PROCEEDINGS

Of The

International symposium

MECOS 4

Marine Ecosystems
Challenges and Oppurtuniities

4-6 November 2025 | ICAR- CMFRI, Kochi

PROCEEDINGS

Of The

International symposium

MECOS 4

Marine Ecosystems
Challenges and Oppurtuniities

4-6 November 2025 | ICAR- CMFRI, Kochi

Organised by

Marine Biological Association of India, Kochi

in collaboration with

ICAR-Central Marine Fisheries Research Institute, Kochi
Bay of Bengal Programme IGO, Chennai
National Fisheries Development Board, Hyderabad

Proceedings of the International Symposium MECOS 4

Prepared by

Dr Rekha J Nair, Organising Secretary, MECOS 4
Dr Eldho Varghese, Co-organising Secretary
Dr V.V.R Suresh, Co-organising Secretary

Published by

Dr Grinson George, Convener MECOS 4

Conducted by Marine Biological Association of India

In collaboration with

ICAR CMFRI, & BOBP - IGO & NFDB

Technical Assistance

Pooja M Uthrad, Nahil Alikutty

Secretarial Assistance

Mrs Melna Rodrigues
Aleena Binoy

TABLE OF CONTENTS

INTRODUCTION

The Marine Biological Association of India (MBAI), in collaboration with the Indian Council for Agricultural Research-Central Marine Fisheries Research Institute (ICAR-CMFRI), successfully hosted the fourth edition of the International Symposium on Marine Ecosystems Challenges and Opportunities (MECOS 4) at ICAR-CMFRI, Kochi, from 04 to 06 November 2025. The Symposium brought together 621 participants, including scientists, academicians, researchers, students, industry professionals, policymakers, and stakeholders from across India and abroad, reflecting the growing momentum in marine ecosystem research and sustainable ocean management.

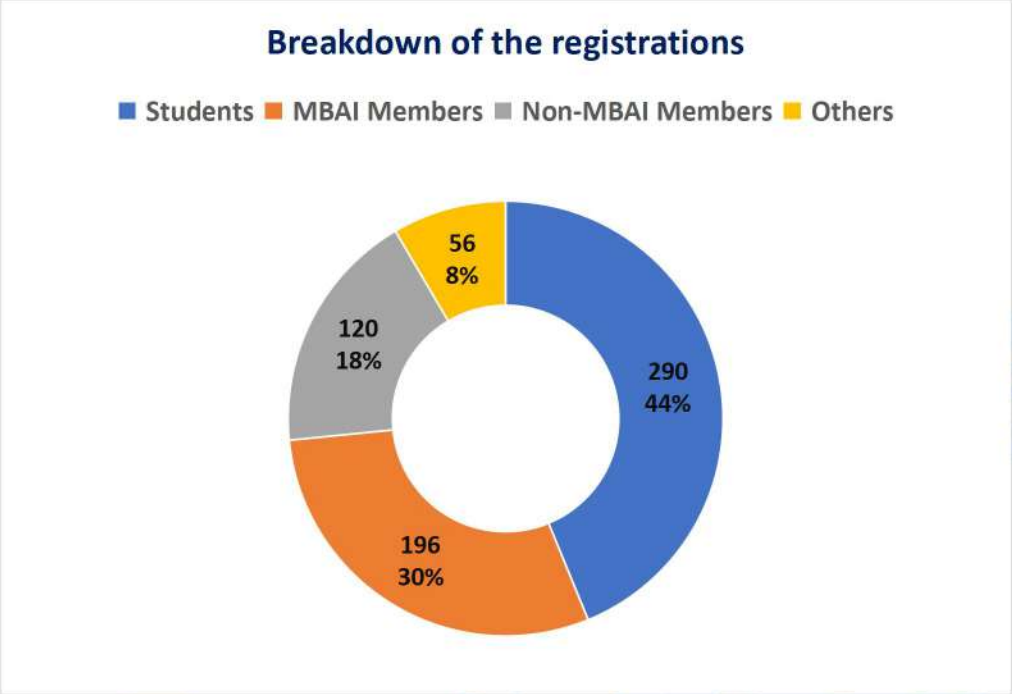
The official launch of MECOS 4 was held earlier on 10 November 2024 by Mr. George Kurien, Hon'ble Minister of State, Ministry of Minority Affairs, Government of India. Following the launch, registrations commenced on 01 March 2025 and concluded on 31 October 2025, attracting wide national and international participation.

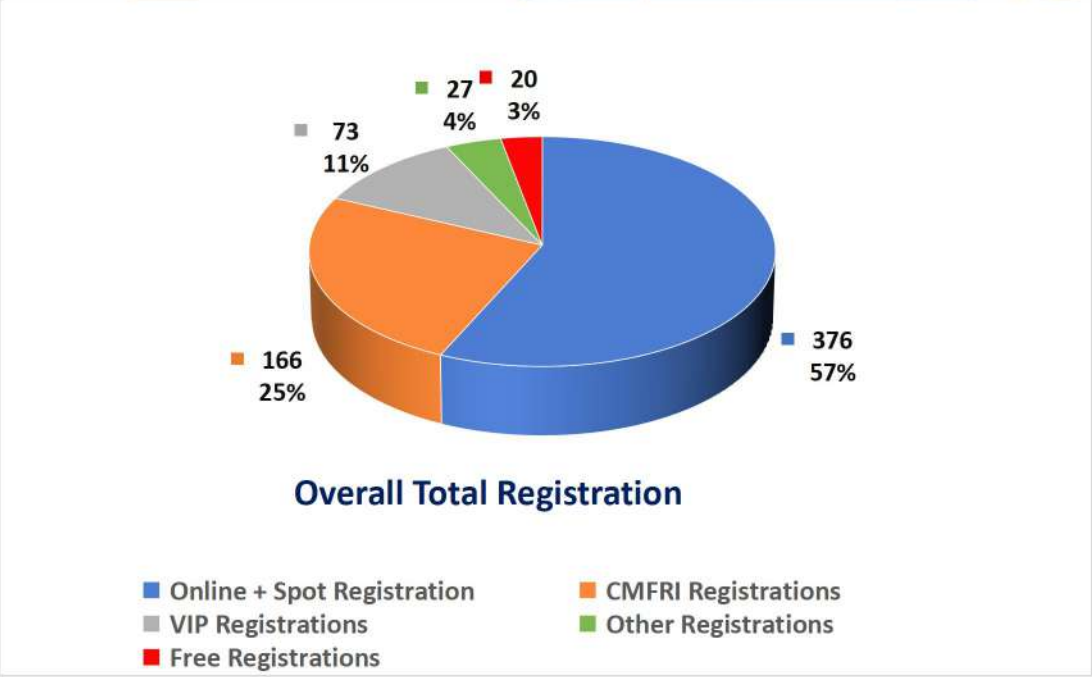
Total number of registrations	621
No. of participants attended	589
No. of abstracts received	502

MECOS 4 was structured around four major scientific themes that captured the breadth of contemporary challenges and emerging opportunities in marine science:

- Ecosystems and Biodiversity Conservation
- Sustainable Fisheries and Mariculture
- Climate and Environment Resilience
- Products, Value Chains, Livelihoods

In addition to the core themes, the Symposium featured two dedicated Special Tracks, “Marine Fisheries and Aquaculture in Amritkal” and “Women in Marine Biology” designed to spotlight emerging priorities and cross-cutting issues of national relevance and two side events along with an Institute Industry meet and a Session on Research in Marine Mammals and Seabirds





MECOS 4 served as a dynamic platform for knowledge exchange, scientific presentations, poster sessions, panel discussions, and collaborative networking. The event enabled participants to share research findings, explore innovative technologies, evaluate policy pathways, and develop collective strategies for advancing marine conservation, sustainable fisheries, climate resilience, and community livelihoods. Through its inclusive and multidisciplinary framework, MECOS 4 reaffirmed the critical role of healthy marine ecosystems in ensuring a healthy planet and a sustainable future for humanity.

INAUGURATION CEREMONY

The Inauguration was held at 10:30 am in the Platinum Jubilee Hall on the 7th floor of ICAR-CMFRI, with Dr. S. Somanath, Former Chairman of ISRO, as the Chief Guest.

Dr. Somanath emphasised that integrating space-based oceanography into India's marine research framework is vital for unlocking the potential of the blue economy and improving the lives of coastal fishing communities. He urged that India should launch a mission to "conquer the oceans" through advanced technology, innovation, strong data integration, and coordinated research efforts. "Currently, we lack hyperspectral sensors for ocean observation and serve as an essential tool for future ocean monitoring and resource mapping," he noted. He stressed the need for deploying more buoys and unmanned aerial vehicles (UAVs) to strengthen real-time data collection and widen observational coverage. He also highlighted the importance of developing deep-sea sensors capable of gathering information from the ocean's depths.

