



Report of the National Workshop on
**ALIGNING ACADEMIC RESEARCH WITH
NATIONAL MARINE FISHERIES RESOURCE
ASSESSMENT NEEDS**

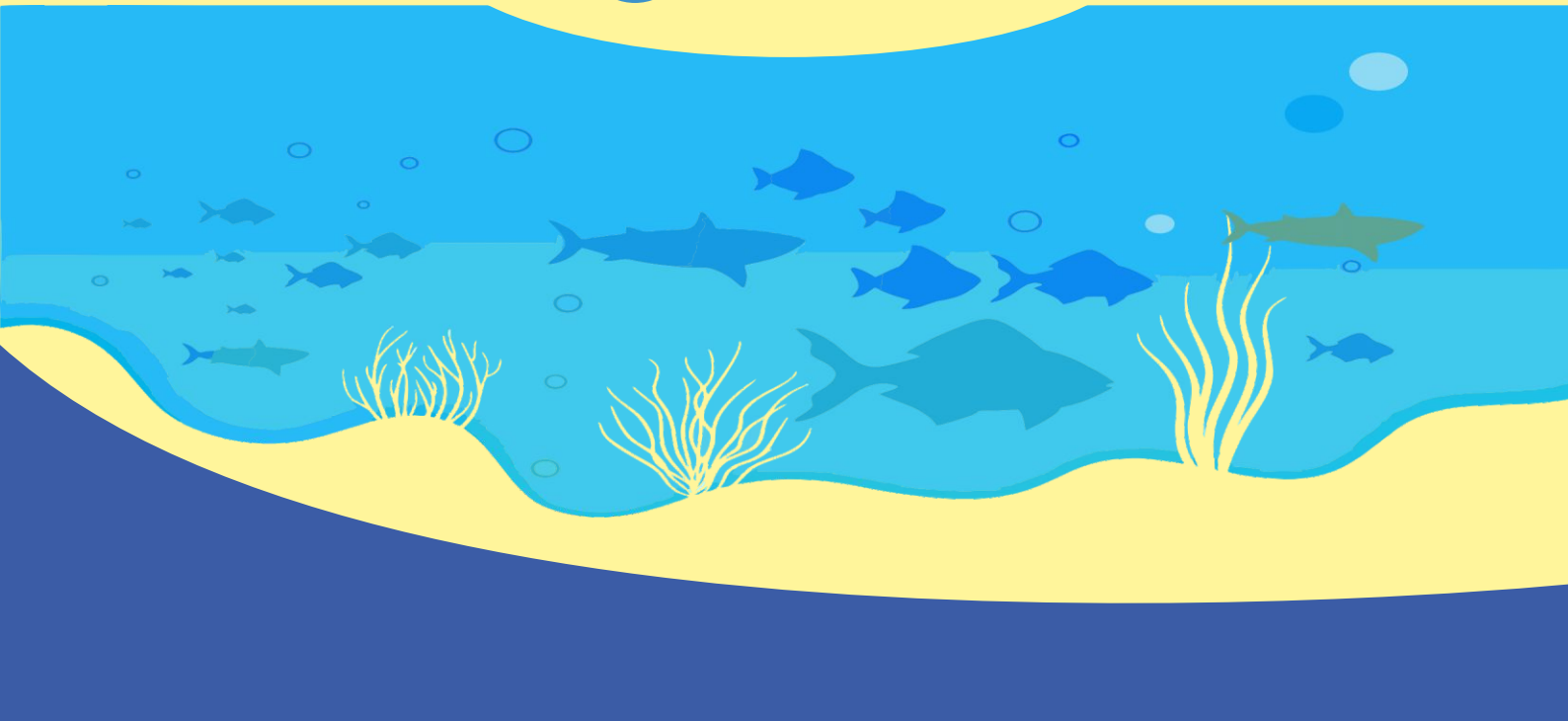
*A capacity development initiative for the Faculty of
Fisheries Resource Management (FRM) Divisions of the
Fisheries Colleges from the Coastal States in India*

29 – 31 May 2025
Four Points by Sheraton, Kochi

In Collaboration with



**Food and Agriculture
Organization of the
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Bay of Bengal Programme
Inter-Governmental Organisation

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About the Organizers



National Fisheries Development Board (NFDB)

Fisheries and aquaculture form a crucial part of India's food production system, supporting over 2.8 crore fishers and contributing significantly to livelihoods, employment, and exports. India ranks third in global fish production and second in aquaculture, with a record marine export earning of ₹63,969 crores in 2022–23. The National Fisheries Development Board (NFDB) plays a key role in promoting sustainable practices, modern technology, and infrastructure, aiming for holistic sectoral growth aligned with the goals of Aatma Nirbhar Bharat, food security, and economic development.



Department of Fisheries, MoFAHD, Government of India

The Department of Fisheries (DoF) is a governmental body responsible for the development, management, and regulation of fisheries and aquaculture in India. It formulates policies, implements schemes, and promotes sustainable practices to boost productivity, livelihoods, and food security. Additionally, the DoF oversees resource conservation, enforces regulations, and supports capacity-building, research, and technological innovation in the sector.



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

The BOBP-IGO is a regional fisheries advisory body with Bangladesh, India, Maldives and Sri Lanka as its contracting parties. It is mandated to enhance cooperation amongst its member countries and other countries (especially, Indonesia, Malaysia, Myanmar and Thailand) for sustainable fisheries management in the Bay of Bengal region. The BOBP-IGO Secretariat is located at Chennai. The Department of Fisheries, Government of India is the nodal agency from India and the hosting agency.



