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भारत सरकार
GOVERNMENT OF INDIA
मत्स्यपालन विभाग
Department of Fisheries

Supported By:

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MINISTRY OF FOOD PROCESSING INDUSTRIES
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Ministry of Earth Sciences

नीति आयोग
National Institution for Transforming India

Joint Organiser:

National Fisheries Development Board
NFDB

Organisers:

IAFI
International Association of Fish Inspectors

PDA Ventures

The Marine Products Export Development Authority

Seafood Exporters Association Of India

Technical Partner:

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ICAR

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WORLD SEAFOOD CONGRESS 2026

**9 - 11 February 2026**
Chennai Trade Centre
Chennai, India

## Sustainable Solutions for Inclusive Growth

Building a safer, fair and resilient global seafood trade

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# TUNA2026

*"Strengthening Value Chain Synergies, Blue Economies and Sustainability across the Global Tuna Industry"*

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**TUNA 2026 will be a forward-looking, industry-driven forum that responds directly to lessons from TUNA 2024 and the evolving commercial realities of the global tuna industry. With a strong focus on value chain synergies, blue economy opportunities and sustainability, the Conference aims to help shape practical, profitable and inclusive pathways for the industry's future.**

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Note:

- The information contained in this book is true as on 3 February, 2026. Last-minute changes in the programme and layout plan may not have been incorporated.
- This Congress Souvenir and Exhibitor Directory has been compiled on the basis of information provided by the exhibitors & presenters. The organisers and publishers of the Congress Souvenir and Exhibitor Directory do not assume responsibility for correctness of the information or breach of any intellectual property rights.

# MESSAGE

Dr. Abhilaksh Likhi, IAS
Secretary
डॉ. अभिलक्ष लिखी, भा.प्र.से.
सचिव

भारत सरकार
मत्स्यपालन, पशुपालन एवं डेयरी मंत्रालय
मत्स्यपालन विभाग
कृषि भवन, नई दिल्ली–110001
Government of India
Ministry of Fisheries,
Animal Husbandry & Dairying
Department of Fisheries
Krishi Bhawan, New Delhi-110001

**MESSAGE**

The World Seafood Congress is a premier global platform that brings together policymakers, industry leaders, scientists, and stakeholders from across the seafood value chain.

The World Seafood Congress, 2026 will foster meaningful dialogue on sustainable fisheries, responsible aquaculture, seafood safety, value addition, and strengthening global seafood trade, while promoting innovation and best practices.

I encourage all participants to actively engage in the sessions, share knowledge and experiences, and build meaningful collaborations that can drive the sector forward.

The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, is committed to the holistic and sustainable development of the fisheries and aquaculture sector through focused policy interventions, infrastructure development, technology infusion, and capacity building, with special emphasis on enhancing the livelihoods of fishers and fish farmers, promoting responsible practices, and strengthening India's position in global seafood markets.

I congratulate the organisers, partners, experts, and delegates for facilitating discussions that will contribute significantly to the future of the global seafood sector.

I wish the Congress every success and productive deliberations.

**(Abhilaksh Likhi)**

Office: Room No. 220, Krishi Bhawan, New Delhi-110001 • दूरभाष / Phone: 23381994, 23070370
E-mail: secy-fisheries@nic.in

# MESSAGE

सत्यमेव जयते
डॉ. एम. रविचंद्रन
Dr. M. Ravichandran

सचिव
भारत सरकार
पृथ्वी विज्ञान मंत्रालय
पृथ्वी भवन, लोदी रोड, नई दिल्ली-110003
SECRETARY
GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
PRITHVI BHAWAN, LODHI ROAD, NEW DELHI-110003

## MESSAGE

It is a pleasure to share my thoughts for the World Seafood Congress, a significant global platform bringing together policymakers, industry leaders, scientists, and stakeholders from across the seafood value chain.

The Congress provides an important opportunity to deliberate on sustainable fisheries, responsible aquaculture, seafood safety, and climate-resilient practices, while promoting innovation and international cooperation.

I encourage all participants to actively engage in the sessions, exchange knowledge, and foster collaborations that can support evidence-based decision-making and sustainable ocean governance.

