Deivasigamani
6.	Dr. Anand Kumar
7.	Dr. C. Sudhan
8.	Dr. S. Balakrishnan
9.	Dr. Dibakar Bhakta
10.	Dr. A.P. Dineshbabu
11.	Dr. P. M. Mohan
12.	Dr. Sivaja
13.	Ms. Selvi Glory
14.	Ms. Sakshi Venkateswaran

	Group 2: Establishing synergy between India's NAP and BOBLME - Assessing National Capacity Needs & Constitution of Working Group
1.	Dr. Nilesh Anil Pawar
2.	Mr. C. M. Muralidharan
3.	Dr. Sourabh Kumar Dubey
4.	Mr. Dipti Kumar Mohapatra
5.	Ms. T. Sumalatha
6.	Dr. K. Madhavi
7.	Dr. Uma Sankar Panda
8.	Dr. Raman Kumar Trivedi
9.	Dr. Ahana Lakshmi
10.	Dr. K. Gopal
11.	Mr. Rajdeep Mukherjee
12.	Dr. Yosuva Marisingarayan

	Group 3: Promoting good waste management practices
1.	Dr. K. Vinod
2.	Dr. Manju Lekshmi N
3.	Dr. Amiya Kumar Sahoo
4.	Mr. Mohammad Kalid Sayeed Pasha
5.	Mr. R. John Peter
6.	Dr. Sabu
7.	Dr. B Anjan Kumar Prusty
8.	Dr. Priya P
9.	Mr. Jeremiah Pandian
10.	Dr. Rajkumar
11.	Dr. S. Saravana Kumar
12.	Dr. S. Kumaresan
13.	Dr. S. Bragadeeswaran

Group 4: Selection of gear types for loss assessment & Ways to promote gear marking- Scope and Challenges in Reducing ALDFG and Gear Marking	
1.	Dr. V.R. Madhu
2.	Prof. K. Sivakumar
3.	Dr. Shoba Joe Kizhakudan
4.	Dr. Loveson Edward
5.	Dr. Kiruba Sankar
6.	Dr. Abuthagir Iburahim
7.	Dr. K. Ramu
8.	Dr. M. Jayanthi
9.	Dr. Bineesh
10.	Dr. Sankara Rao
11.	Dr. A. Gopalakrishnan
12.	Ms. Divya

Group 5: Identification of supporting organisations and their strengths and opportunities	
1.	Mr. Sebastian Mathew
2.	Dr. Ramachandra Bhatta
3.	Dr. Sunil Mohammed
4.	Mr. Vincent Jain
5.	Mr. Bhatnagar Yash Veer
6.	Dr. Aaron Savio Lobo
7.	Ms. Madhuri Mondal
8.	Dr. Arun Padiyar P
9.	Mr. Arjili Dasu
10.	Mr. K Kalaivendhan
11.	Dr. R T John Suresh
12.	Mr. Venkatesh Salagrama
13.	Dr. Murugan
14.	Ms. Sruthi

Group Activity: Management of IUU Fishing

	Group A: Measures for Strengthening India's Draft NPOA-IUU from a participatory perspective		
1.	Dr. Nilesh Anil Pawar	12.	Dr. Yosuva Mariasingarayan
2.	Mr. C.M Muralidharan	13.	Mr. Jeremiah Pandian
3.	Dr. Sourabh Kumar Dubey	14.	Dr. Rajkumar
4.	Mr. Dipti Kumar Mohapatra	15.	Dr. S. Saravana Kumar
5.	Ms. T. Sumalatha	16.	Mr. Wren Mishra
6.	Dr. K. Madhavi	17.	Dr. Dibakar Bhakta
7.	Dr. Uma Sankar Panda	18.	Dr. P.M Mohan
8.	Dr. Raman Kumar Trivedi	19.	Ms. Maeve Nightingale
9.	Dr. Ahana Lakshmi	20.	Mr. Venkatesh Salagrama
10.	Dr. K. Gopal	21.	Ms. Sakshi Venkateswaran
11.	Mr. Rajdeep Mukherjee		

	Group B: Integrating Academic Research into IUU Policy and Practice		
1.	Dr. V.R. Madhu	14.	Mr. Mohammad Kalid Sayeed Pasha
2.	Prof. K. Sivakumar	15.	Dr. R John Peter
3.	Dr. Shoba Joe Kizhakudan	16.	Dr. Sabu
4.	Dr. Loveson Edward	17.	Dr. B. Anjan Kumar Prusty
5.	Dr. Kiruba Sankar	18.	Dr. Priya P
6.	Dr. Abuthagir Iburahim	19.	Dr. Anand Kumar
7.	Dr. M. Jayanthi	20.	Dr. C. Sudhan
8.	Dr. Bineesh	21.	Dr. A.P. Dineshbabu
9.	Dr. Sankara Rao	22.	Ms. Shivaja
10.	Dr. A. Gopalakrishnan	23.	Dr. P Krishnan
11.	Dr. K. Vinod	24.	Dr. E Vivekanandan
12.	Dr. Manju Lekshmi N	25.	Ms. Yumi SON
13.	Dr. Amiya Kumar Sahoo	26.	Ms. Shweta Biswas

	Group C: Role of Central and State Governments and Capacity Building Needs		
1.	Mr. Sebastian Mathew	13.	Dr. S. Kumaresan
2.	Dr. Ramachandra Bhatta	14.	Dr. S. Bragadeeswaran
3.	Dr. Sunil Mohammed	15.	Dr. Jayachandran
4.	Mr. Vincent Jain	16.	Dr. P. Raghavan
5.	Mr. Bhatnagar Yash Veer	17.	Dr. Prithvi Rani
6.	Dr. Aaron Savio Lobo	18.	Mr. K. Deivasigamani
7.	Ms. Madhuri Mondal	19.	Ms. Selvi Glory
8.	Dr. Arun Padiyar P	20.	Ms. Archana Chatterjee
9.	Mr. Arjili Dasu	21.	Dr. N Jesintha
10.	Mr. K. Kalaivendhan	22.	Ms. Dhivya
11.	Dr. R. T. John Suresh	23.	Ms. Sruthi
12.	Dr. Murugan		

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.