Underscoring the growing importance of technology in marine science, Dr. Somanath called for the integration of artificial intelligence and machine learning into ocean data systems to improve analysis, predictive modelling, and decision making in

marine resource management. “Data integration is essential for sustainable ocean governance,” he said, adding that technology driven enterprises will play a key role in sustainably harnessing marine resources while contributing to the nation’s blue economy.

Dr. J. K. Jena, Deputy Director General (Fisheries) of the Indian Council of Agricultural Research (ICAR), presided over the function. Addressing the gathering, C. S. R. Ram, Joint Secretary at the Ministry of External Affairs, highlighted that maritime cooperation remains one of India’s highest priorities. “It is essential for ensuring maritime security, strengthening trade, improving connectivity, and unlocking the potential of the blue economy,” he said.

The inauguration of MECOS 4 also featured remarks from several distinguished dignitaries, including Dr. P. Krishnan, Director of the Bay of Bengal Programme Intergovernmental Organisation (BOBP); Dr. Cherdsak Virapat, Regional Director for Asia at TIEMS, Thailand; Dr. Bijay Kumar Behra, Chief Executive of the National Fisheries Development Board; Sri. Dodda Venkata Swamy, Chairman of the Marine Products Export Development Authority; Dr. A. Gopalakrishnan, former Director of CMFRI; and Dr. Grinson George, Director of CMFRI.

The Book of Abstracts and the Souvenir was released during the Inaugural function.

The Vote of Thanks was delivered by Dr. Rekha J. Nair, Organising Secretary of MECOS 4.

Dr. S. Jones Memorial Award Presentation

The Marine Biological Association of India (MBAI) on Tuesday conferred the prestigious Fourth Dr. S. Jones Memorial Award on renowned marine scientist Dr. G. Gopakumar, honouring his outstanding contributions to mariculture and marine fisheries over the past four decades. The award, which includes a cash prize and a citation, was presented during the inaugural session of MECOS 4 at CMFRI.

The winner of the award was Dr. Gopakumar, former Principal Scientist and Head of the Mariculture Division at CMFRI, also widely regarded as one of the key pioneers of India’s modern mariculture sector. His groundbreaking work in the successful breeding of cobia and silver pompano laid the foundation for the expansion of cage fish farming across the country. These innovations have played a transformative role in empowering coastal communities and fostering sustainable livelihood opportunities.

Special Track 1: Marine Fisheries and Aquaculture in “Amrit Kaal”

The session was chaired by Dr. Grinson George, Director, ICAR-CMFRI. Dr. Grinson George presented an insightful overview of India’s marine fisheries and mariculture sectors. He highlighted the country’s significant progress in sustainable marine fisheries production and the rapid development of mariculture. He also outlined the key steps needed to further strengthen sustainable fisheries production:

1. Adopting a more inclusive approach to achieving sustainable development through effective management interventions
2. Integrating advanced technologies such as AI, machine learning, and space-based tools into marine fisheries research
3. Exploring deep-sea ecosystems and resources in Areas Beyond National Jurisdiction (ABNJ) to enhance seafood production
4. Expanding coastal seafood production through mariculture initiatives
5. Promoting the commercialization of technologies and value-added products
6. Aligning research, innovation, and development efforts with national and global sustainability goals.

Special Track 2: Women in Marine Biology - Panel Discussion


The session was chaired by Dr. B. Meenakumari, Former DDG (Fisheries), ICAR, New Delhi, and featured an eminent panel comprising Dr. Krishna Srinath, Former Director, ICAR-Central Institute for Women in Agriculture and AICRP on Home Science; Dr. V. Kripa, Former Member Secretary, Coastal Aquaculture Authority, Chennai; Dr. Mini Raman, Former Group Director, Space Applications Centre, ISRO; and Dr. Geetha Sasikumar, Principal Scientist, ICAR-CMFRI.

Each speaker shared her professional journey, highlighting key milestones and contributions to the sector. Following the presentations, the panel put forward several recommendations to strengthen the role of women in marine and allied fields. They emphasised that young women and youth must be actively engaged in addressing emerging challenges such as pollution. The panel further noted that ocean sciences offer vast and diverse career opportunities for educated young women across government organisations, NGOs, and the corporate sector.

THEMES

Theme 1: Ecosystems and Biodiversity Conservation (EBC)

The session was chaired by Prof. P. Vethamony, Research Professor and Team Leader at the Environmental Science Centre, Qatar, along with Dr. Kuldeep K. Lal, Director, ICAR-CIBA. The Lead Talk was delivered by Dr. Krishna R. Salin, Chair of the Aquaculture Program at the Asian Institute of Technology, Thailand. The session featured 20 scheduled oral presentations, of which 18 were delivered. Based on the presentations and discussions, the following recommendations were proposed:

1. Develop and implement tools and indicators to evaluate the effectiveness and impact of various conservation methods and technologies.
2. Prioritise research and strategic initiatives aimed at the sustainable utilisation of underexploited ecosystems and genetic resources, with emphasis on their documentation, characterisation, and conservation.
3. Promote integrated aquaculture models that improve input-use efficiency, reduce greenhouse gas emissions, and support climate resilient and economically viable livelihoods for local communities.
4. Encourage community participation and awareness in ecosystem protection and restoration, supported by suitable incentive mechanisms and enabling policy frameworks.

Theme 2: Sustainable Fisheries and Mariculture (SFM)

The session was chaired by Dr. A. Gopalakrishnan, Former Director, ICAR-CMFRI, and Dr. Shubadeep Ghosh, ADG (MFy.), ICAR. All 25 scheduled oral presentations were delivered. Based on the insights shared, the following recommendations were proposed to advance the sustainability of fisheries and mariculture in India:

1. Adopt ecosystem based and integrated assessment frameworks.
2. Enhance the use of advanced analytical tools for data-limited and moderately exploited fish stocks.
3. Develop species and region specific harvest control rules.
4. Strengthen digital data systems and adopt AI-based monitoring tools.
5. Mainstream technologies for bycatch reduction and habitat protection.
6. Promote participatory and community led fisheries monitoring, along with indigenous sustainability certification for marine capture fisheries.
7. Expand sustainable mariculture practices with a strong focus on ecosystem health.
8. Increase seed production capacity to scale up open-sea cage farming.
9. Encourage pond based nursery rearing and farming of Indian pompano to enhance production and reduce costs.
10. Integrate geospatial technologies into both capture and culture fisheries.
11. Foster cross-sectoral collaboration among research institutions, industry, and governance bodies.

The presentations under this theme showcased the positive outcomes of multi-stakeholder initiatives involving fishers, processors, and scientists. The establishment of regional innovation hubs was recommended to accelerate technology transfer, promote value addition, and ensure responsible and sustainable utilization of marine resources.

Theme 3: Climate and Environment Resilience (CER)

The Climate and Environmental Resilience (CER) session was held on 05.11.2025 at the Platinum Jubilee Hall, CMFRI, and was chaired by Dr. B. Meena Kumari (Former DDG, ICAR) and Dr. Grinson George (Director, CMFRI). The session opened with an overview of the increasing importance of climate and environmental resilience in the marine sector. Dr. Thamban Meloth, Director of the National Centre for Polar and Ocean Research, delivered the lead talk, focusing on climate variability and oceanographic processes in a rapidly changing world. He emphasised the critical role of polar research in understanding global climate systems and outlined major challenges such as rising ocean temperatures, sea-level rise, melting ice reserves, shifting monsoon patterns, and their cascading effects on marine ecosystems and coastal livelihoods.

Several presentations explored the impacts of climate change on biodiversity, including coral bleaching, coastal erosion, harmful algal blooms, and shifts in fish distribution caused by warming seas and ocean acidification. Speakers repeatedly highlighted the need for integrated ecological indicators, predictive climate models, and enhanced ocean observation systems. The discussions also covered climate smart fisheries, climate resilient mariculture practices, and adaptive management strategies vital for protecting coastal communities. Nature based solutions such as mangrove restoration, seagrass conservation, and blue carbon enhancement were presented as effective tools for ecosystem protection and climate mitigation. Participants underscored the importance of community based adaptation initiatives, digital advisory systems, and early warning tools to help reduce climate-related risks.

