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Report of the National Workshop on
**Fisheries Management
Inventory (FMInv) - India**

28 – 30 July 2025





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Report on Planning and Implementing Ecosystem Approach to Fisheries Management in India

Capacity Development Course

11 – 14 November 2025

Hotel Raj Park, Chennai



BOBP

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

91, Saint Mary's Road, Abiramapuram, Chennai - 600 018. INDIA

Report Preparation

This report on the “Report on Planning and Implementing Ecosystem Approach to Fisheries Management in India - Capacity Development Course” is prepared by BOBP-IGO.

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Executive Summary

The “Capacity Development Course on Planning and Implementing Ecosystem Approach to Fisheries Management (EAFM) in India” was conducted from 11–14 November 2025 at Hotel Raj Park, Chennai, India. The programme was organized by the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO) under the Bay of Bengal Large Marine Ecosystem (BOBLME) Phase II project, with support from the Food and Agriculture Organization of the United Nations (FAO), the Global Environment Facility (GEF), the Norwegian Agency for Development Cooperation (NORAD), and the Department of Fisheries, Government of India. The course aimed to strengthen the technical and practical capacities of fisheries officials, researchers, academicians, civil society organizations, and practitioners involved in implementing Ecosystem Approach to Fisheries Management (EAFM) in selected Fishery Management Units (FMUs) in India.

The Bay of Bengal Large Marine Ecosystem (BOBLME) project recognizes overexploitation of marine resources, degradation of critical habitats, and pollution as major transboundary concerns affecting fisheries sustainability in the region. In response, the BOBLME Phase II project promotes sustainable management of fisheries, marine living resources, and habitats through ecosystem-based and participatory management approaches. EAFM has been identified as a key component of this initiative, with India selecting five FMUs for piloting EAFM implementation: Fishery in Pichavaram Mangrove Ecosystem, Fishery in Coringa Mangrove Ecosystem, Trawl Fishery in Chennai, Small-Scale Fishery in Puducherry District, and Lobster Fishery in Kanyakumari District.

The Capacity Development Course focused on enhancing participants’ understanding of EAFM principles, strengthening practical skills for scoping and planning, and enabling fisheries practitioners to address ecological, social, economic, and governance issues using an integrated ecosystem approach. The training combined lectures, technical sessions, and extensive group exercises that provided hands-on experience in defining and scoping FMUs, identifying stakeholders and priority issues, establishing co-management arrangements, developing EAFM plans, and monitoring and adapting management measures.

Abbreviation and Acronyms

CDC	Capacity Development Course
CMFRI	Central Marine Fisheries Research Institute
CMS	Convention on the Conservation of Migratory Species of Wild Animals
EAFM	Ecosystem Approach to Fisheries Management
EDIF	Environmental Defense India Foundation
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FMP	Fisheries Management Plan
FMU	Fishery Management Unit
GEF	Global Environment Facility
ICAR	Indian Council of Agricultural Research
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
IWPA	Indian Wildlife (Protection) Act
MFRA	Marine Fishing Regulation Act
MLS	Minimum Legal Size
MSP	Marine Spatial Planning
MSSRF	M. S. Swaminathan Research Foundation
PPC	Pichavaram Panchayat Committee
PRI	Panchayati Raj Institution
SAP	Strategic Action Programme
SEAFDEC	Southeast Asian Fisheries Development Center
SSNI	Sustainable Seafood Network of India
TEDs	Turtle Excluder Devices
TDA	Transboundary Diagnostic Analysis
TNFDC	Tamil Nadu Fisheries Development Corporation
VMS	Vessel Monitoring System

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1. Background

Bay of Bengal Large Marine Ecosystem (BOBLME) is one of the largest LMEs of the world with an area of about 6.2 million km². About 66 percent of the BOBLME lies within the exclusive economic zones (EEZ) of BOBLME countries - Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, and Thailand. The remainder is the high seas area. The BOBLME is home to rich biodiversity and critical habitats. The natural resources are of considerable social and economic importance to the bordering countries. Fisheries and aquaculture contribute immensely to food security, employment, and trade in the region.

The Transboundary Diagnostic Analysis (TDA) and Strategic Action Programme (SAP) phase of the BOBLME project phase I (2009-2015) identified three priority transboundary concerns and their proximate causes in the region. These include (1) overexploitation of marine living resources, (2) degradation of critical habitats, and (3) pollution and water quality.

In order to address these issues, the countries jointly developed the Strategic Action Programme (SAP), which is being implemented under the BOBLME Phase II project titled, “Sustainable management of fisheries, marine living resources and their habitats in the Bay of Bengal region for the benefit of coastal states and communities” (2023-2028). The project is funded by the Global Environment Facility (GEF) and the Norwegian Agency for Development Cooperation (NORAD). It is implemented by the Food and Agriculture Organization of the UN (FAO). The International Union for Conservation of Nature (IUCN), Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO, for its member-countries, namely, Bangladesh, India, Sri Lanka and Maldives), and Southeast Asia Fisheries Development Center (SEAFDEC, for countries part of BOBLME project and members of SEAFDEC) are the executing agencies of the project.

The project 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. Implementing Ecosystem Approach to Fisheries Management (EAFM) is one of the key sub-components of the project. BOBP-IGO will implement the project in its member countries viz., Bangladesh, India, Maldives and Sri Lanka. National execution partners include Ministries of Fisheries and Agriculture, Ministries of Environment, and other national agencies of the participating countries.

The expected outcome of implementing EAFM in the member countries is that by the end of the project period, EAFM will be institutionalized at national level, including targeted transboundary fish stocks.

2. Ecosystem Approach to Fisheries Management (EAFM)

The need to apply an Ecosystem Approach to Fisheries Management (EAFM) is now globally accepted and has been endorsed in several international fora. Introduction of EAFM, as a holistic concept and alternative way to manage fisheries started after the Rio +20 conference in 2012 and several countries have adopted the concept for their national fisheries management. While support for EAFM has been in place through a range of global declarations and policy instruments, progress in the implementation of an EAFM at national and regional levels has been slow, partly due to the practitioners lacking the relevant skills and experience to apply such an integrated and holistic approach.

For implementing EAFM in India,

- (i) Fishery in Pichavaram Mangrove Ecosystem,
- (ii) Fishery in Coringa Mangrove Ecosystem,
- (iii) Trawl Fishery in Chennai,
- (iv) Small-Scale Fishery in Puducherry District, and
- (v) Lobster Fishery in Kanyakumari District

were identified as the Fishery Management Units (FMUs) by experts in a national workshop conducted by the BOBP-IGO (BOBP-IGO, 2025. Prospectus: Capacity Development Course on Ecosystem Approach to Fisheries Management in India

These FMUs were selected for piloting the development and implementation of EAFM under the BOBLME Phase II project, with additional support from partners including FAO, the Government of Puducherry, and the Environmental Defense India Foundation.

While the Fishery in Pichavaram Mangrove Ecosystem and the Fishery in Coringa Mangrove Ecosystem will be directly implemented under the project, the Trawl Fishery in Chennai will be developed with support from the FAO. Similarly, EAFM planning for the Fishery in Puducherry District is being progressed with support from the UT Administration of Puducherry, and the Lobster Fishery in Kanyakumari District will be implemented with assistance from the Environmental Defense India Foundation (EDIF)

With the overall objective of promoting EAFM in India, the BOBP-IGO will conduct a Capacity Development Course (CDC) to strengthen technical skills among fisheries officials, scientists, researchers, civil society representatives, and practitioners who will be involved in preparing and implementing EAFM plans for the selected FMUs. The CDC will serve as a practical, hands-on training programme to enable participants to develop scoping reports, prepare EAFM Plans, and facilitate ecosystem-based fisheries governance in the identified management units

3. EAFM Capacity Development Course (CDC)

3.1 Objectives and Approach to the CDC

To plan and implement EAFM in the five FMUs, the BOBP-IGO conducted a Capacity Development Course (CDC) to the prospective practitioners of EAFM in India.

The broad objectives of the CDC on EAFM were:

- To enhance understanding of EAFM;
- To develop practical skills of fisheries practitioners to implement EAFM in Fishery in Pichavaram Mangrove Ecosystem, Fishery in Coringa Mangrove Ecosystem, Trawl Fishery in Chennai, Small-Scale Fishery in Puducherry District, and Lobster Fishery in Kanyakumari District.
- To enhance understanding of multidimensional issues and find effective solutions to address them by following an expanded ecosystem approach.

The Course was strategically placed as a refresher and skill development course to elevate the practitioners who have basic familiarity with the governance issues to engage in effective consultation with experts and other stakeholders with scientific insights and novel thinking.

The course content and materials were developed from BOBLME Phase I EAFM training resources, but the focus was shifted towards requirements of the specific FMUs. The Course provided hands-on experience in developing EAFM plan. The course comprised lectures by resource persons and a large part of the program was devoted to group exercise. The training course was conducted by the BOBP-IGO from 11.11.2025 to 14.11.2025 at Hotel Raj Park, Chennai (04 days). The Agenda of the CDC is placed in Annex 1.

The target group was participants from the DoF of Tamil Nadu, Puducherry and Andhra Pradesh, academicians from Annamalai University, NGOs such as Dakshin Foundation and the M. S. Swaminathan Research Foundation (MSSRF), and researchers and Scientist from CMFRI, who will be involved in EAFM scoping and plan preparation in the five selected FMUs. To finalise the target group, a request was sent to the organisations prior to the CDC to nominate officials who participated in the Scoping Consultations on Pichavaram Mangrove Ecosystem, Coringa Mangrove Ecosystem, Trawl Fishery in Chennai, Small-Scale Fishery in Puducherry District, and Lobster Fishery in Kanyakumari District., respectively, as it was expected that they will be involved in the preparation of scoping report and EAFM plan in the five FMUs in the BOBLME project. The final list of 23 participants is placed in Annex 2. The rapid assessment on day 1 revealed a very broad spectrum of experience ranging from five people with more than 15 years' experience at one end, to 3 people with one year experience at the other.

The CDC was conducted in English.

3.2 Review of the Course

The opening address and the context of EAFM training was made by **Dr. P. Krishnan**, Director BOBP-IGO. **Dr. E. Vivekanandan**, International Consultant, BOBLME, BOBP-IGO gave a brief background of BOBLME project. The guest of honour address was delivered by Dr. Antony Xavier, General Manager, TNFDC, Government of Tamil Nadu, followed by the inaugural address delivered by Prof. T. Balasubramanian, Advisor and Former Vice Chancellor, Chettinad Health City, Chennai.