Indian Council of Agricultural Research Central Marine Fisheries Research Institute (ICAR CMFRI)

The ICAR-Central Marine Fisheries Research Institute (CMFRI), established in 1947 and later integrated into ICAR in 1967, has evolved into a globally recognized center for tropical marine fisheries research. It has made significant contributions through its national catch estimation system, development of mariculture technologies, and advancements in marine biotechnology and climate research. CMFRI's multidisciplinary work, including its efforts in data collection, resource management, and women-led bivalve farming, has positioned it as a premier institute in both capture and culture fisheries.



PRADHAN MANTRI MATSYA SAMPADA YOJANA (PMMSY)

The Department of Fisheries is implementing the Pradhan Mantri Matsya Sampada Yojana (PMMSY) to drive a Blue Revolution through sustainable and responsible fisheries development with an investment of ₹20,050 crores from 2020 to 2025. The scheme addresses critical gaps across the fisheries value chain, including production, technology, infrastructure, and marketing. It also emphasizes modernization, traceability, and the socio-economic welfare of fishers and fish farmers.

Abstract

Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), in collaboration with NFDB, Department of Fisheries, ICAR-CMFRI and PMMSY, convened a national workshop titled “National Workshop on Aligning Academic Research with National Marine Fisheries Resource Assessment Needs: A capacity development initiative for the Faculty of Fisheries' Resource Management (FRM) Divisions of the Fisheries Colleges from the Coastal States in India” at Four Points by Sheraton, Kochi during 29-31 May 2025.

The workshop highlighted India's scientific capabilities in stock monitoring, innovations in gear technology, and digital transformation in fishery data systems. Key presentations from FAO outlined the global frameworks for the State of Stocks Index (SoSI) and SDG Indicator 14.4.1, including tiered stock assessment approaches and capacity-building tools. ICAR-CMFRI detailed its methodologies, sampling design, and ongoing marine fisheries census efforts. Discussions emphasized India's underrepresentation in global assessments despite its scientific leadership, stressing the urgent need to align national datasets with FAO systems like FIRMS and GRSF.

Practical sessions with faculty addressed aligning student research with national priorities, fostering a shift from data collection to data interpretation. The workshop concluded with a call to institutionalize science-policy linkages, enhance regional cooperation, and establish structured research networks like BOBSAN India to support long-term fisheries governance and SDG compliance.



Abbreviations and acronyms

ALDFG	Abandoned, Lost or Otherwise Discarded Fishing Gear
BOBLME	Bay of Bengal Large Marine Ecosystem
BOBP-IGO	Bay of Bengal Programme Inter-Governmental Organisation
BOBSAN INDIA	Bay of Bengal Stock Assessment Network – India
CECAF	Fishery Committee for the Eastern Central Atlantic
CMSY	Catch-MSY (Maximum Sustainable Yield)
DB-SRA	Depletion-Based Stock Reduction Analysis
FAO	Food and Agriculture Organization of the United Nations
FCWC	Fishery Committee for the West Central Gulf of Guinea
FIRMS	Fisheries and Resources Monitoring System
GFCM	General Fisheries Commission for the Mediterranean
GRSF	Global Record of Stocks and Fisheries
ICES	International Council for the Exploration of the Sea
IOTC	Indian Ocean Tuna Commission
LBB	Length-Based Bayesian Biomass
LB-SPR	Length-Based Spawning Potential Ratio
MMSY	Multispecies Maximum Sustainable Yield
MSY	Maximum Sustainable Yield
RAM Legacy	RAM Legacy Stock Assessment Database
RFB	Regional Fishery Body
SDG	Sustainable Development Goal
SEAFDEC	Southeast Asian Fisheries Development Center
SIOFA	Southern Indian Ocean Fisheries Agreement
SMT	Stock Monitoring Tool
SOFIA	State of World Fisheries and Aquaculture
SOSI	State of Stocks Index
SRA+	Stock Reduction Analysis Plus
TAF	Transparent Assessment Framework
UN	United Nations
UUID	Universally Unique Identifier
VRE	Virtual Research Environment

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Participants at the National Workshop

1. Introduction

The Food and Agriculture Organization of the United Nations (FAO), in collaboration with the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), is organized a regional workshop aimed at strengthening regional representation in global stock status reporting through the Fisheries and Resources Monitoring System (FIRMS). This initiative is a critical step towards enhancing the accuracy, transparency, and comprehensiveness of global fisheries assessments.

As part of this broader effort, a regional workshop was conducted by engaging academic institutions. India, as a member country of BOBP-IGO, has shown a strong commitment to improving its fisheries data collection, stock assessment, and reporting systems. Academic institutions in the country play a pivotal role in developing human capacity and producing research essential for sustainable fisheries management. Strengthening the capabilities of faculty members in these institutions is essential for achieving long-term improvements in fisheries governance and supporting India's progress towards Sustainable Development Goal 14.

This initiative will provide participants with the opportunity to engage with international experts during the regional workshop, attend a specialized session on aligning student research with national stock assessment strategies, and gain insights into the latest initiatives led by ICAR-CMFRI in the field of fisheries resource assessment.

2. Opening session

2.1 Dr. P. Krishnan, Director, BOBP-IGO, commenced the workshop by warmly welcoming the country participants, and introducing the distinguished guests and set the tone for the workshop. Special thanks were extended to Dr. Rishi Sharma, Senior Fisheries Officer, FAO-RAP, for his decade-long contributions to stock assessment and regional fisheries management. Emphasising the importance of collaboration, Dr. Krishnan described the workshop as a platform for institutional learning, regional best practices, and national replication.