Recommendations:

1. Encourage the active participation of young researchers in studying climate change and its impacts on marine ecosystems and fishery resources.

2. Integrate research findings and insights into policy documents and management action plans at regional, state, and national levels.

Theme 4: Products, Value chains and Livelihoods (PVL)

The Technical Session under the theme Products, Value Chains and Livelihoods was held on 06.11.2025 at the Platinum Jubilee Hall, CMFRI, and was chaired by Dr. George Ninan, Director, ICAR-CIFT, and Dr. S. Girja, Former Director, NIFPHATT. The session focused on strengthening fisheries value chains, diversifying marine products, and improving the livelihoods of coastal communities.

Dr. Ram Mohan M. K., Director, MPEDA, delivered the lead talk, highlighting the latest developments in seafood processing, export oriented product innovation, and the expanding global demand for high value, ready-to-cook, and value added marine products. He underscored the importance of adopting international quality standards, modern processing technologies, and robust traceability systems to enhance India's competitiveness in global markets.

A major highlight of the session was the segment on IT and digital innovation. Speakers discussed the increasing use of Artificial Intelligence (AI), Machine Learning (ML), the Internet of Things (IoT), and blockchain in improving fisheries management and optimising value chains. Presentations demonstrated how AI-powered quality assessment tools, automated grading systems, catch forecasting models, and ML-based species identification are transforming post-harvest operations and driving efficiency. Digital platforms and e-marketplace models were showcased as effective tools for strengthening market linkages and empowering small-scale producers. The session also addressed the challenges faced by traditional stakeholders, emphasising the need to improve digital literacy, build technical skills, and promote inclusive adoption of new technologies. Participants highlighted the potential of AI-enabled

decision support systems, smart cold chain monitoring, and digital supply chain tools to enhance transparency, reduce post-harvest losses, and improve profitability.
Strengthening post-harvest infrastructure, supporting women led and youth led enterprises, and fostering sustainable, technology driven value chains were identified as essential steps toward improving livelihoods and promoting equitable growth in the fisheries sector.

Recommendations

1. Strengthen traceability & certification systems
2. Enhance value addition & reduce postharvest losses
3. Build capacity for deep sea fishing and environmental management

INSTITUTE - INDUSTRY MEET

The Institute Industry meet was held on 5 November 2025 in the Dr. E.G. Silas Hall of ICAR-CMFRI. India's seafood export sector is facing a major setbacks following the recent U.S. tariff hike, prompting strong calls from industry leaders and policymakers for urgent market diversification, greater value addition, and technology-driven innovation to sustain the country's seafood trade. This concern took centre stage at the Industry Meet held alongside the fourth International Symposium on Marine Ecosystems (MECOS 4) at ICAR-Central Marine Fisheries Research Institute (CMFRI). With exports to India's largest market declining sharply, stakeholders urged swift action to diversify export destinations and increase value addition to protect the sector from significant losses.

According to Dr. Ram Mohan, Director of the Marine Products Export Development Authority (MPEDA), India's seafood exports to the United States fell by nearly 6% during April-September 2025. In contrast, exports to China, Vietnam, and Thailand grew substantially, indicating a shift in trade dynamics toward Asian markets. "With anti-dumping and countervailing duties combined, the effective tariff now stands at 58.26%, severely eroding India's competitiveness in its top export destination," he noted. Dr. George Ninan, Director of ICAR-Central Institute of Fisheries Technology (CIFT), stressed the need for a strong, technology driven startup ecosystem in the fisheries sector one that brings together researchers, technologists, industry, and policymakers to foster innovation and value addition. The meet recommended

focusing on reprocessing and developing high value products to boost export earnings.

Industry leaders emphasised that India must move beyond exporting bulk raw seafood and tap into the vast potential of diversified value-added products such as breaded squid rings, surimi-based items, and a range of ready-to-eat seafood fillets. Participants noted that India's current value-added seafood exports stand at USD 742 million, far behind major competitors like China, Thailand, Vietnam, Ecuador, and Indonesia. The meet also recommended establishing exclusive aquaculture zones and accelerating Free Trade Agreements (FTAs) to help India regain its competitive edge in global markets.

"The U.S. has long been India's biggest market for shrimp exports, which make up the bulk of the country's seafood trade. However, the new tariff regime, along with sustainability and traceability requirements, has disrupted trade flows and impacted export earnings," said A. J. Tharakan, President of the Seafood Exporters Association of India.

CMFRI Director Dr. Grinson George stated that the concerns raised by fish producers, exporters, feed manufacturers, and other stakeholders would be systematically documented and incorporated into a comprehensive roadmap as part of MECOS deliberations. The Industry Meet brought together representatives from seafood exports, shrimp production, fish meal manufacturing, aqua feeds, adventure sports, coastal ecotourism, as well as fish farmers and fishermen groups. The meet was coordinated by Dr. Joe K. Kizhakudan.

Recommendations:

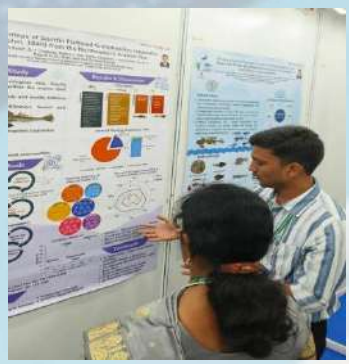
1. Prioritise and intensify efforts to eliminate antibiotic residues in seafood exports.
2. Take immediate action to curb juvenile fishing and address factors leading to declining catch rates to ensure long-term sustainability.
3. Develop strategies to support conversion of agricultural land to aquaculture, following successful models like Andhra Pradesh.
4. Strengthen quality control measures for raw materials to meet the requirements of high-value value-added products.
5. Establish a comprehensive policy and monitoring framework for fisheries operations beyond territorial waters (EEZ and high seas).
6. Implement strategies to significantly increase high-value export products, with the aim of doubling industry income.
7. Prioritise R&D and commercialisation of seaweed based products and by-products to meet rising global demand for natural marine ingredients.

8. Create mechanisms to identify critical industry bottlenecks and provide targeted incubation and financial support for start-ups, leveraging research institute expertise.
9. Conduct regular and rigorous stock assessments to determine Maximum Sustainable Yield (MSY) and guide science-based fishing limits.
10. Strengthen enforcement of Marine Fishing Regulation Acts (MFRAs) and Marine Mammal Protection Acts (MMPAs) to safeguard biodiversity and fish stocks.
11. Mandate registration of all aquaculture farms under the Coastal Aquaculture Authority (CAA) or State Fisheries Departments to improve accountability and quality.
12. Implement mandatory registration and certification of all raw material suppliers and regulate unregistered pre-processing units.
13. Maintain robust traceability records including source, date, location, and processing history to meet international compliance requirements.
14. Accelerate development of modern processing and cold-chain infrastructure.
15. Launch specialised training and capacity building programmes to create a skilled workforce across the value chain.
16. Establish exclusive aquaculture zones for hatcheries and farms, free from polluting industries.
17. Implement measures to reduce wastage of seed and feed.
18. Enable government institutes to support Fisheries Improvement Projects (FIPs) and sustainable fisheries initiatives to facilitate export of FMFO from India.
19. Prioritise skill development tailored specifically to the needs of the aquaculture industry.
20. Focus on conservation breeding and seed production rather than relying only on direct species protection.
21. Promote stronger lab-to-field research and encourage industry–research institute collaborations.

POSTER PRESENTATION


The Poster Committee was chaired by Dr. Suresh Babu P.P and Dr. Adnan Gora and was held in the Poster Hall on the seventh floor.

Theme 1: Ecosystems and Biodiversity Conservation

Held on Day 2 of MECOS 4, on 5 November 2025 the poster session under the theme "Ecosystems and Biodiversity Conservation" brought together 108 posters out of the 132 submissions. The session offered a rich and wide ranging overview of marine and coastal ecological processes, with studies spanning habitat protection, species diversity assessments, ecological restoration, and long-term ecosystem monitoring. The research represented a variety of coastal and oceanic regions across India and beyond.

Many presenters highlighted emerging threats to biodiversity, including climate-driven changes, habitat fragmentation, pollution impacts, invasive species, and growing anthropogenic pressures such as overfishing and coastal development. Several posters showcased the use of advanced tools environmental DNA (eDNA) barcoding, underwater imaging systems, GIS based habitat mapping, and AI-enabled

species identification to strengthen the precision and scope of biodiversity assessments.