The course was delivered entirely by three trainers: **Dr. E. Vivekanandan**, International Consultant, BOBLME, BOBP-IGO, **Dr. K. Sunil Mohamed**, Former Principal Scientist, Central Marine Fisheries Research Institute, Kochi, India and supported by **Dr. T Velumani**, Project Scientist, BOBP-IGO and **Dr. Anisha Shafni**, Research Associate, BOBP-IGO. At the end of each day, the training team of 4 members had a feedback session and detailed planning of the following day.

The Course consisted eight Modules:

Module 1. Overview of EAFM

Module 2. Define & Scope the Fishery Management Unit (FMU)

Module 3. Identify & prioritise stakeholders

Module 4. Identify & prioritise Issues and goals

Module 5. Establishing co-management arrangement

Module 6. Develop EAFM plan

Module 7. Implement the plan

Module 8. Monitor, evaluate and adapt

On Day 4, sessions were held on Theory of Change, Capacity Development Need Assessment, Quiz and Course Evaluation.

The course ran seamlessly and at a good pace throughout. The participants actively participated in the entire Course. About half of the time of the Course was allotted to group exercises that generated lot of interest, and were found to promote better understanding, active involvement and real-world application. The participants had hands-on experience of preparing EAFM model plans for the five fisheries, and more importantly, got an insight into the procedure for preparing the plan.

The presentations by resource persons, results of group activities by the participants and images of the event are placed in Google Drive:

https://drive.google.com/drive/folders/1F8yWU8kjhBPRHlplEGf_6iAH6i0ZtJZ-?usp=drive_link

Guidance materials such as EAFM Handbook and Template for scoping survey prepared by the BOBP-IGO are also placed in the Google Drive. In addition, relevant reference materials can be found in the Google Drive.

The Course concluded with feedback from the participants, next steps to be taken up, and closing remarks by **Dr. P. Krishnan**, Director, BOBP-IGO.

3.3 Performance in the Quiz and Course Evaluation and Feedback

At the end, the participants evaluated the Course by answering a questionnaire on their learning experience, course design and course delivery. Post-course evaluation and feedback shows that participants rate the administration of the course as good.

3.4 Administrative and Logistics Support

DoF of Tamil Nadu, Puducherry and Andhra Pradesh, academicians from Annamalai University, Dakshin Foundation, MSSRF and CMFRI provided administrative support by nominating the right participants for all the events. Logistics support was also provided by BOBP-IGO in arranging hotels, transport and meeting halls for the event in Chennai.

3.5 Outcomes from the CDC

The CDC resulted in a number of key outcomes and lessons learnt, that are pivotal to implementing EAFM in the five FMUs in India.

Outcome 1. Emergence of more capable and effective practitioners of EAFM

As the main focus of the CDC was on developing practical skills, the trainees developed skill for scoping, stakeholder engagements, developing EAFM planning, implementation, and assessment of capacity development initiatives in the five specific FMUs. The trainees can potentially serve as Trainers in future capacity development courses.

Outcome 2. Relevance of the Course to the participants

Many participants in the CDC were the right target audience, as they will be directly involved in the preparation of Scoping Report, EAFM Plan and Implementation. The audience was a mix of middle-level officials and researchers and their younger colleagues, with the prospect of providing the required experience as well as field-level data collection and interaction with the stakeholders. The participants learnt a lot personally, and will be able to apply the learning in implementing EAFM in the five FMUs. As adult learners, they could understand the relevance of the course to the task and to ensure motivation and sustained involvement.

Outcome 3. Platform to connect of the trainers, trainees and the project team to the FMUs

BOBP and FAO team visited the fishery of Pichavaram Mangrove Ecosystem, whereas BOBP team visited the Coringa Mangrove Ecosystem conducted field visits, stakeholder consultations and meetings along with the team that will be engaged with the project to implement EAFM. These

field campaigns have facilitated proper understand of the characteristics of the selected FMUs, issues, potential management actions, and prospects of stakeholder engagement. The CDC served as a platform to connect the trainers, trainees and the project team involved with the above mentioned FMUS and the rest FMUs.

Outcome 4. The training team defined the success of the Course

Trainers are responsible for not only delivery of content, but also the whole planning and organisation of delivery on a daily basis. The training team consisted members Dr. E. Vivekanandan (India), Dr. Sunil Mohamed (India) who have conducted many EAFM trainings in multiple countries in the past in the region. The training team worked together closely and planned meticulously beforehand everyday (content, delivery as well as logistics of each session). The team adapted to the requirements of the trainees, considering the characteristics of the five FMUs. Their experience, supported by Dr. T. Velumani and Dr. Anisha Shafni (India) enabled good delivery style, approach and preparation, and success of the course.

Outcome 5. Aligning the course agenda, presentation materials and group activities to the specific needs

Aligning the training course agenda with requirements ensures that the training effectively addresses the needs of the project and its implementers. For the CDC, the course content, delivery methods, communication with examples were prepared considering the course objectives in the specific FMUs. The agenda and contents developed in the CDC can serve as a model for similar CDCs to be conducted in other countries in the BOBLME project.

Programme Agenda



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AGENDA

Time	Agenda	Resource
11.11.2025 (Tuesday)		
1000 - 1030	Registration	
1030 - 1115	Inauguration	
1030 - 1035	Welcome	
1035 - 1045	Participants Introduction	
1045 - 1100	BOBLME Project & Course Overview	
1100 - 1115	Special Address	
1115 - 1130	Group Photo & Tea Break	
1130 - 1300	Module 1. EAFM Overview <ul style="list-style-type: none"> - Fisheries Management & Ecosystem Approach - WHY EAFM? - Principles and Steps - How much EAFM you are already doing? 	
1300 - 1400	Lunch	
1400 - 1700	Module 2. Define & Scope the Fishery Management Unit (FMU) <ul style="list-style-type: none"> - Start Up A. Preparing Ground - Start Up B. Engaging Stakeholders - Defining the FMU - Scoping the FMU - Preparation of Scoping Report 	
12.11.2025 (Wednesday)		
0930 - 1130	Module 3. Identify & Prioritise Issues and Goals <ul style="list-style-type: none"> - Identify FMU-Specific Issues - Prioritize Issues 	

Time	Agenda	Resource
	- Define Vision & Goals	
1130 - 1145	Tea Break	
1145 - 1300	Module 4. Identify & Prioritise Stakeholders <ul style="list-style-type: none"> - Stakeholders Categories - Prioritise Stakeholders - Role of Stakeholders 	
1300 - 1400	Lunch	
1400 - 1700	Module 5. Establishing Co-management Arrangement <ul style="list-style-type: none"> - Understanding & Fostering Participatory Management - Advancing Towards Gender Equality - Case Study on Co-Management 	
1515 - 1615	<ul style="list-style-type: none"> - Discuss Challenges and Opportunities for Fostering Co-management in Fisheries - Develop Plans for engaging Fishing Communities 	
1530 - 1545	Tea Break	
1615 - 1700	Facilitation Skills Conflict Management	
13.11.2025 (Thursday)		
0930 - 1300	Module 6. Develop EAFM Plan <ul style="list-style-type: none"> - Develop Management Objectives - Develop management Actions - Develop Indicators and Benchmarks - Include Finance Mechanism - Formalize the plan 	
1300 - 1400	Lunch	
1400 - 1530	Module 7. Implement the Plan <ul style="list-style-type: none"> - Prepare Implementation Plan - Communicate and Engage - Align to EAFM Principles 	
1530 - 1545	Tea Break	
1545 - 1700	Module 8. Monitor, Evaluate and Adapt <ul style="list-style-type: none"> - Monitor and Evaluate performance - Review and Adapt the Plan 	
14.11.2025 (Friday)		
0930 - 1130	EAFM Plan Presentation by groups	
1130 - 1145	Tea Break	
1145 - 1300	Discussion <ul style="list-style-type: none"> - Government Measures and Schemes That can be Applied to Implement EAFM in the Project - Co-Financing Opportunities 	

Time	Agenda	Resource
	- Training / Capacity Development Requirements	
1300 - 1400	Lunch	
1400 - 1430	EAFM Scaling-Up Opportunities	
1430 - 1500	Course Evaluation	
1500 - 1530	Course Certification and Closure	
1530 - 1600	Tea & Close	

List of Participants



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Participants List

S.No	Fishery	Participant	Phone / Mail ID
1.	Pichavaram Mangrove Fishery	Dr. A. Gopalakrishnan, Assistant Professor, Centre of Advanced Study in Marine Biology, Annamalai University, Parangipettai – 608 502.	Tel: +91 9443537538 Email: aquagopal@gmail.com
2.		Ms. P. Ramyalakshmi, Assistant Director of Fisheries, Department of Fisheries, Parangipettai – 608 502.	Tel: +91 93848 24252
3.		Dr. G. Suthagar, Scientist, Fish for All Research and Training Centre, MS Swaminathan Research Foundation, Mayiladuthurai – 609 105.	Tel: +91 96296 26975 Email: sutha1994@mssrf.res.in
4.		Ms. R. Hema, Project Associate, Fish for All Research and Training Centre, MS Swaminathan Research Foundation, Mayiladuthurai – 609 105.	Tel: +91 9952693226 Email: hembafsc@mssrf.res.in
5.	Coringa Mangrove Fishery	Dr. H. M. Manas, Senior Scientist, ICAR- Central Marine Fisheries Research Institute (CMFRI), Visakhapatnam – 530 003.	Tel: +91 8912543793 Email: Manas.HM@icar.gov.in
6.		Dr. G. Gopi, Fisheries Development Officer, Department of Fisheries, Kakinada – 533 463.	Tel: +91 9491859072 Email: gopi27nov@gmail.com
7.		Mr. Arjilli Dasu, Executive Secretary, District Fishermen's Youth Welfare Association (DFYWA),	Tel: +91 7013568744 Email: arjillidasu@gmail.com

S.No	Fishery	Participant	Phone / Mail ID
		Visakhapatnam – 530 026.	
8.		Ms. B. Prathibha, Fisheries Development Officer, Commissioner of Fisheries, Vijayawada -521 137.	Tel: +91 7337273374 Email: bathinaprathibha013@gmail.com
9.	Kanyakumari Lobster Fishery	Dr. K. R. Veera Venthan, Scientist, ICAR- Central Marine Fisheries Research Institute (CMFRI), Thoothukudi – 628 001.	Tel: +91 8220740777 Email: vinothanars16@gmail.com
10.		Ms. M. Kavitha, Scientist, ICAR- Central Marine Fisheries Research Institute (CMFRI), Thoothukudi – 628 001.	Tel: +91 8012889990 Email: kavifish@gmail.com
11.		Ms. Ayiswarya S Varghese, Senior Programme Assistant, Head office, Dakshin Foundation, Bengaluru – 560 092.	Tel: +91 94959 64143 Email: ayiswarya@dakshin.org
12.		Mr. N. Ramamoorthy, Sub Inspector of Fisheries, Office of Assistant Director of Fisheries, Chinna Muttam, Kanyakumari – 629 702.	Tel: +91 89034 33919
13.		Trawl Fishery in Chennai	Smt. P. Gomathi, Scientist, ICAR- Central Marine Fisheries Research Institute (CMFRI), Chennai – 600 028.
14.	Dr. S. Gomathy, ACTO, ICAR- Central Marine Fisheries Research Institute (CMFRI), Chennai – 600 028.		Email: gomathycmfri@gmail.com
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16.	Ms. R. Kalaiarasi Inspector of Fisheries, Office of the Assistant Director of Fisheries (FHMW), Chennai – 600 028.		Tel: +91 9080002106
17.	Mr. N. Kanniyappan, Fishermen Leader, Rayapuram – 600 013.		Tel: +91 97899 98386