2.2 Dr. Grinson George, Director, ICAR-CMFRI, Kochi delivered an overview of CMFRI's historical and scientific contributions to India's marine fisheries sector. He emphasised that CMFRI's evolution has paralleled the development of scientific fish stock assessment in India. With a strong data backbone involving catch, effort, and biological parameters, CMFRI has pioneered indigenous methodologies for multi-species stock assessments in tropical waters. Dr. George discussed the transition from traditional paper-based data collection to AI-enabled mobile technologies and ongoing pilot initiatives to develop automated, real-time stock monitoring systems. He emphasised the need to align national data generation systems with international frameworks such as FAOs, while also retaining the strengths of India's unique fishery landscape.

2.3 Dr. K. Mohammed Koya, Fisheries Development Commissioner, Department of Fisheries, Government of India, joined the workshop virtually and extended warm greetings to all participants. In his opening remarks, Dr. Koya acknowledged India's privileged position within the Indian Ocean region and the vast potential of its fisheries resources. He reiterated the Government of India's priority on sustainable development and responsible management of these resources. Dr. Koya emphasized the importance of aligning national frameworks with evolving regional and global standards and expressed strong support for the workshop's objectives. He reaffirmed the Department's commitment to continued collaboration with international partners and regional initiatives like BOBP-IGO to strengthen fisheries governance and data reporting systems.

3. Day 1: Lead presentations

3.1 FIRMS Workshop Session: Overview of FAO's role in structuring global state of stocks monitoring and in support of global fisheries management - Dr. Rishi Sharma

The presentation on “Blue Transformation: FAO Vision for Incorporating Change in Fisheries and Aquaculture” outlines a comprehensive global strategy aimed at transforming aquatic food systems through sustainability, inclusivity, and data-driven governance. Anchored in FAO's 10-year vision, the initiative is structured around three core pillars: sustainable aquaculture development, effective fisheries management, and value chain enhancement. The presentation emphasized the shift from aggregate to stock-level assessments to improve precision in monitoring and management, with a target of bringing 100% of marine and inland fisheries under effective management. A key advancement is the development of the Global Record of Stocks and Fisheries (GRSF),

integrating 2,570 globally identified stocks—including 238 from India, Bangladesh, and Sri Lanka—into a centralized system under the FIRMS partnership. Stocks are categorized into three tiers based on data availability and methodological rigor. The approach promotes alignment with SDG indicators and supports the Bay of Bengal Large Marine Ecosystem (BOBLME) project by establishing baselines and ecosystem-level indicators. Dr. Sharma underscored that sustainable aquatic food systems are central to global food security, contingent on collaborative assessments, improved data resolution, and continuous capacity-building across regions.

3.2 FIRMS Workshop Lecture: FAO's role as custodian agency for SDG Indicator 14.4.1 at National level and convergence with the regional and global indicator – Dr. Anne Elise Nieblas

The presentation emphasized FAO's role as the custodian agency for SDG Indicator 14.4.1—tracking the sustainability of fish stocks—and its alignment with the State of Stocks Index (SOSI). She outlines the convergence of national, regional, and global indicators using diverse data sources, including FIRMS, RAM Legacy, FishSource, and national SDG questionnaires. A key focus is improving data quality and coverage through enhanced reporting processes, updated methodologies, and a multi-tiered stock assessment approach. She highlighted persistent challenges such as technical capacity gaps, limited data granularity, and institutional communication barriers. To address these, FAO has implemented comprehensive capacity development initiatives—eLearning courses, workshops, virtual platforms, and expert help desks—to support countries in robust data collection and stock assessment. The presentation underscores encouraging trends in reporting quality and regional participation, especially within BOBP-IGO countries, while calling for continued investment in technical tools, training, and governance mechanisms to strengthen global fisheries monitoring and achieve SDG 14.4.1 targets.

3.3 FIRMS Workshop Lecture: The FIRMS partnership in support of the collation of fishery stock assessment at global and regional level – Mr. Aureliano Gentile

Mr. Aureliano Gentile's presentation provided a comprehensive overview of the FIRMS (Fisheries and Resources Monitoring System) Partnership, emphasizing its pivotal role in global fishery stock assessment and monitoring. Established in 2004, FIRMS functions as an information-sharing platform among 19 intergovernmental organizations encompassing 24 Regional Fishery Bodies (RFBs) and 4 collaborative organizations to promote standardized, high-quality, and transparent reporting of marine resources and fisheries data. The presentation highlighted FIRMS' contributions to the FAO's State of Stocks Index (SOSI), especially through the Global Record of Stocks and Fisheries (GRSF), which assigns unique identifiers for over 2,000 stock records to harmonize global data. The collaboration between BoBP-IGO and FIRMS aims to strengthen regional representation in global assessments, enhancing visibility and policy relevance for the Bay of Bengal. Mr. Gentile detailed the data collection mechanisms, biennial reporting cycles, and protocols that ensure consistency and scientific rigor. Overall, the presentation underscored the importance of evidence-based fisheries governance, capacity building, and regional integration into global stock status reporting through collaborative frameworks.