Researchers also emphasized ecosystem valuation approaches that link ecological well being with socio-economic benefits. These included blue carbon assessments, habitat service quantification, and cost benefit analyses of conservation interventions. A noteworthy aspect of the session was the focus on community driven conservation, with posters presenting participatory monitoring initiatives, co-management models, and local stakeholder engagement in managing ecologically sensitive areas. Overall, the session provided a comprehensive perspective on current conservation needs, underscoring the necessity of science based management, adaptive policy frameworks, and sustained collaboration to safeguard marine ecosystems and enhance long term ecological resilience.

Theme 2: Sustainable Fisheries and Mariculture

The poster session on the theme “Sustainable Fisheries and Mariculture” was conducted in two parts on Day 1 of MECOS 4 on 04 November 2025, with Part 1 held from 12:00 to 14:15 and Part 2 from 15:15 to 17:30. Of the 175 posters registered, 133 were presented, reflecting the strong and growing scientific interest in responsible fisheries development and advanced mariculture systems.

The session featured extensive research on sustainable stock assessment techniques, ecosystem based fisheries management, and innovative mariculture technologies aimed at enhancing productivity while reducing environmental impacts. Several studies highlighted advancements in open-sea cage farming, integrated multi-trophic aquaculture (IMTA), and species diversification approaches designed to strengthen farm resilience and improve economic outcomes. Common challenges discussed included disease outbreaks, climate variability, hatchery constraints, and the pressing need for robust biosecurity measures.

The session also showcased emerging technological solutions such as digital monitoring platforms, sensor based water quality management, remote diagnostics, and innovations in feed optimization tools that are increasingly vital for achieving efficient and environmentally sound aquaculture practices. Many posters emphasized sustainable harvest strategies, livelihood diversification for coastal communities, and the importance of long-term stewardship of marine resources. Overall, the research presented underscored the necessity of balancing economic advancement with ecological responsibility, ensuring that the fisheries and mariculture sectors grow as resilient, inclusive, and sustainable pillars of the blue economy.

Theme 3: Climate & Environmental Resilience

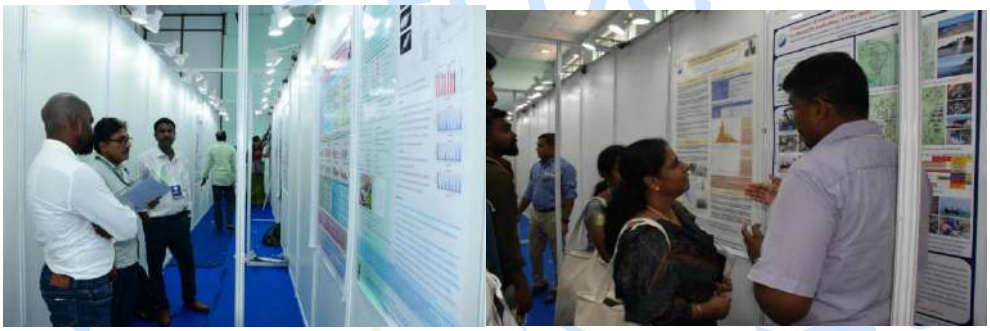
Held on Day 2 of MECOS 4, on 5 November 2025, the poster session on “Climate & Environmental Resilience” took place from 11:45 AM to 1:00 PM, featuring 41 posters out of the 48 submissions. The session highlighted cutting edge scientific work aimed at understanding how marine and coastal ecosystems are coping with escalating climate related pressures.

The posters covered a wide range of critical issues, including ocean warming, ocean acidification, shifting current patterns, sea-level rise, and the growing frequency of extreme weather events factors that directly affect marine biodiversity, fish stocks, and the socio-economic stability of coastal communities. Researchers presented vulnerability assessments and climate adaptive management strategies informed by long term datasets, ecological modelling, and scenario based projections. Several studies showcased the use of advanced tools such as remote sensing, satellite based oceanographic data, AI-driven climate forecasting models, and automated anomaly detection systems, which together enhance the precision of environmental monitoring and early warning capabilities. Nature based climate solutions featured prominently, including mangrove restoration, seagrass meadow rejuvenation,

artificial reef installation, and the conservation of climate resilient species practical approaches that help safeguard ecosystems against climate impacts.

Overall, the session underscored the need for proactive climate governance, integrated coastal zone management (ICZM), habitat focused conservation, and community led adaptation initiatives to strengthen long term ecological resilience and secure sustainable livelihoods in an era of increasing climate uncertainty.

Theme 4: Products, Value Chains and Livelihoods



Held on Day 2 of MECOS 4, on 5 November 2025, from 11:45 AM to 1:00 PM, the poster session on “Products, Value Chains and Livelihoods” featured 60 posters out of 72 submissions, offering a broad and insightful look into innovations and socio-economic developments across the marine sector.

The presentations highlighted significant advancements in seafood product development, including ready-to-cook varieties, functional foods, nutraceuticals, and high value processed products. These innovations were supported by improvements in preservation methods, eco-friendly packaging, and modern cold chain infrastructure. Several posters focused on digital transformation within fisheries value chains through tools such as blockchain based transparency systems, digital traceability platforms, GIS enabled supply mapping, and real time market intelligence all enhancing authenticity, quality assurance, and consumer trust. Research centred on livelihoods brought attention to opportunities for empowering coastal communities, especially fisherfolk, women’s self help groups, and micro-entrepreneurs. Themes included capacity building, skill development, small scale enterprise promotion, and diversified income pathways. Many posters also addressed challenges such as post harvest losses, supply chain bottlenecks, and the need for strategies to strengthen economic resilience.

Overall, the session emphasized a forward thinking vision in which technology driven value addition, sustainable processing practices, and inclusive value chain development work together to improve livelihoods and support the socio-economic well-being of communities across the fisheries and marine sectors.

Side Event: Research in Marine Mammals and Seabirds

Held as a Side event on Day 1 of MECOS 4, on 4 November 2025, from 15:15 to 17:30, the session on “Research in Marine Mammals and Seabirds” featured 10 selected posters (out of 12 submitted) and highlighted significant progress in India’s rapidly growing research on marine megafauna. The session brought together studies on whales, dolphins, porpoises, and a wide range of seabird species, underscoring the importance of long term monitoring and conservation of these important ecological sentinels.

The posters showcased advanced techniques for non invasive monitoring, including Passive Acoustic Monitoring to detect cetacean vocalizations over long distances, drone based aerial surveys for population estimation, photo identification catalogues to track individual animals, and habitat modelling to understand patterns of distribution. These methods are greatly improving researchers’ ability to monitor elusive and wide ranging species even in difficult marine conditions.

Several posters highlighted the increasing pressures faced by marine mammals and seabirds, such as entanglement in fishing nets, ship strikes, underwater noise, depletion of prey, ingestion of plastic, and habitat degradation caused by coastal development and climate change. Case studies of strandings and findings from necropsies offered valuable information on causes of mortality and overall health, stressing the need to strengthen stranding response capacity.

Research on seabirds examined foraging behaviour, migratory links revealed through tracking tools, breeding ecology, and their growing importance as indicators of ocean health and pollution levels. Together, these studies highlighted the deep ecological connections between marine mammals, seabirds, and the wider marine ecosystem.

Overall, the poster session emphasized the urgent need for coordinated national monitoring, stronger policy support, and continued technological innovation to protect India's marine megafaunal diversity. The event reaffirmed the value of scientific collaboration in advancing effective conservation strategies for these vital components of the marine environment.

SIDE EVENTS

Conservation of marine mammals in the EEZ of the India: Prioritizing future evidence needs

In a Special Track at MECOS 4, held on 6 November 2025 at the EG Silas Hall of ICAR - CMFRI, experts highlighted the transformative potential of Passive Acoustic Monitoring (PAM) for advancing marine mammal research in India, marking a major shift in how whales, dolphins, and other cetaceans are studied and protected. Since sound travels much faster and farther underwater than light, PAM provides a powerful, continuous, and non-invasive method to detect and track marine mammals even in deep waters or low visibility environments overcoming many of the limitations of traditional visual surveys.

During the session, Dr. Divya Panicker from Ashoka University explained how advanced Passive Acoustic Monitoring (PAM) technologies such as bottom mounted moorings, drifting or surface buoys, towed acoustic arrays, and even animal borne tags are being used to record the vocalizations of marine mammals. These tools allow researchers to map their presence, abundance, movements, and migration patterns with far greater accuracy. By analysing the unique acoustic signatures of calls, clicks, and whistles, and integrating Artificial Intelligence and Machine Learning, scientists can significantly enhance species identification and classification while also describing fine scale behaviour's that would otherwise go unnoticed.