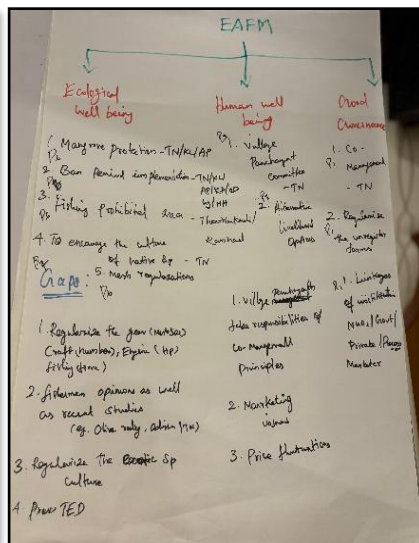
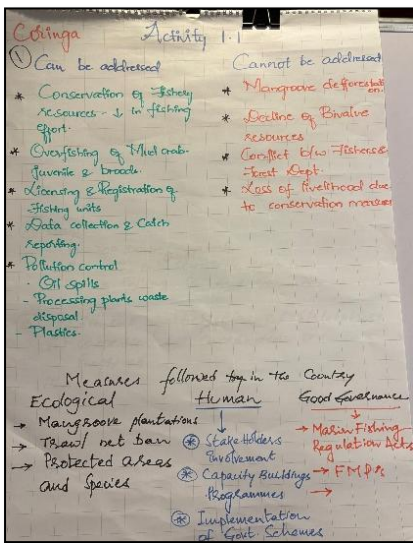
S.No	Fishery	Participant	Phone / Mail ID
18.		Mr. T. Thennarasu, Fishermen Leader, Rayapuram – 600 013.	Tel: +91 96001 60069
19.		Mr. Arul Antony Muthu, Community Intern, Dakshin Foundation Field Station, Ramanathapuram – 623 501.	Tel: +91 97157 22346 Email: arulantony61@gmail.com
20.	Small-scale Fishery in Puducherry (Motorized and Non-Motorized)	Mr. A. Balamurali, Sub Inspector of Fisheries, Department of Fisheries, Puducherry – 605 001.	Tel: +91 9443875737 Email: abalamurali13@gmail.com
21.		Mr. A. Antoniraj, Sub Inspector of Fisheries, Department of Fisheries, Puducherry – 605 001.	Tel: +91 9894758036 Email: antonirajsify@gmail.com
22.		Mr. Thamizhazhagan, Development Associate, Fish for All Research and Training Centre, MS Swaminathan Research Foundation, Mayiladuthurai – 609 105.	Tel: +91 98430 42930 Email: thamizhazhagan@mssrf.res.in
23.		Ms. A. Shwetha Tony, Associate Scientist, Fish for All Research and Training Centre, MS Swaminathan Research Foundation, Mayiladuthurai – 609 105.	Tel: +91 7010117642 Email: shwethatony@mssrf.res.in
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25.		Dr. E. Vivekanandan, Senior Scientific Consultant, Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), Chennai – 600 018.	Tel: +91 9444238648 Email: evivekanandan@hotmail.com
26.		Dr. K. Sunil Mohamed, Chair, Sustainable Seafood Network of India (SSNI), Kochi – 682 018.	Tel: +91 9444238648 Email: ksmohamed@gmail.com
	Rapporteur Team	Dr. T. Velumani, Project Scientist, and Dr. Anisha Shafni Jhon, Research Associate from BOBP-IGO	

Module 1: EAFM Overview

Activity 1.1 EAFM Overview

- Discuss the issues that can be and cannot be addressed by the existing fisheries management.
- Discuss the measures followed in the country under the three components of EAFM.

I. Coringa Mangrove Ecosystem



Issues Addressed by Existing Management

- Conservation of fishery resources through regulation of fishing effort, mesh-size control, and seasonal closures.
- Overfishing and mixed catches addressed through licensing, vessel registration, and

technical measures.

- Protection of juveniles and broodstock through minimum legal size (MLS) and gear restrictions.
- Registration and licensing of fishing vessels and fishers, which provide the basis for regulating fishing capacity.
- Strengthening statistics, catch reporting mechanisms, and monitoring systems.
- Addressing pollution through waste management rules, effluent control in processing units, and monitoring of water quality.
- Response systems for oil spills coordinated through existing disaster management and environmental agencies.
- Regulation of solid waste disposal, including measures to reduce plastic leakage from fishing and processing activities.

These issues can be managed through existing legal frameworks, departmental mandates, enforcement systems, and monitoring structures, although the degree of implementation varies across regions.

Issues Beyond the Scope of Existing Management

- Mangrove deforestation, which falls under broader coastal zone management and forestry/environmental governance.

- Decline of bivalve resources linked to habitat degradation, pollution, and watershed-level interventions beyond fisheries control.
- Conflicts between fishers and fisheries departments, which require institutional reform, grievance mechanisms, and improved governance rather than regulatory measures alone.
- Loss of livelihood due to conservation measures, which necessitates social protection, livelihood diversification, and welfare programmes beyond the regulatory ambit of fisheries departments.

These areas demand cross-sectoral coordination, broader environmental management, institutional reforms, and socio-economic policy support, as reflected throughout the workshop discussions and national frameworks.

Measures Followed in the Country Under the Three Components of EAFM

A. Ecological Measures

- Mangrove plantation and habitat restoration, supporting nursery grounds and coastal resilience.
- Ban on destructive gear and trawl-net restrictions, aligned with ecological conservation objectives.
- Creation of protected areas and species conservation zones, including no-fishing zones and seasonal closures.
- These measures safeguard ecosystems, maintain biodiversity, and improve stock recovery.

B. Human (Social and Economic) Measures

- Stakeholder engagement and community participation through co-management platforms, village-level institutions, and fisher associations.
- Safety-at-sea initiatives, awareness programmes, and training for fishers.
- Capacity-building and livelihood support programmes implemented under various state and national schemes.
- Implementation of welfare schemes that provide financial assistance, insurance, and relief during fishing bans.
- These initiatives strengthen livelihoods, improve compliance, and enhance community ownership of management measures.

C. Good Governance Measures

- Marine Fishing Regulation Acts (MFRA) and related rules that guide licensing, zoning, and fishing restrictions.
- Registration and licensing frameworks that regulate fishing capacity and access.
- Development and implementation of Fisheries Management Plans (FMPs) based on scientific guidance and stakeholder participation.

- These frameworks ensure clarity in roles, strengthen enforcement capacity, and align national actions with broader ecosystem-based management principles.

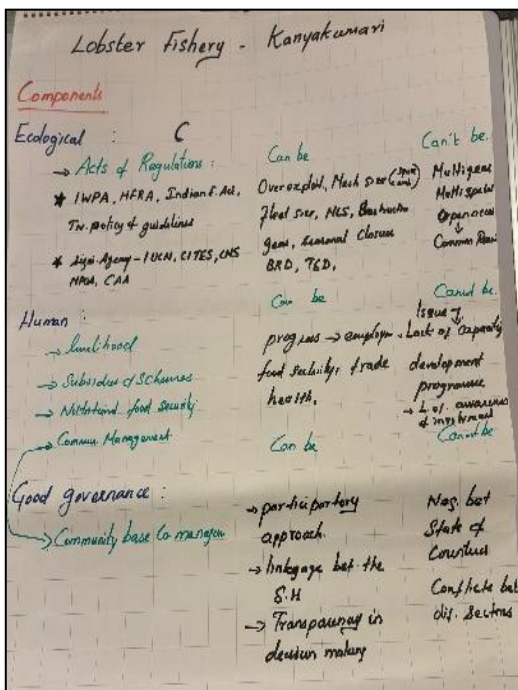
II. Lobster Fishery in Kanyakumari

Issues That Can Be Addressed by Existing Fisheries Management

- Overfishing resulting from excessive effort.
- Mixed-operation fishing practices that require zoning or gear regulation.
- Use of illegal gears, including non-compliant mesh sizes.
- Violations of Minimum Legal Size (MLS) requirements.
- Implementation and enforcement of seasonal closures.
- Stock enhancement programmes undertaken through scientific and departmental initiatives.
- Ban on destructive gears such as bottom trawls or other prohibited gear types.

These issues fall within the purview of fisheries management, supported by established Acts, Rules, and field-level monitoring mechanisms.

Issues That Cannot Be Addressed by Existing Fisheries Management



- Broader natural resource depletion linked to catchment-level ecological change.
- Environmental changes such as habitat degradation, pollution, and siltation.
- Climate-driven impacts, including extreme weather and shifting species distribution.
- Fluctuations in market demand and price volatility.
- Addressing these issues requires multi-sectoral efforts involving environment, climate, agriculture, disaster management, and market/institutional sectors.
- Issues That Could Be Addressed with Additional Support
- Promotion and development of entrepreneurial activities among fishers.
- Facilitating market linkages and value-chain strengthening.

- Introducing and supporting alternative livelihood opportunities.

Addressing gaps in insurance, social security, and welfare coverage.

These issues can be effectively managed only when fisheries management is integrated with coastal development, livelihood programmes, and social protection systems.

Measures Followed in the Country Under the Three EAFM Components

A. Ecological Measures

- Implementation of fisheries-related Acts and Regulations (e.g., MFRA and associated Rules).
- Provisions under the Indian Wildlife (Protection) Act (IWPA).
- Species- and habitat-specific guidelines, including turtle bycatch mitigation measures.
- International conservation commitments and conventions that inform national measures, including:
- IUCN Red List, CITES, CMS, IWC, among others.

These measures collectively support habitat conservation, sustainable fishing effort regulation, and protection of threatened species.

B. Human (Social/Economic) Measures

- Livelihood development initiatives supporting income diversification.
- Stakeholder consultations that facilitate participatory decision-making.
- Nutrition and food security interventions benefiting coastal communities.
- Capacity development and training programmes for fishers and officials.
- Support for climate adaptation and management initiatives.