3.4 FIRMS Workshop Lecture: Introduction to FAO's updated State of Stocks Index (FAO SOSI) – Dr. Rishi Sharma

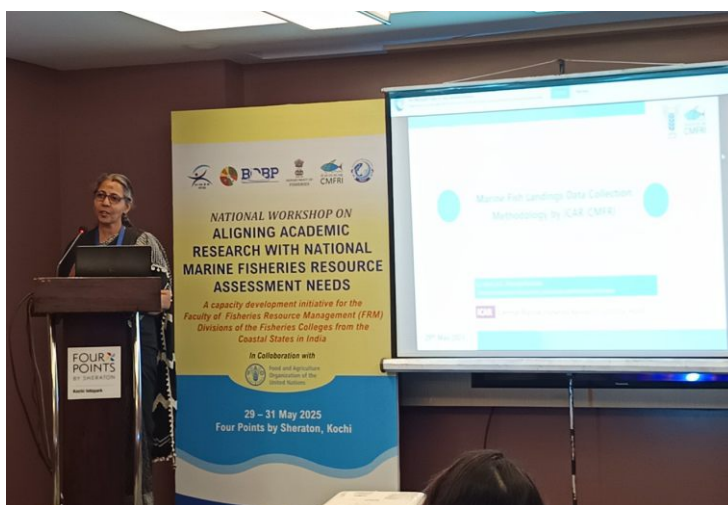
The presentation on the updated methodology for the FAO State of World Fisheries and Aquaculture (SOFIA) report marks a significant shift toward more transparent, evidence-based, and regionally representative assessments of global fish stocks. Tracing its evolution since 1974, the presentation critically analyzes the limitations of earlier approaches, such as lack of transparency, representativeness, and replicability, and introduces a revised framework that classifies stocks into data-driven tiers and integrates multiple data sources, including SDG 14.4.1 reporting. The new method, tested across six regions, incorporates both assessed and unassessed stocks using a tiered system to evaluate biological sustainability and overfishing. Findings reveal that while 65% of global stocks are around or above target reference points, 35% remain below, highlighting significant yield loss risks. Notably, Tier 2 (data-limited) stocks are generally in worse condition than well-assessed Tier 1 stocks. The approach promotes harmonization with national and regional systems and aims to balance MSY-based sustainability targets with global food security needs. Dr. Sharma emphasized that despite data limitations and system variability, this updated methodology ensures consistency, stakeholder buy-in, and capacity development, forming a robust basis for future SOFIA reports and SDG monitoring.

3.5 National Workshop Lecture: Criteria for selection of species and stocks for stock assessment for marine fish stock status: ICAR - CMFRI

India's approach to selecting species and stocks for marine fish stock assessment, led by ICAR - CMFRI, is underpinned by a robust and scientifically validated data collection framework that has evolved since 1947. This system employs a Certified Multi-Stage Random Sampling Design that incorporates both spatial and temporal variables, ensuring representativeness and statistical reliability across diverse marine ecosystems. A key aspect of this methodology is stratification, which classifies landing centers into single, major, and minor zones based on fishing intensity. This allows for proportional sampling and better targeting of high-density fishing areas, ensuring critical species and stocks are not overlooked.

Primary sampling units are defined by the combination of a specific base and landing center on a particular day, allowing precise identification of stock occurrence and landing trends. The launch of the Fish Catch Survey and Analysis (FCSA) software in 2018, and its subsequent mobile upgrade, has transformed data processing—reducing turnaround times drastically and enabling real-time geolocation tracking, electronic data capture, and centralized analytics. These technological enhancements support the selection of species based on real-time catch trends, ecological significance, commercial value, and vulnerability to overfishing.

Despite persisting challenges such as species misidentification and fluctuating landing densities, the framework remains the foundation for selecting candidate species and stocks for stock assessments. It ensures that decisions are informed, data-driven, and aligned with national fisheries management goals, including policy development and meeting legislative and parliamentary information needs.



3.6 National Workshop Lecture: Introduction to marine fisheries census: ICAR - CMFRI

The upcoming marine fisheries census, initiated by the Ministry is a nationwide effort aimed at generating a detailed socio-economic and demographic profile of marine fishing households. Structured in three phases: preparatory activities, field enumeration, and data analysis, the census marks a significant shift by adopting a mobile-based data collection system, replacing traditional paper formats to ensure faster, more accurate, and efficient data capture. Key indicators include household composition, occupational details, ownership of fishing gear and crafts, and available infrastructure within and beyond fishing villages. Backed by a dedicated budget of ₹15 crore the operation is designed to provide critical baseline data to inform policy, support sectoral development, and enable targeted welfare measures. A dual-application mobile interface was proposed for real-time field data entry and supervisory validation, thereby improving the quality and timeliness of information gathered from over 3,000 marine fishing villages. The effort will be guided by a hierarchical coordination model, comprising national, regional, and district-level supervisors, to ensure consistency, accountability, and quality assurance throughout the enumeration process.

3.7 National Workshop Lecture: Methodological frameworks and analytical tools for stock assessment in India's tropical marine fisheries: Dr. Rajan Kumar

Dr. Rajan emphasized the methodological complexity and challenges of species stock assessment within India's vast tropical fisheries. Stock delineation—essential for resource management—relies on biological, genetic, and geographical considerations, but data limitations restrict the feasibility of advanced techniques like molecular tagging. Consequently, the Indian approach uses geographic zones to define stocks, with 392 identified across four coastal regions. Prioritization of species is based on six criteria, including commercial value, data availability, and conservation status. Dr. Rajan further briefed about the different stock assessment approaches ranging from data-limited (catch only models or length only models) to data-rich approaches (using catch, length and catch rate data). The selection of models is driven by available data and the management objectives, making stock assessment both a scientific and policy-guiding process.

A detailed overview of contemporary stock assessment models and analytical platforms used in Indian fisheries research, emphasizing the importance of data quality and model suitability. Various Bayesian and maximum likelihood-based tools such as ASPIC, SPICT, and JABBA were discussed, with attention to their input requirements ranging from catch and length data to life history parameters and the outputs they generate, such as biomass (B/BMSY) and fishing mortality (F/FMSY) indicators. Integrated frameworks like Stock Synthesis and LIME were highlighted for their capacity to process diverse datasets and propagate parameter uncertainties, enabling more robust, data-rich assessments. The limitations of traditional length-based methods especially assumptions of constant recruitment and mortality are now being addressed through models that dynamically estimate these variables using time-series data. A key analytical insight stressed the



importance of aligning model complexity with data reliability; complex models cannot compensate for poor-quality data, particularly when sourced from commercial fisheries with inherent biases. Local ecological knowledge and context-sensitive sampling strategies are essential to ensure data representativeness and accurate stock assessment outcomes.