Given India's vast coastline and rich marine biodiversity, researchers stressed the urgent need to develop indigenous acoustic monitoring systems. They advocated for a National Plan of Action for Marine Mammal Conservation supported by adequate funding, capacity building, and a strong multi-institutional network to coordinate research and protection efforts across the country. This aligns with global best practices, as PAM is increasingly used worldwide not only to study cetaceans but also to monitor underwater noise from human activity and help mitigate its impacts.

A major concern highlighted during the discussions was the lack of a coordinated marine mammal stranding response mechanism. Dr. Grinson George, Director of CMFRI, emphasized that rescue operations and post-mortem examinations must be led by trained marine scientists to reliably determine causes of death. Supporting this view, Dr. A. Bijukumar of KUFOS called for a national, multi-institutional marine mammal network that brings together research organisations, enforcement agencies, and coastal communities for better monitoring and conservation.

The session also showcased recent scientific progress. Research groups at CMFRI and other institutions have made notable advances in acoustic data collection and signal processing. Studies along India's west coast, for instance, have documented thousands of marine mammal vocalizations including humpback whale calls contributing to a valuable and expanding data repository.

Overall, the discussions reaffirmed that strengthening PAM capacity, improving policy frameworks, and building regional collaboration networks will be essential for protecting India's marine mammals in the face of rapid environmental change.

Recommendations

1. Establish a multi-agency task force to consolidate marine mammal data across ICAR institutes and partner non-governmental organisations.
2. Begin long-term monitoring programs in priority hotspots using complementary methods such as visual surveys, passive acoustics, satellite tracking, and eDNA sampling.
3. Focus research efforts on stock-level distribution, population trends, acoustic datasets, and population structure.
4. Build capacity among officials, researchers, and conservation practitioners by creating a dedicated national network for coordinated stranding response and analysis.

BIMSTEC-India Marine Research Network (BIMReN): First Regional Partners Conclave

The first Regional Partners Conclave of the BIMSTEC-India Marine Research Network (BIMReN), held alongside MECOS 4 at CMFRI at the E.G Silas Hall on the 4 November 2025, underscored the growing importance of regional scientific collaboration among Bay of Bengal nations. Established jointly by India's Ministry of External Affairs and the Bay of Bengal Programme Inter Governmental Organisation (BOBP-IGO), BIMReN aims to bring together scientists, policymakers, and research institutions across BIMSTEC member countries to collectively address shared marine and ocean challenges. As highlighted by BOBP-IGO, issues such as overfishing, illegal, unreported and unregulated (IUU) fishing, climate change, and the degradation of marine ecosystems are inherently transboundary problems no single country can solve alone.

In his address, C. S. R. Ram, Joint Secretary, Ministry of External Affairs, emphasized that the initiative, closely followed by the Prime Minister's Office, holds strategic significance not only for India but for the entire Bay of Bengal region. He noted that coordinated research will be essential to convert scientific findings into sound policy decisions that advance sustainable blue economy growth. This approach is supported by BIMReN's broader capacity building vision, which includes twinning research grants and split-site PhD fellowships to nurture emerging scientific talent across borders.

The network aligns seamlessly with India's broader regional outlook, complementing key pillars such as Neighbourhood First, Act East, Indo-Pacific, and MAHASAGAR policies. With over 25 institutions and more than 50 researchers already connected across BIMSTEC countries, BIMReN has laid a strong foundation for collaborative work in ocean observation, sustainable fisheries, ecosystem resilience, and other priority areas.

At a time when the region faces mounting threats from climate change, rising sea levels, pollution, and dwindling marine stocks, the conclave's call for strengthened scientific networking is both urgent and timely. Experts emphasized that only through shared efforts can Bay of Bengal nations build reliable data systems, develop evidence based policies, and implement community focused solutions that support the blue economy. Such collaboration will be vital not only for conserving marine ecosystems but also for safeguarding food security, strengthening coastal livelihoods, and ensuring long term sustainable development in this environmentally and geopolitically important region.

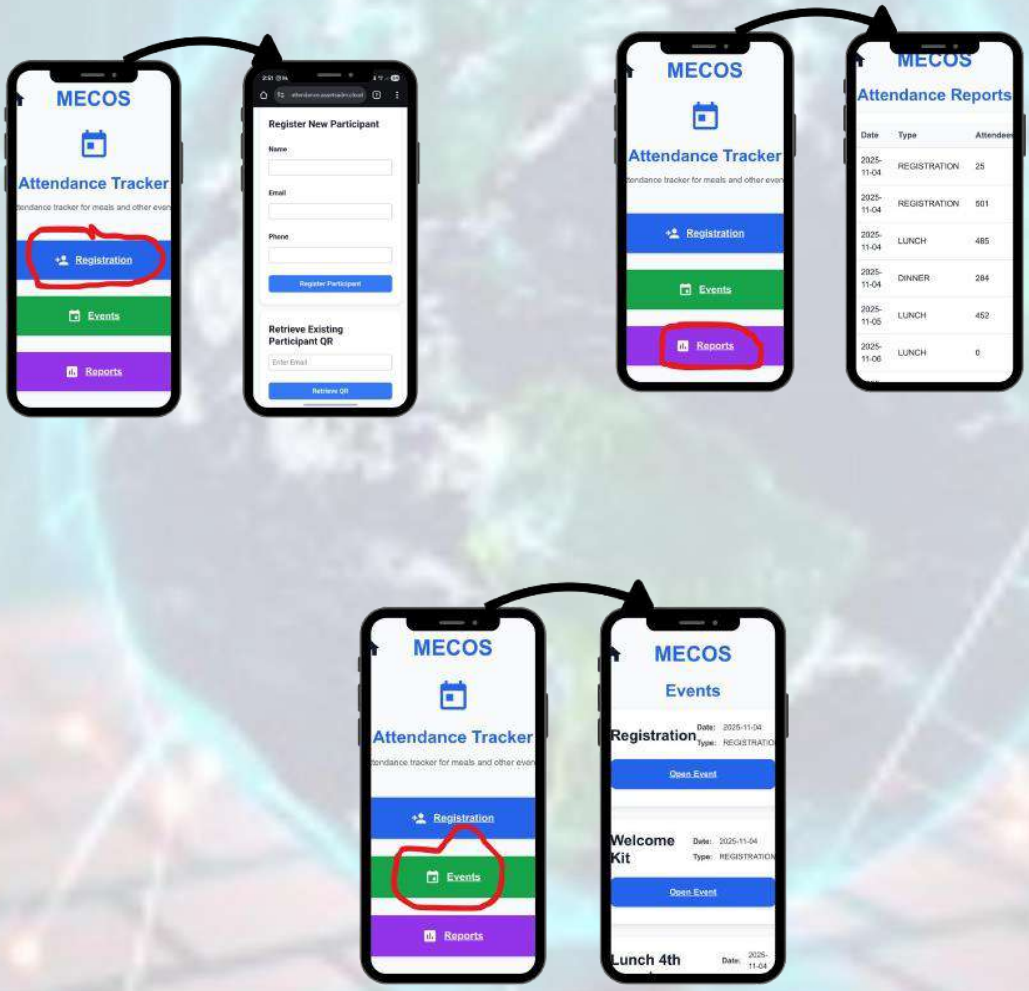
Recommendations:

1. Develop a joint regional action plan and thematic working groups.
2. Strengthen institutional integration and stakeholder mapping.
3. Establish regional centres of excellence and capacity-building hubs.
4. Mobilize international funding and policy support.
5. Promote collaborative research outputs and regional recognition.

Ecosystem Approach to Fisheries (EAF) and Other Effective Area-based Conservation Measurement (OECM)

A special session on EAFM was held on 4.11.25 as part of MECOS 4 with Dr. J K Jena DDG (Fy.) ICAR as Chief Guest. The session included an overview of EAFM and re-positioning in the region by Dr. P Krishnan, Director, BOBP-IGO. Dr. E Vivekanandan BOBP-IGO led the discussions on how to mainstream EAFM in the Bay of Bengal region. Participants from India and other Bay of Bengal countries, SEAFDEC (online) and IUCN Asia-Pacific (online) shared their EAFM experience and discussions were held on furthering regional expansion of EAFM. During the session, the ICAR-CMFRI BOBP EDIF Centre for EAFM was inaugurated which would serve as a secretariat for the Network of EAF Practitoners in the country.