The Ministry of Earth Sciences, Government of India, plays a pivotal role in advancing the Blue Economy through ocean observation systems, marine research, climate services, and capacity building, which are essential for sustainable utilization of marine resources and enhancing the resilience of coastal and fishing communities. Strengthening the interface between science, policy, and industry is crucial for long-term sustainability of the seafood sector.

I congratulate the organisers, partners, experts, and delegates for bringing together diverse perspectives that will help shape the future of the global seafood sector.

I wish the Congress every success and fruitful deliberations.

(M.Ravichandran)

Tel. : +91-11-24629771, 24629772 ❑ E-mail : secretary@moes.gov.in

# MESSAGE

WORLD FOOD INDIA 2025
Processing for Prosperity

डी. प्रवीण
संयुक्त सचिव
D. Praveen
Joint Secretary

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
खाद्य प्रसंस्करण उद्योग मंत्रालय
MINISTRY OF FOOD PROCESSING INDUSTRIES
नई दिल्ली-110 049
New Delhi -110 049

## MESSAGE

It is a pleasure to share my thoughts for the World Seafood Congress, an important global platform bringing together policymakers, industry leaders, scientists, and stakeholders across the seafood value chain.

The Congress offers a valuable opportunity to deliberate on strengthening value addition, improving processing technologies, ensuring food safety and quality standards, and enhancing global competitiveness of seafood products, while promoting innovation and sustainable practices.

I encourage all participants to actively engage in the sessions, exchange insights, and explore collaborations that can contribute to the growth of the seafood processing and allied industries.

The Ministry of Food Processing Industries, Government of India, is committed to promoting a robust and modern food processing ecosystem through policy support, infrastructure development, cluster-based approaches, and adoption of advanced technologies, with the objective of reducing post-harvest losses, improving value realization for producers, generating employment, and strengthening India's position in global food markets.

I congratulate the organisers, partners, experts, and delegates for bringing together diverse stakeholders and facilitating discussions that will contribute meaningfully to the future of the global seafood and food processing sectors.

I wish the World Seafood Congress every success and productive deliberations.

(D. Praveen)

पंचशील भवन, अगस्त क्रांति मार्ग, नई दिल्ली-110 049
Panchsheel Bhawan, August Kranti Marg, New Delhi-110 049
Tel. : +91 11 2649 9177 • E-mail : d.praveen@nic.in

# MESSAGE

## 4. MPEDA

# MESSAGE

**Dr. Manuel Barange**
Assistant Director General at the
Fao and Director of the Fisheries and
Aquaculture Division

Good morning and thank you. My name is Manuel Barange. I'm Assistant Director General at the FAO and Director of the Fisheries and Aquaculture Division.

It is my pleasure to speak to you, although virtually, at the World Seafood Congress 2026. In 1969, FAO and UNIDO convened the first International Fish Inspection and Quality Control Conference, the foundation of what is now the World Seafood Congress. I'm pleased to see that the International Association of Fish Inspectors is now leading the organisation of this important forum.

Now let me be clear, today 735 million people face hunger and almost 700 million people live in extreme poverty conditions. These are real lives, not just numbers. At the same time, our oceans and seas are under increasing pressure, but they hold enormous, untapped potential for food security and for poverty alleviation.

Let me tell you why aquatic foods matter. Global aquatic food production of aquatic animals reached 189 million tonnes in 2023. 19 million tonnes of those come from capture fisheries and 98 million tonnes come from aquaculture.

90% of this production goes directly for direct human consumption. In fact, the consumption of aquatic foods has been growing at twice the rate of population growth since the 1960s and is growing faster than the rate of consumption of any other protein sources, animal or vegetable. This means that they are having already a significant and growing role in improving nutritional outcomes.

Perhaps more importantly, aquatic foods are very rich on essential micronutrients, omega-3 fatty acids, iodine, iron and zinc, vitamins A, D and B12. Seafood is truly brain food. For example, omega-3 acids support brain development, memory and learning.

Iodine is critical for cognitive function. Let me mention 1.9 billion people currently lack sufficient iodine in their diets, a deficiency that is entirely preventable.