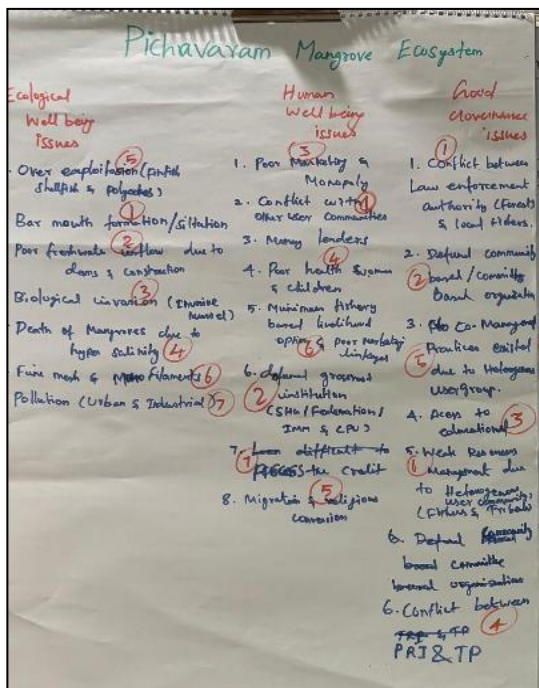
These measures strengthen fisher well-being while improving compliance and participation in management.

C. Good Governance Measures

- Community-based and co-management arrangements that promote shared responsibility.
- Participatory approaches involving fishers, managers, researchers, and civil society.
- Integration and coordination between departments and agencies involved in fisheries, environment, and coastal management.
- Transparent decision-making processes that improve trust and accountability.
- Clear communication channels between stakeholders to support timely implementation of measures.

These governance measures create the enabling environment required for effective, inclusive, and adaptive EAFM implementation.

III. Pichavaram mangrove Ecosystem



1. Ecological Well-Being Issues

- Over-exploitation of fishery resources
- Poor waste management, including plastic accumulation and pollution
- Poor water quality due to effluents and urban discharge
- Degradation of mangroves through cutting and land conversion
- Pollution from urban and industrial sources
- Decline of biodiversity across trophic groups
- Climate change impacts on hydrology, salinity, and ecosystem resilience

These issues collectively affect the productivity, ecological stability, and long-term sustainability of

the mangrove system.

2. Human Well-Being Issues

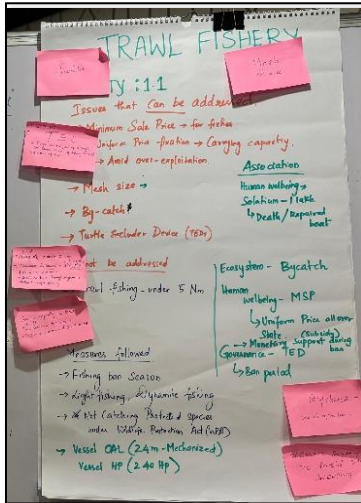
- Poor marketing systems and limited price realization
- Conflicts among stakeholders (e.g., fishers–forest department; women–men divisions)
- Poor health and sanitation conditions
- Malnutrition among vulnerable groups
- Limited livelihood options and economic insecurity
- Lack of education and skill development opportunities
- Infrastructure deficits in coastal and village areas
- Migration for income due to livelihood instability
- Lack of access to credit and financial inclusion

3. Good Governance Issues

- Governance challenges arise from institutional overlaps, weak coordination, and limited stakeholder engagement. The major issues include:
- Conflict between departments (law enforcement, fisheries, forest, revenue)
- Lack of monitoring and coordination mechanisms
- Weak institutional structures for management and decision-making
- Conflict between PRIs and TP (local governance bodies)
- Lack of stakeholder consultation in planning and implementation
- Poor compliance and weak enforcement of regulations
- Lack of community participation in management processes

These governance gaps hinder effective implementation of conservation and management measures within the mangrove ecosystem.

IV. Small-Scale Fishery in Puducherry (Motorized and Non-Motorized)



Issues That Can Be Addressed

Minimum sale price for fish is identified as an issue relevant to trawl fisheries. Overfishing is noted as a concern due to increased fishing capacity and higher engine power of vessels. Mesh size is highlighted as an issue influencing the capture of small and juvenile fish. Bycatch is identified as a recurring issue associated with trawl operations. The use of Turtle Excluder Devices (TEDs) is mentioned in relation to bycatch mitigation. Fishing operations within five nautical miles are also identified as an issue under trawl fisheries.

Measures Followed

Seasonal fishing ban periods are implemented for trawl fisheries. Day fishing practices and limitations on fishing trips are followed. Mesh size regulations and minimum legal-size provisions are applied. The use of Turtle Excluder Devices (TEDs) is prescribed. Vessel Monitoring Systems (VMS) are used for monitoring fishing activities. Trawl vessels are categorised based on size and capacity, including mechanised vessels up to 24 metres and vessels with engine capacity up to 24 HP.

Issues Not Adequately Addressed

- Certain issues related to trawl fisheries are indicated as not being fully addressed. These include effective control of bycatch, consistent use of Turtle Excluder Devices (TEDs), and fishing activities within restricted nearshore zones.
- Ecosystem-Level Concerns
- Bycatch is identified as an ecosystem-level concern in trawl fisheries. Broader ecosystem impacts associated with trawling are recognised. Marine Spatial Planning (MSP) is noted in relation to managing ecosystem-level interactions.
- Habitat and Environmental Linkages
- Mangroves, seagrass, and coral reef ecosystems are identified as linked to trawl fisheries. Water pollution and solid waste are noted as environmental factors connected to trawl fishing activities.
- Governance and Planning
- Marine Spatial Planning (MSP) is noted as a planning approach relevant to trawl fisheries. Governance measures include licensing, registration, and regulation of fishing operations. Fishing ban periods are part of the governance framework applied to trawl fisheries.

V. Trawl Fishery in Chennai

Ecological Well-being

- Overfishing is identified as a major ecological concern affecting fish stocks.
- Bycatch and the capture of juveniles are noted as issues impacting stock sustainability.
- Biodiversity loss and decline in fish stocks are highlighted as key ecological problems.
- Pollution, including coastal and industrial pollution, is identified as affecting marine ecosystems.
- Climate change and natural climate variability are recognised as factors influencing ecological conditions.

Human Well-being

- Unprofitable fishing is identified as a challenge affecting fishers' livelihoods.
- Exploitation by middlemen is noted as a concern within the fisheries value chain.
- Loss of income is highlighted, particularly during fishing bans and cyclone events.
- Closed fishing days are identified as having an impact on daily earnings and household stability.
- High interest rates on informal loans are noted as a financial burden for fishers.
- Sanitation is identified as an issue affecting overall human well-being in fishing communities.



Good Governance

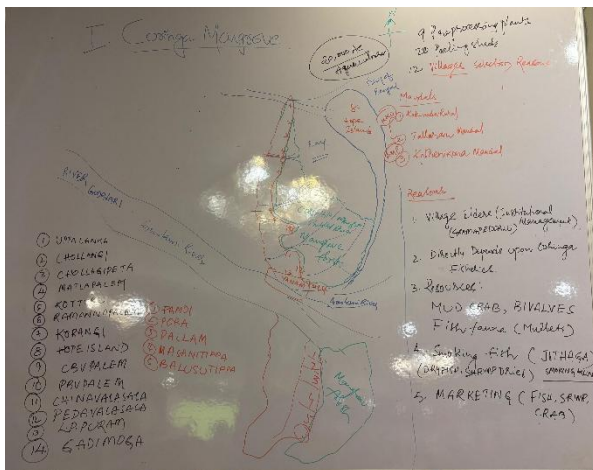
- Weak resource management is identified as a governance-related concern.
- Lack of fishery planning and inadequate fishing regulations are noted as challenges.
- Conflicts between fishing communities and fisheries authorities are identified as governance issues.
- Lack of cold storage facilities and limited fish handling infrastructure, including fish landing sheds, are noted.
- Slow access to low-interest loans from formal banking systems is identified as a governance constraint.

Annexure 4. Module 2: Define and Scope Fishery Management Unit (FMU)

Activity 2.1: Steps of EAFM

- Create a map of ecosystem, supporting your fishery.
- In your group, select and demarcate the exact FMU that will be suitable for EAFM planning and implementation in the fisheries.
- Make presentation by giving reasons for the selection of FMU.

Coringa Mangrove Ecosystem

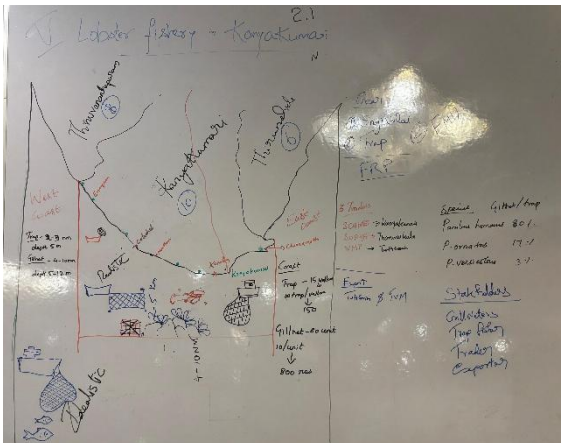


A participatory ecosystem mapping exercise was conducted to identify and define the Fishery Management Unit (FMU) suitable for Ecosystem Approach to Fisheries Management (EAFM) planning and implementation. The group prepared a detailed sketch map of the ecosystem supporting the fishery, highlighting key ecological, social, and fishery-related features within the coastal and estuarine environment. The map included important fishing villages, river mouths, estuarine channels, mangrove and mudflat areas, fishing grounds, fish landing centres, navigation routes, and associated habitats supporting fisheries resources.

During the exercise, the group selected and demarcated the FMU boundary based on ecological connectivity, fishing activities, resource use patterns, and administrative practicality. The selected FMU covered the estuarine and nearshore fishing areas influenced by mangrove ecosystems and associated coastal habitats. Key fishing communities and landing centres identified within the FMU included Umarikadu, Kollakudi, Ottapidaram, Muttom, Kottaipattinam, and surrounding coastal settlements. The ecosystem map also identified important fisheries resources such as finfish, crabs, mussels, and bivalves, along with critical habitats including mangrove patches, nursery grounds, and breeding areas.