DIGITAL ATTENDANCE MANAGEMENT SYSTEM FOR MECOS-4



To ensure smooth coordination and efficient participant management, MECOS 4 introduced a dedicated web-based Attendance Tracker system, accessible on both mobile devices and laptops. This user-friendly platform was designed to manage registrations, track participation, and generate real-time attendance insights throughout the event, significantly enhancing operational transparency and reducing manual effort.

The system opens with a clean homepage featuring three primary modules: Registration, Events, and Reports. In the Registration section, new participants can be enrolled by entering their essential details such as name, email, and phone

number. Upon successful registration, the participant automatically receives a confirmation email containing a unique QR code, which serves as their digital identity for the entire duration of the conference. For individuals who had already registered but did not receive the QR code or may have misplaced or deleted the email a Retrieve Existing Participant QR option is available. By simply entering their email ID, the system instantly retrieves and resends the QR code, ensuring that every attendee is digitally equipped. The Events module functions as the core of the attendance tracking system. At each event checkpoint such as welcome kit distribution, lunch service, and dinner arrangements volunteers and organizers scan the participants' QR codes. Upon scanning, the system displays the participant's name, email, and phone number, enabling verification and preventing unauthorized access. The platform is designed with intelligent validation; if a QR code is scanned more than once for the same service, the system alerts the volunteer with a "User already registered" message. This prevents duplication and ensures fair and accurate distribution of resources, particularly for high demand items like the welcome kit or meal services. The Reports section provides a comprehensive overview of participation metrics. It displays real-time counts of the number of welcome kits issued, as well as day wise attendance for lunch and dinner. This data-driven approach helps organizers monitor crowd flow, evaluate resource utilization, and make informed decisions during the event. The clarity and accuracy of the reporting feature significantly improved backend coordination and offered a transparent system for managing large volumes of attendees.

Overall, the MECOS 4 Attendance Tracker played a crucial role in modernizing event management. By integrating registration, verification, and reporting into a single digital platform, the system minimized manual errors, enhanced participant experience, and ensured smooth functioning across all event activities. Its successful implementation demonstrated the potential of simple yet powerful digital tools in elevating the efficiency and professionalism of large scale scientific conferences.

SEAFOOD EXPO






The Seafood Expo offered visitors a vibrant and flavourful celebration of coastal cuisine, bringing together an impressive assortment of traditional and contemporary seafood delicacies. One of the major highlights of the fest was its creative range of octopus based dishes, including the crowd favourite *octopus momos* and the richly flavoured *octopus roast*, each expertly prepared to showcase the versatility and unique taste profile of this premium marine ingredient. Alongside these specialities, the expo presented an extensive selection of popular marine fare, featuring fresh and expertly crafted preparations of mussels, prawns, squid, and a variety of fish, catering to diverse preferences and palates.

Adding to the culinary experience, visitors were treated to an array of special snacks and traditional recipes, many of which reflected the rich seafood heritage of the region. The aromatic and elaborate *Sagara Sadya*, a grand seafood feast rooted in coastal tradition, drew significant attention for its authenticity and variety. Another delicacy that stood out was the traditional Stuffed Mussels (*Kallumakkaya Niranjaathu*), known for its delicate balance of spices and meticulous preparation, making it a favourite among both locals and tourists.

With stalls buzzing with activity and aromas that filled the air, the MECOS Seafood Festival created a lively and immersive atmosphere for families, food lovers, and

culinary enthusiasts alike. The festival remained open to the public from 10:00 AM to 10:00 PM, allowing visitors to explore its offerings at their own pace and indulge in the finest flavours the ocean has to offer.

EXHIBITION STALL

The exhibition stalls offered a vibrant and immersive experience, presenting a fascinating blend of science, art, culture, and commerce centered around marine life and biodiversity. Each stall was thoughtfully curated to highlight different dimensions of the marine ecosystem, giving visitors a comprehensive understanding of both ecological significance and human interactions with the ocean. Several stalls focused on marine biodiversity conservation, displaying informative charts, specimen models, and interactive materials that helped visitors appreciate the diversity and ecological importance of various marine species. Adding a cultural and aesthetic dimension, a number of stalls showcased beautifully crafted jewellery made from ocean sourced pearls.These jewellery pieces, created by local artisans, demonstrated how marine resources can be transformed into elegant handicrafts that support coastal livelihoods while promoting sustainable use of natural materials.

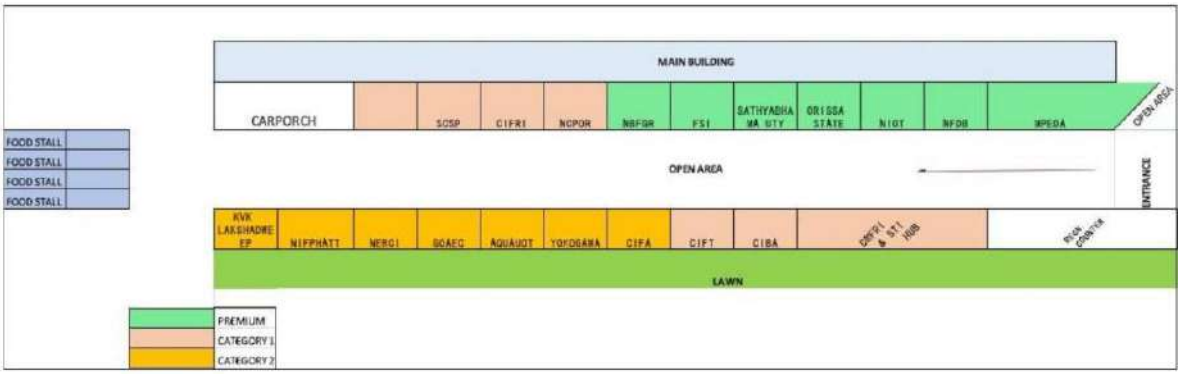
The Exhibition stalls in the Pavilion were:

1. MARINE PRODUCTS EXPORT DEVELOPMENT AUTHORITY
2. NATIONAL FISHERIES DEVELOPMENT BOARD
3. NATIONAL INSTITUTE OF OCEAN TECHNOLOGY
4. DEPARTMENT OF FISHERIES, GOVERNMENT OF ODISHA
5. SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
6. FISHERY SURVEY OF INDIA
7. ICAR-NATIONAL BUREAU OF FISH GENETIC RESOURCES
8. NATIONAL CENTRE FOR POLAR AND OCEAN RESEARCH
9. ICAR-CENTRAL INLAND FISHERIES RESEARCH INSTITUTE
10. SCHEDULED CASTE SUB PLAN – TRIBAL SUB PLAN- CMFRI
11. KRISHI VIGYAN KENDRA, LAKSHADWEEP
12. NATIONAL INSTITUTE OF FISHERIES POST-HARVEST TECHNOLOGY AND TRAINING
13. NANSEN ENVIRONMENTAL RESEARCH CENTRE OF INDIA
14. GOA AQUACULTURE ECO CENTRE, VISAKHAPATNAM
15. AQUA OUTBACK RESORT & RESEARCH CENTRE, TUTICORIN
16. STATE BANK OF INDIA
17. ICAR-CENTRAL INSTITUTE OF FRESHWATER AQUACULTURE
18. ICAR-CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY

19.ICAR-CENTRAL INSTITUTE OF BRACKISHWATER AQUACULTURE
20. SCIENCE TECHNOLOGY AND INNOVATION HUB – CMFRI - KOCHI
21.ICAR-CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

One of the most popular attractions was the stall selling shrimp and reef-associated fishes, where visitors could observe a wide variety of commercially important species sourced directly from the local marine environment. This stall not only promoted seafood marketing but also educated the public on responsible harvesting and the value of maintaining healthy reef ecosystems. Another visually striking stall featured artistic paintings and illustrations of marine life, capturing the vibrant colours, textures, and movements of underwater species. These artworks added an emotional and creative dimension, inspiring visitors to appreciate the aesthetic beauty of the ocean beyond scientific understanding.

MECOS4 Exhibition Layout



Complementing the artistic and educational displays were stalls offering value added seafood products such as fish pickles, dried fish, ready-to-cook items, and other packaged seafood delicacies. These stalls highlighted the entrepreneurial potential within coastal communities and demonstrated how marine resources can be utilized sustainably to generate income and create high quality food products. Overall, the exhibition created a dynamic and engaging environment where science, culture, craftsmanship, and commerce came together. It provided an enriching platform for visitors to explore the multifaceted relationship between humans and the marine ecosystem, fostering awareness, appreciation, and responsible stewardship of ocean resources.