3.8 National Workshop Lecture: FRM faculty practical concerns in planning students research: interaction with CMFRI Team

The core focus of the discussion revolves around the need to shift the academic and research culture from merely data collection toward meaningful data interpretation and model-based analysis. The domain of stock assessment not only requires a good understanding of the quantitative approaches but also requires a fair insight of the history of exploitation of a given resource to ensure drawing of meaningful inferences from the model output. The academic research being short-duration in nature and urge to draw conclusion within the academic timeframe often hinders its wider acceptance at management level, especially when executed without expert consultation or supervision. A strong emphasis was placed on the biostatistical modeling of systems, where access to structured and relevant datasets—such as those from CMFRI—can enable students and researchers to derive actionable insights over a two-year period. The current approach, which prioritizes primary data collection, often overlooks the critical aspect of inference-making, which is vital for policy development and scientific publishing. Global research trends show that leading institutions generate high-impact publications by leveraging secondary data and training students in data interpretation rather than extensive fieldwork. Encouraging students to pursue statistical coursework, providing mentorship, and adopting modular data systems like the T-shape model can significantly improve the quality and efficiency of research output. It was also noted that while open access to data is ideal, a negotiable pricing model could serve as an incentive structure, ensuring sustained motivation and engagement among contributors. Ultimately, aligning academic research with national objectives and global practices requires institutional support, structured planning, and a paradigm shift in how research competencies are cultivated.

4. Day 2: Lead presentations

4.1 FIRMS Workshop Lecture: Categorization of stock assessment methodologies: tiered approaches (Tiers 1,2,3) – Dr. Rishi Sharma

The presentation on fish stock assessment methods provides a structured, tier-based framework for evaluating marine resources under varying data availability and complexity. The approach categorizes assessments into three tiers: Tier 1 (data-rich) utilizes integrated and surplus production models; Tier 2 (moderate data) relies on catch-effort and survey-based models like SRA+; and Tier 3 (data-limited) applies methods such as CMSY, LB-SPR, and expert judgment-based weight-of-evidence models. The presentation underscored the trade-off between model sophistication and data requirements, especially for multispecies and multigear fisheries. It also emphasizes emerging tools like LBB, DB-SRA, and MMSY for ecosystem-based fisheries management. Dr. Sharma highlighted that while modeling techniques have advanced significantly, the main constraint remains the availability of reliable biological, environmental, and socio-economic data. The tiered approach ensures scalability and applicability across regions with different assessment capacities, supporting evidence-based, precautionary, and adaptive fisheries management.

4.2 FIRMS Workshop Lecture: Data categories and collection methods: Categories of data sources – Ms. Anne Elise Nieblas

The presentation provided a critical overview of the data architecture supporting the FAO State of Stocks Index (SOSI), emphasizing transparency, representativeness, and integration of diverse data sources. The updated SoSI reference list now includes 2,570 stocks, categorized into Tier 1 (formal assessments), Tier 2 (rapid assessments with limited data), and Tier 3 (empirical or expert-informed assessments), reflecting improved biological understanding, governance, and socioeconomic priorities. Key data streams include the Global Record of Stocks and Fisheries (GRSF), SDG 14.4.1 questionnaires, FAO-led rapid assessments, and regional consultations. Each stock is uniquely identified via internationally standardized UUIDs to ensure traceability and harmonization. The presentation highlighted the operational processes and roles of data owners and providers, especially for transboundary and nationally significant stocks, including those from BOBP-IGO countries. Ms. Nieblas emphasized the importance of aligning regional reporting mechanisms with global frameworks like SDG 14.4.1 and FIRMS, enhancing both the quality and visibility of regional contributions to global stock status reporting.

4.3 FIRMS Workshop Lecture: Stock status determination in data poor situations – a light refresh on data limited assessments methods - Ms. Anne Elise Nieblas

The presentation introduced the FAO's i-Marine Virtual Research Environments (VREs) as essential digital platforms for supporting stock assessment and capacity development under the SOFIA-TAF and SDG 14.4.1 frameworks. These web-based environments facilitate the application of data-limited assessment methods such as SRA+ (within SOFIA-TAF) and LBSPR, CMSY, and Elefan/YPR (within the SDG 14.4.1 VRE), enabling consistent, transparent, and reproducible workflows using remote computing infrastructure. Designed for accessibility and collaboration, these VREs eliminate the need for local installations and allow users to conduct assessments seamlessly across operating systems.

Dr. Rishi Sharma highlighted the ongoing update of the Stock Monitoring Tool (SMT), which currently features CMSY, LBI, and LBSPR methods. While CMSY is commonly used, he noted that it is best applied when other options are unavailable, due to its reliance on assumptions and catch-only data. He emphasized the value of length-based methods, which offer more robust alternatives. The VRE for rapid assessment will remain unchanged, as it is a script-based tool intended for advanced users.

Ms. Anne Elise Nieblas confirmed that updates to the SMT and e-learning course are planned for November. The revised e-learning will be split into two separate modules—one focusing on SDG context and reporting, and the other on stock assessment methods, particularly length-based approaches, supported by the SMT. Each course will include an exam and certificate. Users were advised that while the SMT interface may change, access will remain available, with continued support provided.