# MESSAGE

Ocean foods, including seaweed, offer a natural and sustainable solution.

Now, what is the role of seaweed overall? Global seaweed production exceeded 37 million tonnes in 2023. This is primarily in Asia. Seaweed is nutritionally dense, climate-friendly and holds a significant potential for future growth.

Now, what about the demand in the future? The global seafood demand is projected to grow by at least 15% by the end of this decade, driven by population growth, urbanisation and rising incomes, especially in the global south. Yet aquatic foods remain underrepresented in food security and nutrition strategies. Let me talk a little bit about jobs, economics and livelihoods.

Now, seafood is one of the most traded food commodities globally. Over 45% of its products are traded internationally, and the global trade of this product exceeds 195 billion US dollars. On people, 600 million people are estimated to depend on fisheries and aquaculture for their livelihoods, particularly small-scale fisheries that employ 90% of these people and produce 40% of the global catch.

So let me tell you about three priority actions that we think the sector needs to take into consideration. First, to make better use of aquatic foods. That means reducing loss of waste and use more of the whole fish.

At times, 30 to 70% of a fish is discarded during filleting, yet these parts are the most nutrient-dense. With simple, affordable technology, byproducts can be transformed into low-cost nutritional foods. Promoting sustainable foods like seaweed will also ensure food safety and better quality and better volume of production.

Second, to support small-scale fisheries and post-harvest workers, especially women who play a critical and often overlooked role, and youth who are the future of the sector. Investing in policies that improve incomes, working conditions and recognitions, and ensure the social sustainability of the sector. And third, to scale up sustainable aquaculture.

Aquaculture must expand and intensify, depending on the region, but responsibly. Focus particularly on eco-friendly, inclusive systems that protect ecosystems while delivering nutrition and jobs. Raising awareness of the reduced environmental impact of aquaculture compared to land-based protein sources, and it's

# MESSAGE

significant to feed a growing population.

FAO endorsed last year guidelines for sustainable aquaculture, primarily to follow this vision. In closing, if we are serious about ending hunger and poverty by 2030, we must recognise that oceans and seas are not only something to protect, but they are partners in development. We need to invest in sustainable ocean food systems, investing in nutrition, in livelihoods, in resilience, and in hope.

Let us turn this tide together for our oceans, for our people, and for our planet. Thank you very much.

# MESSAGE

## 6. NFDB

# MESSAGE

# 7. TNFDC

# MESSAGE

**Mr. Gunturu Pawan Kumar**
National President,
Seafood Exporters Association of India (SEAI)

" We are pleased to learn and be a part of The World Seafood Congress 2026 happening in Chennai from the 9th to 11th of February 2026.

May this event be a hub of knowledge exchange, fostering meaningful discussions and partnerships that drive the Seafood Sector forward.

India is committed to encouraging growth in the Seafood segment.

Best wishes to all the participants and organisers of World Seafood Congress "

# MESSAGE

**Dr. Ravishankar C N**
Former Director,
ICAR-CIFE & ICAR-CIFT
Chairman, National Steering Committee, World Seafood Congress 2026

On behalf of the National Steering Committee, it is my honour to welcome you to the World Seafood Congress-2026 in Chennai, India. This gathering marks a historic milestone as the first time the Congress is hosted on Indian - Nation that stands at the forefront of the global "Blue Revolution." This Book of Abstracts is a testament to our shared commitment to scientific excellence and industrial progress, serving as a comprehensive roadmap for the future of the global seafood trade.

The Congress theme, "Sustainable Solutions for Inclusive Growth – Building a safer, fair and resilient global seafood trade," reflects the urgent need to balance a rapidly expanding industry with the preservation of our aquatic ecosystems and the empowerment of the people who depend on them. The research curated within this volume addresses the critical challenges of our time: from ensuring rigorous seafood safety and integrity to implementing climate-resilient aquaculture practices. We believe that by bridging the gap between cutting-edge research and commercial application, we can build a seafood economy that is not only profitable but profoundly responsible.