NATIONAL FISHERIES DEVELOPMENT BOARD


NATIONAL BUREAU OF FISH GENETIC RESOURCES
FISHERY SURVEY


MPEDA


ERNMENT OF ODISH
sheries & ARD Department


ICAR - CENTRAL INLAND FISHERIES
RESEARCH INSTITUTE
KOCHI CENTRE


SURVEY OF INDIA


SEAWEED

AWARDS

Dr S. Jones Memorial Prize

MBAI has instituted a triennial Dr S. Jones Memorial Prize in memory of its founder President for researchers who have made outstanding contributions in marine biology and fisheries. The prestigious fourth Dr. S. Jones Memorial prize carrying a cash prize of Rs. 25,000/ a Medallion and Citation was given away during MECOS 4 to Dr G Gopakumar, Retired Principal Scientist, & Former Head, Mariculture Division, ICAR-CMFRI.

THE MARINE BIOLOGICAL ASSOCIATION OF INDIA

Kochi-682 018, KERALA, INDIA

The Fourth

Dr. S. Jones Memorial Prize - 2025

The Marine Biological Association of India has great pleasure in presenting the Fourth **Dr. S. Jones Memorial Prize** - 2025 to the eminent marine biologist, **Dr. G. Gopakumar** for his outstanding research contributions to the field of Mariculture and Marine Fisheries on the 4th day of November, 2025 at Kochi.

The Award includes a medallion, certificate, citation and a cash prize of Rupees Twenty five thousand.

Dr. Rekha J. Nair
Secretary, MBAI

Dr. Grinson George
President, MBAI

MBAI
www.mbai.org.in

OTHER AWARDS

Dr M. Devaraj Memorial Award -

Ambarish, P. Gop, B. Santhosh, M. Sakthivel, A. Anuraj, F. Muhammed Anzeer, K. S. Aneesh, Y. Dispin Das, S. Surya, Krishna Sukumaran, G. Rathi Bhuvaneswari, Boby Ignatius, V. V. R. Suresh, A. Gopalakrishnan and Grinson George (SFM-1): *Year-round induced spawning of giant trevally Caranx ignobilis in captivity.*

Dr N.R. Menon Memorial Award -

S. **Remya**, P.V. Suvina, Toms C. Joseph, C.O. Mohan and J. Bindu (PVL-4): *Seaweed polysaccharides as novel prebiotic sources for symbiotic functional food development*.

&

Sujitha Thomas, M. P. Remesan, K.M. Rajesh, Shoba Joe Kizhakudan, K. V. Akhilesh, K. K. Prajith, Sunil Kumar Ail, Divya Viswambharan, Bindu Sulochanan, Shelton Padua, U. Ganga, A. Jeyakumari, K. K. Anas, L. Remya, Livi Wilson, P. Shinoj, P. S. Ashik, Abdul Luhai, U. A. Akhila, T. B. Nadiya, George Ninan and Grinson George (SFM-1): *Multi-stakeholder participatory trials for the potential commercial exploration of mesopelagic resources in the Indian EEZ.*

Dr R. Reghuprasad Memorial Award -

N. **S. Jeena,** S. Rahuman, W. Sebastian, R. Kumar, K. A. Sajeela, Joe K. Kizhakudan, K. K. Menon, S. K. Roul, A. Gopalakrishnan and E. V. Radhakrishnan (EBC-71): *Unveiling cryptic diversity in the mud spiny lobster (Panulirus polyphagus): A molecular framework for conservation and regional fisheries management in the Indo-Pacific.*

Dr P.S.B.R. James Memorial Award -

J. **Raymond Jani Angel,** R. Aravind, K.P. Sandeep, Dani Thomas, Amal Vasu, P.S. Shyne Anand, P. Mahalakshmi, M. Jayanthi and Kuldeep K. Lal (SFM-106): *Optimising larval and nursery survival of the blue swimmer crab Portunus reticulatus: Influence of salinity and stocking density.*

YOUNG MARINE BIOLOGIST AWARD

The Young Marine Biologist Award has been given to those who follows:

1. **P.S. KEERTHANA** for the paper *Mapping the deep-sea diet: A comprehensive review on trophic ecology and feeding guilds of deep-sea fishes*

2. **POOJA M UTHRAD** for the paper *Marine Ichthyofauna of the Andaman & Nicobar Islands: Diversity, distribution patterns and conservation imperatives in deep-sea environments*

3. **SUYANI NITIN KANJI** for the paper *AI-based identification vs. conventional taxonomy of deep-sea fishes: A comparative analysis of strengths, limitations and synergies*
4. **STEPHY TERRY** for the paper *Biodiversity hotspots in the deep: Comparing biological succession and ichthyofaunal diversity on artificial reefs and sea mounts*
5. **T.M. MANU** for the paper *Diversity and community structure of microzooplankton community in diverse coastal water ecosystems of the Andamans*
6. **K.M. VISHNUPRIYA** for the paper *Morphometric discrimination and distribution patterns of nine Upeneus species (Family: Mullidae)*
7. **NAHIL ALIKUTTY** for the paper *Automated identification of deep-sea marine fishery resources through neural networks*
8. **ANZEENA AZEEZ** for the paper *Deep DATA: An android application for displaying key identification features of deep-sea fish species*

YOUNG WOMEN MARINE BIOLOGIST AWARD

1. **SAIMA REHMAN** for the paper *Development and characterisation of chitosan-silver nanoparticles for bioactive applications*
2. **JERUSHA ANN THOMAS** for the paper *Squeezed by a changing scene: Will climate change push Caranx ignobilis to the brink*
3. **N. MANJULEKSHMI** for the paper *Transforming abandoned FRP fishing boats into circular economy products for marine waste mitigation*

CGOA-MBAI Award for the best Oral Presentation

A one time Award was constituted by CGOA (Central Government Officers Association) for the Best Oral Presentation in MECOS 4. It was awarded to **A. Suresh** and I.D. Rajesh (PVL-6) for the presentation "*Total factor productivity growth in the fish processing industry of India*". The Award carried a Memento, Certificate and cash award of Rs 2500.

BEST ORAL AND POSTER PRESENTATIONS

Best Oral and Poster presentations were given in all Themes. The Award carried a certificate and memento.

Theme 1: Ecosystems and Biodiversity Conservation (EBC)

Best Oral Presentation:

S. Narayani and S. Venu (EBC-11): *Functional role of the striated surgeonfish Ctenochaetus striatus in the reefs of south Andaman.*

Best Poster:

M. U. Rekha, S. Akash, C. P. Abhilash, R. Vallarasu and T. T. Ajith Kumar (EBC-84): *Insights into the reproductive biology of Chromis viridis.*

***K.* P. Neethu,** K. S. Sobhana, Keerthi R. Babu, S. Jasmine, L. Ranjith, K. K. Joshi and Grinson George (EBC-86): *Diversity and characterisation of culturable extremely halophilic archaea from two saltpans in Tamil Nadu, South India.*

Theme 2: Sustainable Fisheries and Aquaculture (SFM)

Best Oral Presentation:

J. **Jayasankar**, Somy Kuriakose, K. G. Mini, Eldho Varghese, Vinaya Kumar Vase, Sindhu K. Augustine, R. Manjeesh., Sijo Paul, V. K. Manu., V. Sreepriya and A. R. Reshma (SFM-3): *Enhanced survey methodology for estimating marine fish landings - A relook at ICAR-CMFRI methodology.*

Best Poster:

P. Gomathi, M. K. Anil, Josileen Jose, Shoji Joseph, P. M. Krishnapriya and O. Shalini (SFM-103): *Optimising spat production of the tropical brown mussel (Perna indica) in a micro-nursery system.*

Theme 3: Climate and Environment Resilience (CER)

Best Oral Presentation

R. Kiruba-Sankar, Yuvaraj Eswaran, Sirisha Adamala, Abilash Singh Chauhan1, A. R. Adharsh, S. Gokul and Shoaib Rassel (CER-3): *Ecological sensitivity, shoreline dynamics and resource vulnerability in Car Nicobar: Towards a sustainable small island management plan.*

&

Rajan Kumar, Vinayakumar Vase, Shikha Rahangdale, Swathi Lekshmi, R. Ratheesh Kumar, J. Jayasankar and Grinson George (CER-5): *Lagged environmental forcing improves predictive models of trawl CPUE off Gujarat Coast.*

Best Poster:

Shelton Padua, Reshma Gills, Prema D., Sobhana, K. S., Grinson George and Rajeev Ranjan (CER-11): *Cyclonic systems of the Northern Indian Ocean: Impacts on fisheries.*