4.4 FIRMS Workshop Lecture: National SDG 14.4.1 reporting framework - Mr. Aureliano Gentile

The presentation outlined the framework for national reporting under SDG Indicator 14.4.1 and its integration with the FAO's State of Stocks Index (SOSI), with a focus on strengthening the participation of BOBP-IGO member countries. The presentation details the evolution of methodologies, emphasizing convergence between national, regional, and global stock status reporting. A structured, multi-step process, ranging from institutional setup and stock reference list development to categorization and submission via revised questionnaires, ensures consistency and quality. The quality assurance system (QA1 and QA2) determines the credibility of submitted data, influencing whether stock records are incorporated into the Global Record of Stocks and Fisheries (GRSF). Mr. Gentile stressed the need for countries to align their SDG-reported stocks with the SoSI reference list to ensure coherence and visibility in global assessments.

4.5 National Workshop Lecture: Recent advances in gear technology (Gear modifications, marking, ALDFG, etc) - Dr. M.P. Remesan

The Central Institute of Fisheries Technology (CIFT) has implemented a suite of technological interventions in India's trawling sector to enhance sustainability, reduce environmental impacts, and improve fuel efficiency. Key innovations include the redesign of trawl nets using advanced materials such as ultra-high molecular weight polyethylene, resulting in significantly reduced drag and fuel consumption compared to conventional HDPE nets. Gear modifications, including bycatch reduction devices (BRDs) and juvenile fish exclusion systems like the square mesh cod end and the Turtle Excluder Device (TED), have been optimized and validated through trials to align with international sustainability standards. CIFT has also piloted green propulsion systems, such as dual-fuel LNG engines and biofuel alternatives, to lower carbon emissions, though infrastructural limitations remain a barrier to widespread adoption. These advancements collectively aim to address overfishing, reduce bycatch, and promote energy-efficient harvesting practices, while supporting compliance with evolving global export regulations. CIFT has undertaken a series of innovative interventions aimed at enhancing sustainability, safety, and environmental stewardship in Indian fisheries. Notably, it has developed stainless steel (SS304) sinkers as an eco-friendly alternative to conventional lead sinkers, addressing toxicity and bioaccumulation concerns raised by the WHO. In collaboration with SAIL, prototype trials demonstrated the long-term durability and minimal environmental impact of stainless-steel sinkers. Additionally, CIFT has promoted the use of biodegradable materials, such as cotton twine for gillnet rigging, and explored acoustic deterrent devices (pingers) to mitigate marine mammal interactions. To address marine litter from abandoned FRP fishing vessels, the institute has advanced gear and vessel marking systems and partnered with CPET to transform FRP debris into usable cementitious products. These multifaceted interventions support low-impact, fuel-efficient fishing (LIFE) while aligning with international guidelines on sustainable fisheries and marine litter mitigation.

4.6 National Workshop Lecture: Planning the gear technology research: Interaction with CIFT Team

The session highlighted the ongoing difficulties in mainstreaming bycatch reduction technologies, such as Turtle Excluder Devices (TEDs) and square mesh cod ends, into Indian marine fisheries practices. Although these tools have demonstrated success in large-scale trials, widespread adoption remains limited due to socio-economic resistance and adherence to traditional fishing methods—particularly in areas heavily reliant on artisanal fisheries. TEDs have proven effective in minimizing turtle bycatch, but to ensure broader ecological benefits, the complementary use of square mesh cod ends is necessary to reduce juvenile and non-target catch. The absence of uniform vessel design standards and variation in gear regulations among coastal states further complicate sustainable implementation. To improve uptake and compliance with global conservation standards, the session stressed the need for stronger enforcement, inclusive stakeholder engagement, and incentive-driven, community-based approaches.

4.7 FIRMS Workshop Lecture: FIRMS reporting framework, requirements and formats: ensuring data quality and consistency.

GRSF stock and fisheries unique identifiers

The presentation on the Global Record of Stocks and Fisheries (GRSF) highlights its critical role as a centralized digital platform for assigning unique identifiers to fisheries and stock records, thereby enabling traceability, data harmonization, and transparent global monitoring. Developed through the EU-funded BlueBRIDGE initiative and governed under the FAO-FIRMS partnership, the GRSF integrates records from major sources such as FIRMS, RAM Legacy, and SDG 14.4.1 questionnaires. The core innovation lies in the use of Universally Unique Identifiers (UUIDs) and semantic identifiers, which ensure persistent, interoperable references for each stock or fishery, supporting data integration across systems and time. The GRSF categorizes records into assessment units, fishing units, and traceability units, aligning with international standards and enhancing data quality and consistency for reporting to SDGs, ecolabelling, and scientific assessments. By fostering interoperability with regional databases (e.g., ICES, FCWC, GFCM), GRSF facilitates a unified, transparent view of global fisheries, improving the quality of policy decisions and sustainability practices. The system is currently in a pilot phase, publishing validated identity information and serving as a backbone for future ecosystem-based fisheries management.

Area standards for the BOBP-IGO region

This presentation outlines the standardized geographic area classifications essential for defining fish stock units in the Global Record of Stocks and Fisheries (GRSF) within BOBP-IGO region. It highlights the use of various area typologies including FAO Major Fishing Areas, Large Marine Ecosystems (LMEs), and management areas defined by Regional Fishery Bodies (e.g., IOTC, SIOFA, SEAFDEC), to enable precise stock identification and harmonized reporting. Each stock's area is encoded using a semantic identifier that integrates both species and spatial components. The presentation critically emphasizes the need for countries to explore more granular area delineations beyond national waters to improve assessment accuracy and regional representativeness.