The group provided justification for the selection of the FMU by explaining that the identified area represents a biologically connected ecosystem where fishery resources, habitats, and fishing communities are interdependent. The FMU was considered suitable for EAFM implementation because it integrates ecological boundaries with socio-economic dependence on fisheries, includes shared fishing grounds and resource users, and allows for practical management interventions. Major issues and management concerns identified within the FMU included habitat degradation, sedimentation, fishing pressure, resource conflicts, and market-related challenges. The exercise also highlighted the importance of community participation, ecosystem conservation, and coordinated management measures to ensure sustainable fisheries and livelihood security within the selected FMU.

Lobster Fishery in Kanyakumari



As part of the Ecosystem Approach to Fisheries Management (EAFM) exercise, the group developed an ecosystem map to understand the fisheries resources, habitats, and human activities supporting the lobster fishery in the Kanyakumari region. The map illustrates the coastal ecosystem, fishing grounds, nearby villages, habitat features, and fishing activities associated with the lobster fishery. Key ecological and geographical features such as the Arabian Sea, Thengapattinam area, fishing routes, landing

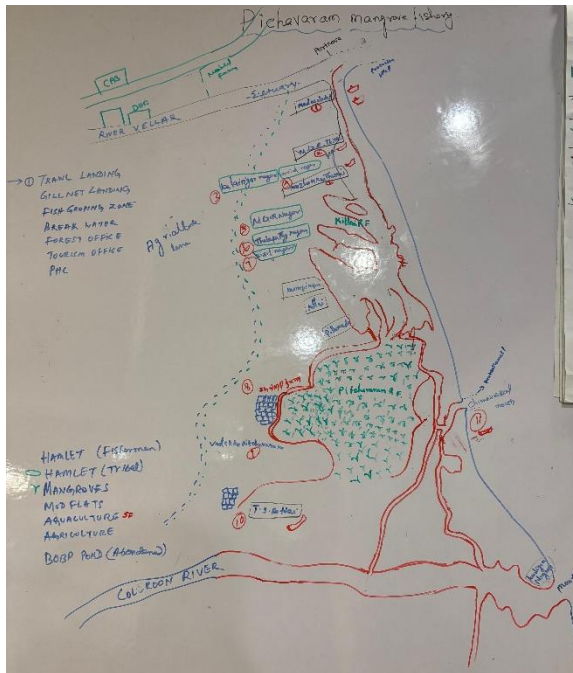
locations, reef and rocky habitats, and fishing operation zones were identified and marked in the map. The ecosystem map also highlighted important fishing infrastructure, including fish landing points, auction areas, and fishing vessel operation zones.

During the group exercise, the participants selected and demarcated the Fishery Management Unit (FMU) suitable for EAFM planning and implementation. The selected FMU focused on the lobster fishing grounds and associated coastal ecosystem surrounding Kanyakumari and nearby fishing villages. The FMU boundary was identified based on the extent of lobster fishing activities, ecological connectivity of the fishing grounds, and dependence of local fishing communities on lobster resources. Important ecosystem components such as coral and rocky reef habitats, breeding and nursery grounds, fishing areas, and coastal current patterns were considered while defining the FMU.

The presentation by the group explained the reasons for selecting this FMU for EAFM implementation. The participants highlighted that the lobster fishery is economically important for the local fishing communities and supports livelihoods through fishing, marketing, and export activities. The FMU was considered suitable because the fishery operates within a clearly identifiable coastal ecosystem with shared fishing grounds and common resource users. The map also identified several management concerns affecting the fishery, including seasonal variations, habitat degradation, fishing pressure, and the need for improved regulation of lobster harvesting practices.

The group further emphasized that implementing EAFM within the selected FMU would help promote sustainable lobster fisheries management through habitat conservation, stakeholder participation, monitoring of fishing activities, and ecosystem-based decision-making. The exercise demonstrated the importance of integrating ecological, social, and economic factors while defining the FMU to ensure long-term sustainability of the lobster fishery and the livelihoods dependent on it.

Pichavaram mangrove Ecosystem



As part of the Ecosystem Approach to Fisheries Management (EAFM) exercise, the group prepared an ecosystem map of the Pichavaram mangrove fishery system to understand the ecological features, fishing activities, and socio-economic dependence of local communities on fisheries resources. The map illustrates the interconnected coastal and estuarine ecosystem surrounding the Pichavaram mangrove area, including major ecological and administrative features such as the Vellar River, Coleroon River, mangrove forests, aquaculture ponds, boat routes, fishing hamlets, and coastal villages. Important supporting institutions and infrastructure such as the Forest Office, Tourism Office, Pichavaram Panchayat Committee (PPC), check dams, and road connectivity were

also identified within the ecosystem map.

During the group activity, the participants selected and demarcated the Fishery Management Unit (FMU) suitable for EAFM planning and implementation. The selected FMU primarily covered the Pichavaram mangrove ecosystem and the surrounding estuarine and backwater fishing areas connected to the Vellar and Coleroon river systems. The FMU boundary was drawn considering ecological connectivity, fishing activities, and the dependence of local fishing communities on mangrove-associated fisheries resources. Several fishing hamlets and villages located within and around the mangrove ecosystem were identified and marked as key stakeholders dependent on fisheries and associated livelihood activities.

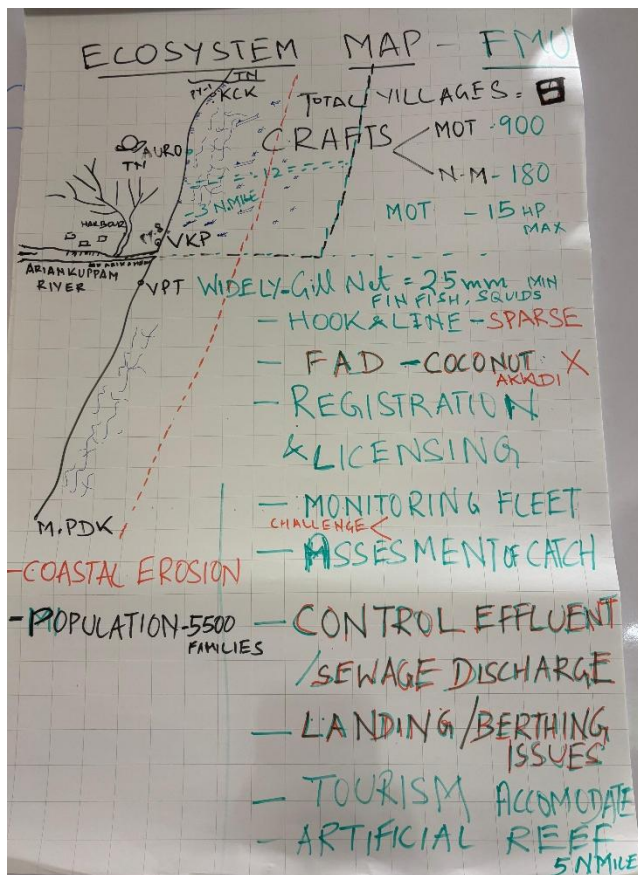
The map also identified critical ecosystem components supporting the fishery, including mangrove habitats, nursery and breeding grounds, estuarine channels, aquaculture areas, shrimp collection zones, and fish landing locations. Fishing activities carried out in the FMU include capture fisheries, crab collection, shrimp fishing, and small-scale estuarine fishing practices. The ecosystem map further highlighted the role of mangroves in supporting biodiversity conservation, coastal protection, fish breeding, and livelihood security for local communities.

The group presentation explained the reasons for selecting this FMU for EAFM implementation. The participants highlighted that the Pichavaram mangrove ecosystem represents a highly interconnected ecological and socio-economic system where fisheries resources, habitats, and fishing communities are closely linked. The FMU was considered suitable because the mangrove ecosystem functions as an important nursery and feeding ground for several commercially important fish and shellfish species, while also supporting traditional fishing livelihoods. Additionally, the area faces several management concerns such as habitat degradation, pressure

from aquaculture activities, resource-use conflicts, environmental changes, and increasing dependency on mangrove resources.

The group emphasized that implementing EAFM within the selected FMU would help strengthen ecosystem conservation, sustainable fisheries management, stakeholder participation, habitat restoration, and community-based management practices. The exercise demonstrated the importance of integrating ecological boundaries, livelihood dependence, and governance considerations while defining the FMU to ensure long-term sustainability of fisheries resources and mangrove ecosystems in the Pichavaram region.

Small-Scale Fishery in Puducherry (Motorized and Non-Motorized)



As part of the Ecosystem Approach to Fisheries Management (EAFM) exercise, the group prepared an ecosystem map to understand the fisheries resources, ecological features, fishing activities, and management challenges within the selected coastal Fishery Management Unit (FMU). The map illustrates the coastal ecosystem extending along the shoreline and adjacent marine fishing grounds, covering several fishing villages, landing centres, and nearshore fishing areas. Key villages and locations identified in the map include Ariankuppam, VKP, YPT, Nallavadu, KCK, and nearby coastal settlements connected through the river and marine ecosystem. The map also shows the Ariankuppam River, coastal waters, fishing routes, and marine resource areas supporting the fishery.

During the group activity, the participants selected and demarcated the FMU suitable for EAFM planning and implementation based on ecological connectivity, fishing operations, and the dependence of coastal communities on marine fisheries resources. The selected FMU includes the nearshore coastal waters and associated fishing villages where marine capture fisheries are the primary livelihood activity. The FMU was defined considering shared fishing grounds, fishing craft operations, fish landing and berthing areas, and common resource-use patterns among the fishing communities.

The ecosystem map also documented important fishery characteristics within the FMU. The group identified that the area supports approximately eight fishing villages with a population of around 5,500 families. The fishery is mainly supported by motorized crafts, with nearly 900 motorized vessels and 180 non-motorized crafts operating within the fishing grounds. The major fishing methods identified include gill nets with a minimum mesh size of 25 mm targeting finfish

and squids, while hook-and-line fishing was observed to be relatively sparse. The map further noted the presence of fish aggregating devices (FADs), though their use was identified as a concern in certain areas.

The group presentation highlighted several management and governance issues affecting the FMU. These included the need for improved registration and licensing systems, monitoring of fishing fleets, proper assessment of fish catches, and better regulation of fishing activities. Environmental concerns such as coastal erosion, control of effluent and sewage discharge, and habitat degradation were identified as key challenges affecting fisheries sustainability. Infrastructure-related issues including landing and berthing difficulties were also highlighted by the participants. In addition, the group recognized tourism development and the establishment of artificial reefs approximately five nautical miles offshore as important considerations for future fisheries and ecosystem management.

The participants explained that this FMU was selected for EAFM implementation because it represents a clearly connected ecological and socio-economic system where fisheries resources, fishing communities, habitats, and coastal activities are closely interlinked. The area was considered highly suitable for EAFM because the fishery supports a large coastal population, involves multiple stakeholders, and faces several ecosystem and management challenges that require integrated and participatory management approaches. The exercise demonstrated the importance of combining ecological mapping, fisheries information, and stakeholder knowledge to define an effective FMU for sustainable fisheries management and long-term ecosystem conservation.