India's fisheries and aquaculture sectors have demonstrated strong growth and resilience, with record seafood export performance supported by advancements in aquaculture practices, Genetic improved programmes, nutrition and feed

technologies, aquatic animal health management, improved standards, modern processing and packaging technologies, value addition, and providing qualified and skilled human resource at all levels. India's dynamic Fisheries and Aquaculture sector provides the perfect backdrop for this exchange of ideas. As we look toward the ambitious goal of doubling our seafood export earnings, we recognise that innovation is our most valuable resource.

The abstracts presented here-covering everything from blockchain traceability to the valorisation of seafood by-products-showcase the ingenuity required to navigate a complex, post-pandemic marketplace. Contents include: The role of the blue economy in developing countries, Blue foods- safety and nutrition challenges for developing countries, the Future of the global seafood trade, Ethical seafood, Value addition and processing technologies, Inspection and control systems, Hazards in seafood, and Traceabilty and data tools. We are delighted to host a joint UNIDO/FAO panel on seaweed - the blue food of the future as well as an exciting workshop supported by our colleagues at the Bay of Bengal Program, on the challenges facing the marine ingredients sector.

This event is expected to attract a diverse group of National and International Participants including industry professionals, regulators, policymakers, academia, and NGOs. It will serve as a platform for knowledge sharing and collaboration, aiming to drive the future of the global seafood industry. May the insights found here spark the partnerships and breakthroughs needed to ensure "Blue Foods" remain a safe, sustainable, and inclusive pillar of global food security.

I extend my deepest gratitude to the International Association of Fish Inspectors (IAFI), Department of Fisheries, Government of India, other government Institutions, PDA Ventures Pvt. Ltd., and the global community of researchers, administrators, and policy makers who have contributed to this mega event. I wish to compliment Dr. Ian Goulding, Dr. C.K. Murthy and Ms. Nazeeba Zarin for their significant efforts in planning and executing WSC 2026.

On behalf of the National Steering Committee, it is my great privilege to welcome you once again to the World Seafood Congress 2026, scheduled to be held in Chennai from 8-11 February 2026 and wishing everyone a productive and inspiring Congress!

# MESSAGE

**Dr. Ian Goulding**
President, International
Association of Fish Inspectors

On behalf of the International Association of Fish Inspectors it gives me great pleasure to welcome you to the World Seafood Congress 2026, being held at the Chennai Trade Centre, Chennai, India.

IAFI is recognised by the UN Social and Economic Affairs Committee as representing stakeholders in the global supply chain for aquatic food and feed products, of both plant and animal origin. In this respect, in promoting the biennial World Seafood Congress, IAFI aims to bring together parties engaged in ensuring that blue foods are safe, sustainable and equitable. We seek to sustain dialogue between governments, the fish and seafood harvesting, processing and marketing industries, academia, public and private organizations and other diverse disciplines. The Congress provides all of these sectors with a great opportunity to exchange information, ideas and methodologies, and for interaction with fellow professionals to foster understanding and strengthen collaboration.

The World Seafood Congress has its roots in the FAO Technical Conference on Fish Inspection and Quality Control, held in Halifax, Canada in 1969. The historical city of Chennai joins a long list of distinguished hosts including Halifax, Canada (1999), Vancouver, Canada (2001), The Hague, Netherlands (2003), Sydney, Australia (2005), Dublin, Ireland (2007), Agadir, Morocco (2009), Washington DC (2011), Newfoundland, Canada (2013), Grimsby, UK (2015),

Reykjavik, Iceland (2017), Penang, Malaysia (2019) and Peniche, Portugal 2023. We are delighted to bring the Congress for the first time to the Indian sub-continent, with its vibrant, dynamic and globally integrated seafood sector.

Whilst IAFI has its roots in fish quality control, and particularly in the safety of fishery and aquaculture products, our remit has expanded considerably over recent years, as globalisation of our food supply has brought additional issues of sustainability and equity to the fore. IAFI has always placed a high priority in ensuring that the seafood supply chain delivers products in a way that ensures that all participants, and especially those in developing countries, receive a fair share of the benefits of the global seafood trade, and that the environmental impacts of our business activities do not undermine the livelihoods of future generations. To this end, we especially welcome once again the participation of our UN and bilateral development partners, for whom production and distribution of fisheries and aquaculture products forms a core part of their blue economy strategies.