4.8 National Workshop Lecture: Breaking myths in FRM research and opportunities for networking with National & Regional - Dr. P. Krishnan

The presentation by BOBP-IGO Director P. Krishnan at the National Workshop on Aligning Academic Research with National Marine Fisheries Resource Assessment highlights key gaps, challenges, and opportunities in regional fisheries management in the Bay of Bengal (BOB) region. It debunks common myths—particularly that fisheries management is solely national and biology-driven, emphasizing the need for international cooperation in managing shared and climate-sensitive stocks. Using examples like the NE Atlantic mackerel conflict, it warns of future disputes unless BOB nations collaborate effectively. The presentation underscores that fisheries management is fundamentally about managing people and policy, not just fish, and advocates for bridging the academic-managerial divide. While India is a regional leader in marine science infrastructure and publication, it remains underutilized as a collaborator within BOB countries. Initiatives like BIMReN and BOB-SAN are presented as strategic platforms to build capacity, foster stock assessment networks, and align science with policy. The talk concludes with a call for stronger science-management linkages, institutional collaboration, and multidisciplinary research to ensure sustainable, evidence-based fisheries governance across the region.



5. Day 3: Field Visit to ICAR-CMFRI & ICAR-CIFT

The third day of the workshop was designed to provide participants with a hands-on exposure to the advanced research infrastructure and ongoing technological innovations at India's premier fisheries research institutions ICAR-CIFT and ICAR-CMFRI.

At ICAR-CIFT, the participants explored cutting-edge advancements in eco-friendly and fuel-efficient fishing gear and bycatch reduction devices. Discussion were focussed on how scientific interventions are translated into practical gear modifications to promote sustainability and reduce environmental impact. The session served as a platform for FRM faculty to discuss potential collaborative research areas in gear design, ALDFG mitigation, and sustainable harvesting practices.

On 31st May 2025, following their visit to the Central Institute of Fisheries Technology, the participants of the BOBP National Workshop on 'Aligning Academic Research with National Marine Fisheries Resource Assessment Needs' visited ICAR–Central Marine Fisheries Research Institute.

Participants visited the Fishery Biology laboratories of the Institute, where a special demonstration-cum-hands-on training session was conducted on the use of hard parts for age determination in shellfishes and finfishes. Scientists and technical officers from the Resource Division of ICAR–CMFRI provided both theoretical and practical training, offering exposure to techniques for age estimation using hard parts. Recent advancements, methodologies, and equipment used in such studies were also demonstrated to the trainees.

5.1. Valedictory session

The valedictory function of the National Workshop on Aligning Academic Research with National Marine Fisheries Resource Assessment Needs was successfully held on May 31, 2025, at ICAR-CMFRI, Kochi, India. The workshop, spanning three days from May 29-31, 2025, was jointly organized by the Bay of Bengal Programme Inter-Governmental Organisation (BOBP), and ICAR-CMFRI. The workshop was arranged to train the academicians who can disseminate the knowledge and best practice in sustainable fisheries management and understand FIRMS and SOFIA SoSI methodologies, which will lead to the integration of academic research with national resources assessment.

Dr. Dineshababu, Head, SFD, and Co-ordinator of the program, delivered the welcome address and in his speech mentioned that the global fisheries management scenarios are changing regarding stock status, and the results should be from a detailed investigation and not biased. He also emphasised the need of this type of workshop with the academicians for improving the fisheries data collection, assessment, and reporting practices.

Dr. Shoba Joe Kizhakudan, Head, FFD, ICAR-CMFRI who informed the gathering that the workshop saw the participation of approximately 20 delegates from deemed universities and other fisheries universities. The program encompassed several insightful technical sessions and expert classes, providing a comprehensive platform for discussions on global stock status reporting and assessment. Dr. Shoba gave a brief outline of the entire workshop and the sessions handled by ICAR-CMFRI and ICAR-CIFT.

The Chief Guest for the valedictory function was Dr. Grinson George, Director, ICAR-CMFRI. In his address, Dr. Grinson underscored the critical importance of robust data collection and fostering strong collaborations for achieving improved and accurate stock assessments within the region. He also emphasized the vital linkages between institutions and universities for the betterment of fisheries science and for effectively skilling professionals in the fisheries sector.

Participants shared their thoughts on the program and stated that it was highly useful, and such regular programs should be conducted. During the valedictory session, the recommendations formulated throughout the workshop were discussed and finalized, aiming to provide actionable insights for the integration of updated stock assessment techniques into fisheries curricula in Indian universities.

Participation certificates were distributed to the participants, and certificates of appreciation were awarded to the faculty members and resource persons by Dr. Grinson.

The valedictory function concluded with a formal Vote of Thanks delivered by Dr. Anulekshmi Chellappan, Sr. Scientist and Scientist-in-Charge, Calicut Regional Station marking the successful culmination of the workshop.



6. Discussions

- **To what taxonomic level can field personnel identify fish specimens, and how is accuracy ensured?**

Field personnel can identify fish at the genus level and usually to species level with maps and expert verification. Accuracy is ensured through regular workshops, training, and cross-verification with lab samples.

- **How is sampling designed according to fishing intensity at landing centers?**

Landing centres are stratified into major and minor categories based on the intensity of fishing units operating and volume of fish landed, aligning with principles of stratified sampling. Major centres, characterized are assigned greater sampling weight and observed more intensively to ensure representative data coverage, whereas minor centres, with relatively lower landings, are sampled at proportionally reduced intensity.

- **How many observation days are allocated to major and minor landing centers?**

Major centres have dedicated personnel conducting observations approximately 9 landing centre days per month, while minor centres, are sampled less frequently—typically once or twice a month.