Trawl Fishery in Chennai



As part of the Ecosystem Approach to Fisheries Management (EAFM) exercise, the group developed an ecosystem map to identify and understand the geographical scope, ecological connectivity, and fisheries management considerations of the selected Fishery Management Unit (FMU). The map illustrates the southeastern coastal region of India extending from Machilipatnam in Andhra Pradesh to Puducherry along the Tamil Nadu coast. Important coastal locations such as Machilipatnam, Krishnapatnam, Ennore, Chennai, and Puducherry were marked to represent major fishing and coastal activity zones within the ecosystem supporting the fishery.

During the group exercise, participants discussed and demarcated both an “ideal” and a “realistic” FMU boundary for EAFM planning and implementation. The ideal FMU was identified as the coastal stretch extending from Thiruvallur to Puducherry, including Kovalam and surrounding fishing areas. This proposed boundary was considered ecologically and administratively practical because the

selected coastal region shares similar marine ecosystems, fishing practices, fishing fleets, and socio-economic dependence on marine fisheries resources.

The group also identified a broader realistic management region extending from Machilipatnam to Puducherry, recognizing the wider ecological connectivity and movement of fishery resources along the east coast. However, for practical implementation of EAFM, the participants recommended focusing on the smaller and more manageable FMU between Thiruvallur and Puducherry. The selected FMU was considered suitable because it falls largely within a single-state governance framework, making coordination, monitoring, enforcement, and implementation of fisheries management measures easier and more effective.

The presentation highlighted several reasons for selecting this FMU. The participants explained that having a relatively compact and administratively connected management area would support easier governance under state-level control and facilitate effective management of fisheries resources. The FMU was also considered appropriate due to the presence of active fishing communities, fishing harbours, marine fishing grounds, and interconnected coastal ecosystems within the selected region. The map further reflected the importance of integrating fisheries management with ecosystem considerations such as coastal resource use, vessel movement, and marine habitat protection.

The exercise demonstrated how ecosystem mapping and stakeholder discussions can help define an operationally feasible FMU for EAFM implementation. By identifying both ecological linkages and administrative practicality, the group emphasized the importance of selecting a management unit that supports coordinated governance, stakeholder participation, and sustainable fisheries management for the long-term conservation of marine resources and coastal livelihoods.

Module 3: Identify and Prioritize Issues

Activity 3.1: Risk Assessment

Identify issues under the three components.

- Take the issues and plot them on a 2x2 risk matrix and then identify the ones that are high risk.
- Impact vs. likelihood (Hi/hi – Lo/lo)
- Take the Hi/hi risks problems and group them up under the 3 EAFM components.

Coringa Mangrove Ecosystem



The image presents a 2x2 risk matrix developed as part of the Ecosystem Approach to Fisheries Management (EAFM) process. The matrix was used to identify, assess, and prioritize issues affecting the fishery system under the three EAFM components: ecological/environmental, social, and governance/economic aspects. The issues identified by stakeholders were plotted based on their likelihood of occurrence and level of impact

on the fishery and dependent communities.

The matrix shows that several major risks fall under the Hi/Hi category. These include:

- Fish catch reduction
- Climate change
- Pollution
- Dependency on livelihood
- Deforestation/mangrove degradation
- Reduced freshwater flow
- Weak enforcement of laws

These high-risk issues were then grouped under the three EAFM components as follows:

A. Ecological/Environmental Component

The ecological risks identified as high priority include:

- Fish catch reduction, indicating declining fishery resources and reduced productivity.
- Climate change, which affects coastal ecosystems, fish distribution, and fishing operations.
- Pollution, including waste and environmental contamination affecting aquatic habitats.
- Deforestation and mangrove degradation, leading to habitat destruction and coastal vulnerability.

- Reduced freshwater flow, which alters estuarine and coastal ecosystem balance.

These issues directly affect ecosystem health, biodiversity, and the sustainability of fish stocks.

B. Social Component

The major social issue identified in the Hi/Hi quadrant is:

- Livelihood dependency, showing that coastal communities are highly dependent on fisheries for income and food security.

Additional lower-risk social concerns shown in the matrix include:

- Low literacy rate
- Community-related challenges

These issues influence community resilience, awareness, participation, and adaptive capacity.

C. Governance/Economic Component

The governance and economic risks identified include:

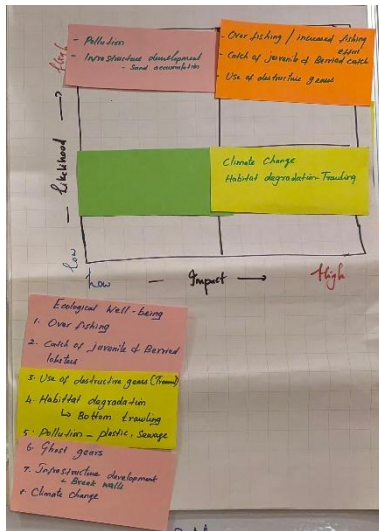
- Weak enforcement of laws, indicating inadequate implementation of fisheries and environmental regulations.
- Income reduction
- Gender inequality
- Political interference
- Inter-departmental issues

These factors affect fisheries governance, institutional coordination, equity, and effective management implementation.

The exercise demonstrates how EAFM uses participatory risk assessment tools to systematically identify and prioritize fishery issues. By focusing on the High Impact–High Likelihood risks, management efforts can be directed toward the most urgent ecological, social, and governance concerns affecting the sustainability of the fishery and the well-being of dependent communities.

Lobster Fishery in Kanyakumari

The image illustrates a 2×2 risk matrix analysis conducted as part of the Ecosystem Approach to Fisheries Management (EAFM) process. The exercise was carried out to identify major issues affecting the fishery system, assess their level of risk, and prioritize them for management action under the three EAFM components: ecological/environmental, social, and governance/economic components.



The identified issues were first listed and categorized. The issues shown in the image include:

- Overfishing
- Catch of juvenile and berried lobsters
- Use of destructive gears (trawling)
- Habitat degradation/trawling
- Pollution – plastics and sewage
- Ghost gears
- Infrastructure development around the area
- Climate change

The matrix shows that the issues falling under the High Impact–High Likelihood (Hi/Hi) category are:

- Overfishing
- Catch of juvenile and berried lobsters
- Use of destructive gears (trawling)

These are placed in the upper-right quadrant of the matrix, indicating that they pose the greatest threat to the sustainability of the fishery and require immediate management attention.

The matrix also identifies several issues under the High Impact–Low/Medium Likelihood category, including:

- Climate change
- Habitat degradation due to trawling

Other issues such as pollution, ghost gears, and infrastructure development are recognized as concerns but are considered relatively lower in risk compared to the Hi/Hi issues.

The high-risk (Hi/Hi) problems were then grouped under the three EAFM components as follows:

A. Ecological/Environmental Component

The major ecological issues identified include:

- Overfishing
- Catch of juvenile and berried lobsters
- Use of destructive gears (trawling)
- Habitat degradation
- Pollution from plastics and sewage
- Ghost gears
- Climate change

These issues directly affect fish stocks, marine habitats, biodiversity, and ecosystem productivity.

B. Social Component

The social concerns associated with the fishery include:

- Dependence of communities on fisheries resources
- Effects of declining fish catch on livelihoods
- Impacts of destructive fishing practices on long-term food security and community well-being

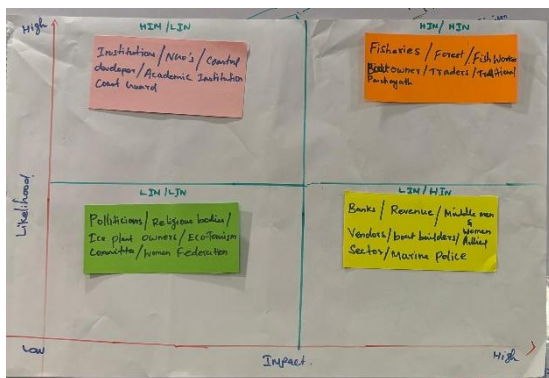
C. Governance/Economic Component

The governance and economic issues identified include:

- Lack of effective regulation and control over overfishing
- Weak monitoring of juvenile and berried lobster catch
- Management challenges related to destructive gears and trawling
- Infrastructure development around the area affecting coastal and fishery resources

The exercise demonstrates how EAFM applies participatory risk assessment methods to prioritize fisheries issues systematically. By focusing on the High Impact–High Likelihood risks, fisheries managers and stakeholders can develop targeted interventions and management measures to improve ecological sustainability, strengthen governance, and protect the livelihoods of fishing communities.

Pichavaram mangrove Ecosystem



The image presents a 2x2 risk matrix analysis carried out under the framework of the Ecosystem Approach to Fisheries Management (EAFM). The purpose of the exercise was to identify the major issues affecting the fishery system, classify them under the three EAFM components, and prioritize them according to their impact and likelihood. This helps stakeholders recognize which issues pose the highest risk and require immediate

management attention.

The issues identified in the exercise include:

- Industrialization
- New developments around the coast
- Canal construction
- Pollution
- Religious tourism
- Ice plants
- Illegal fishing
- Ecosystem connectivity issues

- Human–elephant conflict
- Bank erosion
- Waste management issues
- Vendors and buyers
- Safety concerns
- Marine police
- Fisheries department
- Fish workers
- Boat owners
- Traders
- Fishermen

The matrix shows that the issues placed in the High Impact–High Likelihood (Hi/Hi) quadrant are mainly related to fisheries stakeholders and governance systems, including:

- Fisheries Department
- Fish workers
- Boat owners
- Traders
- Fishermen

These are considered the most critical risks because they strongly influence fishery operations, governance, resource use, and livelihood sustainability.

The High Likelihood–Low Impact (Hi/Lo) quadrant includes:

- Industrialization
- New developments around the coast
- Canal construction

These issues occur frequently but are considered to have comparatively lower direct impact on the fishery system at present.

The Low Impact–High Likelihood (Lo/Hi) quadrant includes:

- Bank erosion
- Waste management issues
- Vendors and buyers
- Safety issues
- Marine police

These are recognized as recurring concerns with moderate influence on fisheries and coastal communities.

The Low Impact–Low Likelihood (Lo/Lo) quadrant contains:

- Pollution

- Religious tourism
- Ice plants
- Illegal fishing
- Ecosystem connectivity concerns
- Human–elephant conflict

These issues are currently considered lower priority compared to the Hi/Hi risks.