&

Krishna Sukumaran, Ambarish P. Gop, A. Anuraj, Rathi Bhuvaneswari, Archana Satheesh, Anu Baiju, F. Muhammed Anzeer, K. S. Aneesh, S. Nisha, A. P. Dineshbabu, V. V. R. Suresh, B. Santhosh, A. Gopalakrishnan and Grinson George (CER-30) *From embryos to adults: How temperature influences the different life stages and thermal tolerance of marine medaka Oryzias dancena.*

&

P. A. Vikas and K. Vinod (CER-53): *Transforming Tamil Nadu's hypersaline landscapes: A sustainable Artemia-based model for biodiversity and climate-aligned land use.*

Theme 4: Products, value chains and Livelihoods (PVL)

Best Oral Presentation:

A. Jeyakumari, Rose Joseph, Sreepriya Prakasan, S.J. Laly, Renjith Kumar Nadella, K.K. Anas, K.K. Prajith, J. Bindu, M.P. Ramesan and Sujitha Thomas (SFM-3): *Exploring mesopelagic fishes for sustainable fish meal production and quality assessment.*

&

Eldho Varghese, V.K. Manu, J. Jayasankar, Somy Kuriakose, K.G. Mini, Sindhu Augustine, Sijo Paul, R. Manjeesh, T.V. Thejus and Grinson George (PVL-2): *AI-driven conversational assistant for fisheries data analysis and decision support.*

Best Poster:

Karthika Raveendran, Visnuvinayagam Sivam, Sifana Sharaf, Jerin Jacob, Jinsa Jose, Teena George, Ammu Lakshmi, K.K. Sreelakshmi, Toms C. Joseph, T. Raja Swaminathan, R. Shashidhar, B. Madhusudana Rao, Vandan Nagar and Murugadas Vaiyapuri (PVL-13): *CIFTEQ Staphage formulation: A phage consortium for the biocontrol of methicillin-resistant and sensitive Staphylococcus aureus in seafood.*

&

Ashwin A. Pai, Kajal Chakraborty, Archana Raj, Bibu John Kariyil, Shubhajit Dhara and R. Anoopraj (PVL-28): *A promising (1→4) linked glucuronoglucan from Perna perna.*

VALEDICTORY

The Valedictory Session of MECOS 4 was held on the final day of the conference and marked the formal conclusion of the scientific deliberations. The session was presided over by Dr. Biju Kumar, Vice Chancellor, Kerala University of Fisheries and Ocean Studies (KUFOS), who attended as the Chief Guest.

In his Valedictory address, Dr. Biju Kumar emphasised the relevance of MECOS 4 in strengthening national initiatives on marine ecosystem research. He highlighted the need for enhanced inter-institutional collaboration, capacity building, and the integration of advanced tools for ecosystem monitoring and management. He commended the organisers for bringing together a diverse group of scientists, researchers, and students, thereby facilitating meaningful exchange of knowledge.

The Vice Presidents of the Marine Biological Association of India (MBAI) Dr V Sugunan and Dr P Jayasankar, graced the occasion as Guests of Honour. In their remarks, they acknowledged the strong scientific content and excellent organisation of the conference. They appreciated the wide coverage of thematic sessions, high-quality presentations, and the active participation from young researchers, which collectively contributed to the success of the event. The overall recommendations which evolved from the Symposium was presented by Dr P Jayasankar, Vice President, MBAI. Dr, Grinson, Director of ICAR-Central Marine Fisheries Research Institute (CMFRI) addressed the gathering and congratulated the MECOS 4 organising team for conducting the conference in a structured, impactful, and professionally coordinated manner. He noted that the discussions and recommendations emerging from MECOS 4 would provide valuable inputs for ongoing research and policy frameworks related to India's marine ecosystems.

The Dr M. Devaraj Memorial Award, Dr N.R. Menon Memorial Award, Dr R. Reghuprasad Memorial Award, Dr P.S.B.R. James Memorial Award Best Oral and Poster Awards for each Theme, the Young Marine Biologist Award, Young Women Marine Biologist Award and the CGOA-MBAI Award for the best Oral Presentation

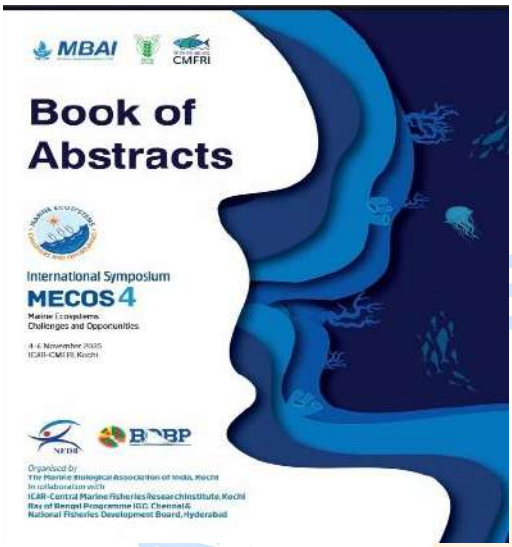
were also presented during the Valedictory. In addition, awards for Best Stalls in different categories were also presented.

The session concluded with the Vote of Thanks delivered by Dr. Rekha Nair, Organising Secretary, MECOS 4. She expressed sincere gratitude to the Chief Guest, Guests of Honour, Director CMFRI, invited speakers, session chairs, delegates, sponsors, partner institutions, and volunteers for their contributions and support. She acknowledged the efforts of the scientific committee, organising committee, and student teams whose dedicated work ensured the smooth conduct of all conference activities. The Valedictory Session formally brought MECOS 4 to a close, reaffirming the commitment of the marine science community to continued research, collaboration, and dissemination of knowledge for the sustainable management of marine ecosystems.

Overall Recommendations:

1. Adopt a more inclusion approach towards integrated, ecosystem based and multi-species management approaches for sustainable utilization of marine resources.
2. Incorporate environmental and socio-economic indicators into national stock assessment and fisheries management frameworks.
3. Enhance technological innovations through AI, machine learning, remote sensing, and digital data platforms for real-time fisheries monitoring.
4. Expand sustainable mariculture practices emphasizing IMTA, species diversification, and ecosystem health integration.
5. Strengthen brood stock, hatchery, and nursery networks through public - private partnerships for scalable mariculture production.
6. Develop robust value chains with improved cold chain infrastructure, traceability, and indigenous sustainability certification systems.
7. Develop and implement to do and indicators is asses the indicativeness and impact of conservation methods and technologies.
8. Mainstream climate change research and environmental resilience strategies into national and regional framework.
9. Promote participatory and community lead fisheries governance, ensuring inclusion of costal and island fishers.
10. Empower women and youth through targeted capacity building , start- up support, and leadership in marine sector.
11. Foster regional collaboration, institutional partnership, and centers of excellence to advance blue economy goals and innovation.
12. Develop and implement tools and indicators to assess the indicativeness and impact of conservation methods and technologies.

PUBLICATIONS




REGISTRATION COUNTER
MECOS 4
CHAIR
INCOME (₹)
Subscription 80,500.00
Bank Interest 72,831.48
Sale of Journals & Publications
Colour Printing Charges
Interest on IT refund
Grant for JMBAI
Total
AGENDA
MECOS4

SPONSORS

सत्यमेव जयते

भाकृअनुप ICAR

सी एम एफ आर आइ CMFRI

ESTD. 1958 MBAI The Marine Biological Association of India

NFDB

THE MARINE PRODUCTS EXPORT DEVELOPMENT AUTHORITY - INDIA - भारत

BOBP

राष्ट्रीय समुद्र प्रौद्योगिकी संस्थान रा स प्रौ सं NIOT National Institute of Ocean Technology

SIST JUSTICE PEACE REVOLUTION

ओडिशा शासन

भारतीय मात्स्यिकी सर्वेक्षण FISHERY SURVEY OF INDIA

राष्ट्रीय ध्रुवीय एवं समुद्री अनुसंधान केन्द्र NCPOR NATIONAL CENTRE FOR POLAR AND OCEAN RESEARCH

एम.भा.अनु.सं.ब्यूरो NBFGR

भाकृअनुप ICAR CIFRI

SBI

CIBA

सी.आई.एफ.टी cift

CIFA

NABARD

CENTRAL INSTITUTE OF FISHERIES EDUCATION ICAR मुंबई

NERCI

National Institute of Fisheries Post Harvest Technology & Training COCHIN

Prepared by:

Dr. Grinson George | Dr. Rekha J. Nair | Dr. V.V.R Suresh | Dr. Eldho Varghese

Marine Biological Association of India-MBAI