- **How is catch data estimated for grouped landing centers?**

Catch estimates for each stratum are derived by scaling the mean catch values from representative sampled centres, using the actual number of fishing days to compute total catch within the stratum.

- **How does CMFRI collaborate with state governments in data collection?**

CMFRI prepares work programs and processes data, while data is collected jointly with state government personal.

- **How are extraordinary landings on specific days handled?**

Exceptional large landings are treated as a separate stratum within the sampling framework, and estimates for these are generated independently and this stratification ensures that such atypical events are appropriately represented without influencing the statistical properties of regular strata-level estimates, thereby preserving the overall accuracy and reliability of total catch estimation.



- **What challenges exist in species identification during field surveys, and how is misidentification addressed?**

Morphologically similar species, small juveniles, and soft-bodied species (e.g., cuttlefish) are hard to identify. Cross-verification with lab samples and expert review ensures accuracy.

- **How are unsorted or low-value catches recorded and classified?**

CMFRI uses token-based sampling for unsorted catch. Low-value bycatch is classified by use: manure, drying for domestic sale, or regular sale. Some are logged as miscellaneous.

- **Why has random sampling become less valid, and what alternatives are recommended?**

Pre-sorting on board for export reduces representativeness at landing centers. Weighted sampling and periodic fisheries-independent surveys are recommended for better data accuracy.

- **What makes the improved length-based model superior to traditional models, and what data does it require?**

The improved length-based model is superior because it dynamically estimates key parameters like recruitment and mortality within the model itself, rather than assuming they are constant over time. This makes it more flexible and realistic for assessing dynamic fishery systems. However, to function effectively, the model requires a robust time series typically at least 4–5 years of length composition data. Single-year data is insufficient, as reliable recruitment and mortality estimates depend on observing trends over multiple years.

- **How does CMFRI manage taxonomic changes over time in long-term data analysis?**

Data is periodically reviewed and updated to reflect current taxonomy, ensuring consistency and accurate historical comparisons.

- **Is CMFRI fisheries data free for research, and why is payment required?**

No. Detailed data requires payment (with 50% concession for students).



Programme Agenda

Time	Agenda Description	Presenter
Day 1: May 29, 2025		
0900-0945	Welcome address and opening statements	Rishi Sharma
0945-1000	Overview of FAO's role in structuring global state of stocks monitoring (SOFIA SoSI) and in support to global fisheries management	
1000-1015	FAO's role as custodian agency for SDG Indicator 14.4.1 at national level and convergence with the regional and global indicator	Anne Elise Nieblas
1015-1030	The FIRMS partnership in support of the collation of fishery stock assessment at global and regional level	Aureliano Gentile
1030-1100	Coffee break	
1100-1145	Introduction to FAO's updated State of Stocks Index (SOFIA-SoSI)	Rishi Sharma
1145-1230	Categorization of stock assessment methodologies: tiered approaches (Tiers 1, 2, 3)	Rishi Sharma
1230-1400 Lunch break		
1400-1430	Data categories and collection methods: categories of data sources	Rishi Sharma
1430-1500	Revising and expanding stock lists (SoSI list area 51, 57) - Steps for revising the fishery stock list in the region	Rishi Sharma
1530-1545	Criteria for selection of species & stocks for stock assessment for marine fish stock status	ICAR-CMFRI
1545-1615	Data collection and stock assessment methodology used by ICAR-CMFRI	ICAR-CMFRI
1615-1630	Introduction to marine fisheries census	ICAR-CMFRI
1630-1645	Linkage between stock status information and trade negotiations	ICAR-CMFRI
1645-1730	FRM Faculty practical concerns in planning students' research: Interaction with CMFRI Team	ICAR-CMFRI
1830-2100	Cultural show and networking dinner	
Day 2: May 30, 2025		
0900-1030	Stock status determination in data poor situations - a light refresh on data limited assessment methods	Rishi Sharma
1030-1100	Coffee break	
1100-1130	National SDG14.4.1 reporting framework	Anne Elise Nieblas
1200-1245	Recent advances in gear technology (Gear modifications, marking, ALDFG, etc)	ICAR-CIFT
1245-1300	FRM faculty practical concerns in planning gear technology research: Interaction with CIFT Team	ICAR-CIFT
1300-1415	Lunch break	

Time	Agenda Description	Presenter
1415-1515	FIRMS reporting framework, requirements and formats IRMS stock and fisheries templates SoSI minimum data requirements area standards for the BOBP region ensuring data quality and consistency	Aureliano Gentile
1515-1530	Coffee break	
1530-1615	Breaking Myths in FRM research & opportunities for networking with National & Regional experts	BOBP-IGO
1615-1630	Introduction of the BOBSAN INDIA framework for integration of research with national resource assessment	BOBP-IGO & ICAR-CMFRI
1630-1710	Group exercise the participants will be divided into three groups, who will discuss pre-defined questions (Framing nationally and regionally relevant research questions in FRM; challenges and needs for collaboration, etc.)	BOBP-IGO & ICAR-CMFRI
1710-1730	Plenary session	
Day 3: May 31, 2025		
0830	Departure from hotel	
000-1100	Visit gear technology laboratories into CIFT to explore collaborative research in FRM	ICAR-CIFT
1100-1115	Coffee break	
1130	Departure from ICAR-CIFT	
1200-1300	Visit to fish biology laboratories in CMFRI to explore collaborative research in FRM	ICAR-CMFRI
1300-1400	Lunch at CMFRI	
1400-1800	Guests relax in CMFRI guest house in transit and depart to their home states as per their departure schedule (all leaving same day evening)	ICAR-CMFRI



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