The high-risk (Hi/Hi) issues were then grouped under the three EAFM components as follows:

A. Ecological/Environmental Component

The ecological and environmental concerns identified include:

- Pollution
- Ecosystem connectivity issues
- Bank erosion
- Industrialization and coastal development impacts

These affect habitat quality, coastal ecosystems, and long-term resource sustainability.

B. Social Component

The social issues identified include:

- Fish workers and fishermen livelihoods
- Vendors and buyers
- Safety concerns
- Human–elephant conflict
- Religious tourism impacts on local communities

These issues influence community welfare, livelihood security, and social stability within fishing communities.

C. Governance/Economic Component

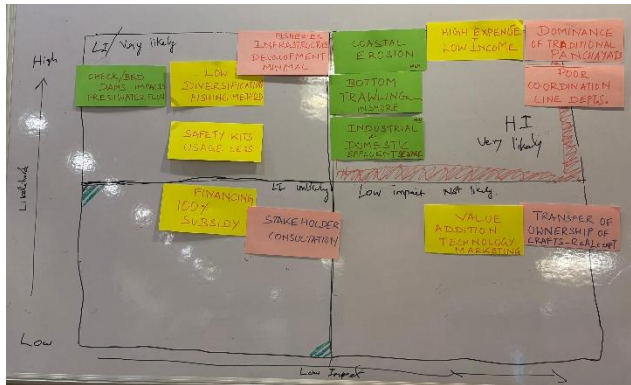
The governance and economic concerns include:

- Fisheries Department
- Boat owners
- Traders
- Marine police
- Illegal fishing
- Waste management
- Canal construction and coastal infrastructure development

These relate to fisheries administration, enforcement, stakeholder coordination, market systems, and resource governance.

The exercise demonstrates how participatory risk assessment tools in EAFM can help stakeholders systematically identify and prioritize fishery-related problems. By focusing on the High Impact–High Likelihood risks, fisheries managers and stakeholders can develop targeted management actions that improve governance, strengthen community resilience, and ensure the sustainable use of fishery resources.

Small-Scale Fishery in Puducherry (Motorized and Non-Motorized)



The image presents a 2x2 risk matrix assessment developed as part of the Ecosystem Approach to Fisheries Management (EAFM) process. The exercise was conducted to identify the major ecological, social, and governance-related issues affecting the fishery and coastal community, assess their level of risk, and prioritize them according to their impact and likelihood. This participatory approach

helps stakeholders identify the most critical issues that require immediate management attention.

The issues identified during the exercise include:

- Cyclone and infrastructure damage
- Invasive development activities
- Coastal erosion
- Bottom trawling
- Industrial dumping and plastic pollution
- High expenses and low income
- Dominance of traditional panchayats
- Coordination line departments
- Safety kits usage
- Financing and government subsidy
- Stakeholder consultation
- Value addition technologies
- Transfer of ownership of crafts

The matrix shows that several issues were categorized under the High Impact–High Likelihood (Hi/Hi) quadrant, indicating that these are the most serious and urgent concerns affecting the fishery system. These high-risk issues include:

- Coastal erosion
- Bottom trawling
- Industrial dumping and plastic pollution
- High expenses and low income
- Dominance of traditional panchayats

- Lack of coordination among line departments

These issues are considered priority risks because they have severe consequences for fisheries resources, coastal ecosystems, governance systems, and the livelihoods of fishing communities.

The High Likelihood–Low Impact (Hi/Lo) quadrant includes:

- Cyclone and infrastructure damage
- Invasive development activities
- Safety kit usage

These are issues that occur frequently but are perceived to have comparatively lower long-term impact.

The Low Likelihood–High Impact (Lo/Hi) quadrant contains:

- Value addition technologies
- Transfer of ownership of crafts

These are less frequent issues but may have significant economic or social implications when they occur.

The Low Impact–Low Likelihood (Lo/Lo) quadrant includes:

- Financing and government subsidy
- Stakeholder consultation

These are currently viewed as lower-priority concerns within the fishery system.

The identified Hi/Hi risks were then grouped under the three EAFM components as follows:

A. Ecological/Environmental Component

The ecological and environmental issues identified include:

- Coastal erosion
- Bottom trawling
- Industrial dumping and plastic pollution
- Cyclone-related impacts

These issues affect marine habitats, fish stocks, coastal stability, biodiversity, and ecosystem productivity.

B. Social Component

The major social issues identified include:

- High expenses and low income among fishing communities
- Safety kit usage and fisher safety concerns

- Impacts of traditional governance systems on community participation and equity

These concerns directly affect the livelihoods, welfare, and resilience of fishing communities.

C. Governance/Economic Component

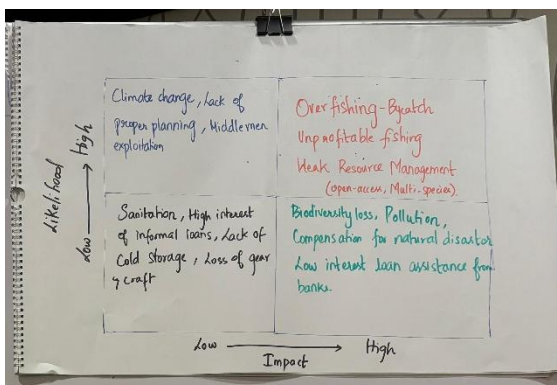
The governance and economic issues identified include:

- Dominance of traditional panchayats
- Lack of coordination among line departments
- Financing and subsidy-related issues
- Stakeholder consultation processes
- Transfer of ownership of crafts
- Adoption of value addition technologies

These issues relate to fisheries administration, institutional coordination, decision-making processes, and economic sustainability.

The exercise demonstrates how EAFM risk assessment tools can be used to systematically prioritize fisheries issues based on their severity and probability of occurrence. By focusing on the High Impact–High Likelihood risks, fisheries managers and stakeholders can develop targeted management measures that support sustainable fisheries, improve governance, strengthen coastal resilience, and enhance the livelihoods of dependent communities.

Trawl Fishery in Chennai



The uploaded image presents a 2x2 risk matrix assessment conducted under the Ecosystem Approach to Fisheries Management (EAFM) framework. The exercise was used to identify and prioritize key issues affecting the fishery system by evaluating them according to their impact and likelihood. The issues were grouped under the three EAFM components: ecological/environmental, social, and governance/economic components.

The issues identified during the exercise include:

- Climate change
- Lack of proper planning
- Middlemen exploitation
- Sanitation problems
- High investment
- Technical issues
- Lack of cold storage
- Loss of gear and craft

- Overfishing
- Bycatch
- Unprofitable fishing
- Weak resource management
- Biodiversity loss
- Pollution
- Compensation for natural disasters
- Low interest loan assistance from banks

The matrix shows that the following issues fall under the High Impact–High Likelihood (Hi/Hi) category:

- Overfishing
- Bycatch
- Unprofitable fishing
- Weak resource management
- Biodiversity loss
- Pollution
- Compensation for natural disasters
- Limited low-interest loan assistance from banks

These issues are considered the most serious because they significantly affect fishery sustainability, ecosystem health, and fisher livelihoods, while also being highly likely to occur.

The High Likelihood–Low Impact (Hi/Lo) quadrant includes:

- Climate change
- Lack of proper planning
- Middlemen exploitation
- These are recurring concerns that influence fisheries and coastal communities but are perceived to have relatively lower direct impact compared to the Hi/Hi risks.
- The Low Likelihood–Low Impact (Lo/Lo) quadrant includes:
- Sanitation problems
- High investment costs
- Technical issues
- Lack of cold storage
- Loss of gear and craft

These are identified as lower-priority concerns in the current risk assessment.

The identified Hi/Hi risks were grouped under the three EAFM components as follows:

A. Ecological/Environmental Component

The major ecological and environmental issues identified include:

- Overfishing

- Bycatch
- Biodiversity loss
- Pollution
- Climate change

These issues directly affect fish stocks, marine biodiversity, habitat quality, and the long-term sustainability of fisheries resources.

B. Social Component

The social issues identified include:

- Unprofitable fishing affecting fisher livelihoods
- Middlemen exploitation
- Compensation challenges during natural disasters
- Sanitation-related concerns
- Loss of fishing gear and craft

These issues influence the well-being, safety, and economic resilience of fishing communities.

C. Governance/Economic Component

The governance and economic issues identified include:

- Weak resource management
- Lack of proper planning
- Lack of low-interest loan assistance from banks
- High investment requirements
- Technical and infrastructure limitations such as lack of cold storage

These concerns affect fisheries governance, institutional support, economic sustainability, and the ability of fishers to adapt and improve their livelihoods.

The exercise demonstrates how EAFM risk assessment tools can help systematically identify and prioritize fisheries-related problems. By focusing on the High Impact–High Likelihood risks, stakeholders and fisheries managers can develop targeted management measures that improve ecosystem sustainability, strengthen governance systems, and enhance the socio-economic conditions of fishing communities.

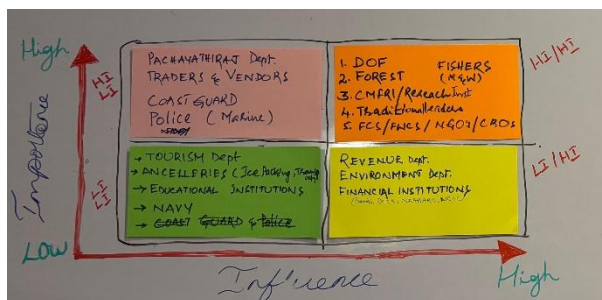
Module 4: Identify and Prioritize Stakeholders;

Activity 3.2: Stakeholder Analysis

In your groups

- List all possible FMU stakeholders.
- Draw a 2x2 matrix with 'importance' on Y axis and 'Influence' on X axis.
- List the stakeholders into one of the 4 boxes.

Coringa Mangrove Ecosystem



The matrix is divided into four quadrants. **The top-right quadrant (High Importance–High Influence)** contains the most critical stakeholders who have both strong authority and major involvement in fisheries governance and management. In the uploaded image, this group includes the Department of Fisheries

(DOF), Forest Department, Coast Guard, traditional/recreational groups, harbour authorities, Fisheries Cooperative Societies (FCS), Fishermen/Fisheries Cooperative Societies (FFS/FMS), NGOs/CBOs, and fishers. These stakeholders are directly involved in management decisions, enforcement, conservation, fisheries operations, and policy implementation. Because of their strong influence and importance, they must be actively engaged in planning, implementation, and monitoring processes.

The top-left quadrant (High Importance–Low Influence) includes stakeholders who are highly dependent on fisheries resources but have comparatively lower decision-making power or influence. In the image, this category includes paraphernalia vendors, transport vendors, Coast Guard police (marine), and related service providers. These stakeholders play a significant supporting role in the fisheries sector and are affected by fisheries policies and management measures, but they may not significantly shape management decisions. Therefore, they should be consulted regularly and supported to increase participation in governance processes.

The bottom-right quadrant (Low Importance–High Influence) represents stakeholders who may not be directly dependent on fisheries resources but still possess significant institutional or administrative influence. In the uploaded matrix, this group includes the Revenue Department, Environment Department, financial institutions, and other administrative agencies. These stakeholders can influence fisheries through regulations, land-use permissions, funding mechanisms, environmental clearances, and policy enforcement. Their cooperation is important for ensuring institutional coordination and policy integration within the FMU.

The bottom-left quadrant (Low Importance–Low Influence) contains stakeholders with relatively limited influence and lower direct involvement in fisheries management. The image identifies tourism departments, ancillary sectors, educational institutions, NGOs, and coastal community groups within this category. Although their current role in fisheries governance may

be limited, they still contribute indirectly through awareness creation, education, tourism activities, and community support. These stakeholders should be kept informed and involved where appropriate to encourage broader ecosystem and community participation.

Lobster Fishery in Kanyakumari



The matrix is divided into four quadrants representing different stakeholder categories. **The top-right quadrant (High Importance–High Influence: HI/HI)** contains stakeholders who are both highly important and highly influential in the FMU. In the uploaded image, this group includes fishers, the Fisheries Department, HPEDA/MPEDA, other associated departments, local leaders, traders, exporters, and community representatives. These stakeholders directly influence fisheries management decisions, trade, governance, policy implementation, and resource utilization. Since they play a central role in fisheries operations and decision-making, they are considered the key stakeholders and should be actively engaged

in planning, consultation, implementation, and monitoring processes.

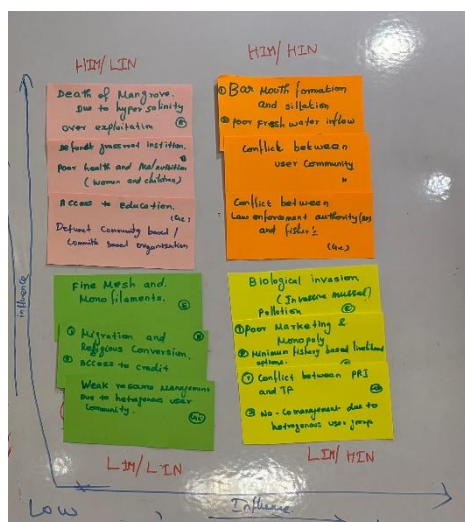
The **top-left quadrant (High Importance–Low Influence: HI/LI)** includes stakeholders who are important to the fisheries sector but have relatively limited influence on management decisions. The image identifies research and academic institutions, NGOs, and mariculture farms/cooperatives in this category. These stakeholders contribute significantly through research, technical knowledge, awareness creation, and livelihood support, but they may not possess direct authority over fisheries governance. Therefore, they should be regularly consulted and involved to strengthen participatory management and scientific decision-making.

The **bottom-right quadrant (Low Importance–High Influence: LI/HI)** represents stakeholders who may not be directly dependent on fisheries resources but have considerable influence over fisheries-related activities and governance. In the image, this category includes the Coast Guard, Environment Department, and cooperative societies. These institutions can influence fisheries through enforcement, environmental regulations, monitoring, and administrative control. Their involvement is essential for maintaining compliance, environmental sustainability, and institutional coordination within the FMU.

The **bottom-left quadrant (Low Importance–Low Influence: LI/LI)** contains stakeholders with comparatively lower importance and lower influence in fisheries management. In the uploaded matrix, this includes tourism developers, coastal developers, and unions. Although these stakeholders are not directly central to fisheries governance, their activities may indirectly affect coastal ecosystems, infrastructure development, and community welfare. They should therefore be kept informed and engaged when necessary to ensure balanced coastal and fisheries development.

Pichavaram mangrove Ecosystem

The matrix is divided into four quadrants. **The top-right quadrant (High Importance–High Influence: HI/HI)** contains the most critical issues that significantly affect fisheries sustainability and community livelihoods. The image identifies problems such as poor health conditions and sanitation, poor freshwater inflow, conflicts between local communities, and conflicts between law enforcement authorities and fishers. These issues directly impact fisheries productivity, resource management, social stability, and governance. Since they are both highly important and highly influential, these concerns require immediate management intervention, stakeholder coordination, and policy attention.

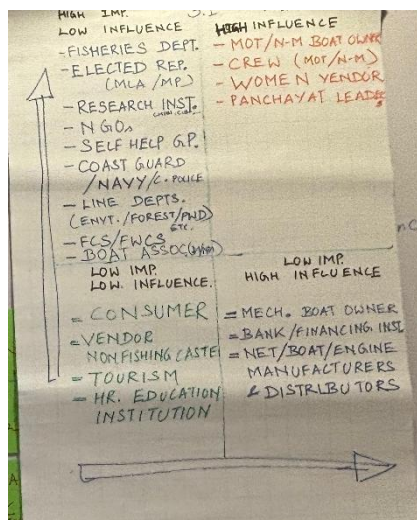


The top-left quadrant (High Importance–Low Influence: HI/LI) includes issues that are highly important for the welfare of fishing communities but have comparatively lower influence on overall fisheries governance. The image lists problems such as death and mortality due to hypersalinity and overexploitation, poor freshwater intrusion, poor health and malnutrition among women and children, inadequate access to education, and the decline of community-based organizations. These issues strongly affect the social and economic wellbeing of fishing communities, although they may not directly shape management decisions. Therefore, these concerns should be addressed through social development programmes, awareness creation, and community support mechanisms.

The bottom-right quadrant (Low Importance–High Influence: LI/HI) represents issues that have significant influence on fisheries systems and governance but are considered comparatively lower in immediate importance. The uploaded image includes biological invasions, political influence in fisheries management, poor marketing systems, minimum support or lack of livelihood assistance, conflicts between different fishing groups, and non-compliance with regulations due to heterogeneous user groups. These issues can indirectly affect fisheries sustainability, resource access, institutional effectiveness, and market dynamics. Such concerns require continuous monitoring, institutional coordination, and governance reforms to prevent escalation.

The bottom-left quadrant (Low Importance–Low Influence: LI/LI) contains issues that currently have lower importance and lower influence within the FMU context. In the image, these include fine mesh and mono-filament net usage, migration and religious conversion affecting access to credit, and weak resource management practices within communities. Although these issues may not presently have major impacts on fisheries governance, they can still contribute to long-term social and ecological challenges if neglected. Therefore, they should be monitored and addressed through awareness programmes, local regulations, and community engagement initiatives.

Small-Scale Fishery in Puducherry (Motorized and Non-Motorized)



The matrix is divided into four quadrants representing different stakeholder categories. The **top-right quadrant (High Importance–High Influence)** includes stakeholders who are both highly important and highly influential in the FMU. In the uploaded image, this category includes motorized and non-motorized boat owners, crew members, women vendors, and Panchayat leaders. These stakeholders are directly dependent on fisheries resources and strongly influence fisheries activities, community decisions, local governance, and market operations. Since they are central to fisheries management and livelihoods, they must be actively involved in planning, implementation, consultation, and decision-making processes.

The **top-left quadrant (High Importance–Low Influence)** consists of stakeholders who are highly important to the fisheries sector but have relatively lower influence over policy and governance decisions. The image identifies fisheries departments, elected representatives (MLA/MP), research institutions, NGOs, self-help groups, Coast Guard/Navy/Police, line departments such as Forest and Revenue Departments, Fisheries Cooperative Societies (FCS/WCS), and boat associations under this category. These stakeholders contribute through administration, research, enforcement, welfare support, and institutional coordination, but may not directly control fisheries operations or local decision-making. Therefore, they should be regularly consulted and engaged in collaborative management processes.

The **bottom-right quadrant (Low Importance–High Influence)** includes stakeholders who possess considerable economic or institutional influence but are comparatively less dependent on fisheries resources. In the uploaded matrix, this category includes mechanized boat owners, banks and financing institutions, net/boat/engine manufacturers, and distributors. These stakeholders influence fisheries through investments, credit support, technology supply, infrastructure, and market systems. Their role is important in shaping economic and operational aspects of the fisheries sector, and therefore coordination with them is essential for sustainable fisheries development.

The **bottom-left quadrant (Low Importance–Low Influence)** contains stakeholders with relatively limited involvement and influence in fisheries management. According to the image, this group includes consumers, vendors, non-fishing caste groups, tourism stakeholders, and higher education institutions. Although they are not directly central to fisheries governance, they still interact with the fisheries sector through trade, tourism, education, and social activities. These stakeholders should be kept informed and engaged when necessary to promote broader awareness and support for fisheries sustainability.

Trawl Fishery in Chennai



The matrix is divided into four quadrants. The **top-right quadrant (High Importance–High Influence)** contains stakeholders who are central to fisheries governance and have strong authority or decision-making power. In the uploaded image, this category includes the Fisheries Department, Boat Owner Associations, Fishermen Associations, Coast Guard, Central and State Research Institutions, fishermen groups, and the Marine Enforcement Wing. These

stakeholders are directly involved in fisheries management, regulation, enforcement, scientific research, and operational decision-making. Because of their strong influence and high importance, they should be actively involved in planning, implementation, monitoring, and policy formulation within the FMU.

The **top-left quadrant (High Importance–Low Influence)** includes stakeholders who are important to the fisheries sector but have relatively lower influence over management decisions. The image identifies academic institutions, NGOs, local leaders, vendors, the Forest Department, and Pollution Control authorities in this category. These stakeholders contribute through awareness creation, environmental conservation, research support, local governance, and market activities. Although they may not directly control fisheries management decisions, they are essential for supporting sustainable fisheries practices and community participation. Therefore, they should be regularly consulted and engaged in collaborative activities.

The **bottom-right quadrant (Low Importance–High Influence)** represents stakeholders who possess significant administrative, regulatory, or institutional influence but are comparatively less dependent on fisheries resources. In the uploaded image, this includes the Harbour Management Committee, Environment Department, and MPEDA (Marine Products Export Development Authority). These organizations influence fisheries through harbour administration, environmental regulations, export policies, and institutional coordination. Their role is important in shaping fisheries infrastructure, trade, and environmental compliance, and they should therefore be involved in coordination and governance mechanisms.

The **bottom-left quadrant (Low Importance–Low Influence)** contains stakeholders with comparatively limited importance and influence in fisheries management. The image includes academic institutes and traders in this category. While these stakeholders may not have a major direct role in governance or resource management, they still contribute indirectly through education, research, and fish trade activities. They should be kept informed and engaged when relevant to ensure broader stakeholder participation and awareness.



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