This year we are honoured by the presence in Chennai of a wide range of stakeholders from all around the world. Participants include producers, processors and distributors of aquatic products, trade associations, government agencies, competent authorities, NGOs, vocational training and educational and the R&D institutions. We are delighted that, for the first time, we have specialised sessions on the blue economy, human resources (including labour conditions) and on seaweed, reflecting the emergence importance of these areas on international trade and development. All of this, along with your active participation, will make WSC2026 an exciting and fulfilling event. I wish you all a great Congress.

# MESSAGE

**Dr. C. K. Murthy**
Technical Advisor,
WSC 2026

It gives me immense pleasure to welcome all delegates, researchers, industry leaders, regulators, policymakers, entrepreneurs, and stakeholders from across the world to the World Seafood Congress 2026 (WSC 2026) being held in Chennai, India.

This Congress comes at a defining moment for global aquatic food systems. The theme of WSC 2026 — "Sustainable Solutions for Inclusive Growth – Building a safer, fair and resilient global seafood trade" — reflects the urgent responsibility of ensuring that a rapidly expanding seafood sector remains environmentally sustainable, socially equitable, and scientifically robust.

Asia stands at the centre of this global transformation, accounting for nearly three-quarters of the world's fisheries and aquaculture production, with aquaculture increasingly emerging as the primary engine of future supply. India, as one of the leading seafood-producing nations, has demonstrated remarkable progress, with fish production reaching 19.78 million metric tonnes in 2024–25, and seafood exports touching 1.70 million tonnes valued at US$ 7.75 billion. These achievements underline India's growing contribution to global seafood value chains and resilient trade systems.

The deliberations at WSC 2026 will address the most critical challenges and opportunities shaping the seafood sector today. The Abstract Book reflects

# MESSAGE

an outstanding range of scientific and industrial contributions spanning the role of the Blue Economy in developing countries, the challenges of seafood safety and nutrition, the future of global seafood trade, and the increasing importance of ethical seafood standards, labour conditions, value addition, inspection systems, and hazard management.

A special highlight of the Congress is the joint UNIDO/FAO Panel on Seaweed and macro- and microalgae, recognizing seaweed as an emerging "blue food of the future" with immense promise for nutrition, climate resilience, and sustainable industrial development.

Equally significant is the growing emphasis on traceability and data tools to strengthen transparency, improve value chain efficiency, and meet evolving international market requirements — reinforcing consumer confidence and supporting fair trade practices.

As Technical Advisor, I firmly believe that WSC 2026 will catalyze meaningful partnerships between science, industry, and governance, fostering innovation-driven solutions that ensure seafood systems remain safe, sustainable, inclusive, and resilient for future generations.

I extend my sincere appreciation to the organizers, session chairs, contributors, and authors whose work is represented in this Abstract Book. I warmly invite all participants to engage actively in the discussions and collaborations that will shape the next phase of the global blue food revolution.

With best wishes for a successful and inspiring World Seafood Congress 2026.

# MESSAGE

**Mr. Pradeep Devaiah**
Chairman & CEO,
India Host – World Seafood Congress 2026

We are honoured to welcome you to the **World Seafood Congress 2026**, as India proudly hosts this prestigious global gathering for the first time. At a time when food security, sustainability, ocean health, and ethical sourcing dominate global conversations, the Congress serves as a critical forum for stakeholders to exchange knowledge, align perspectives, and collectively shape the future of the industry.

The 2026 edition is thoughtfully curated to address the sector's most pressing challenges and emerging opportunities. This vision is brought to the fore and addressed by a distinguished lineup of international and Indian speakers, including leading regulators, scientists, and industry experts.

As one of the leading seafood producers and exporters globally, India stands as the top choice to host this global forum. Our robust regulatory ecosystem, expanding processing capacity, and increasing technological adoption demonstrate a deep engagement with international standards. Hosting this Congress reflects India's unwavering commitment to responsible fisheries, sustainable aquaculture, scientific advancement, and transparent global trade.

The Congress is co-organised with the Department of Fisheries, Government of India, and supported by the Ministry of Food Processing Industries, the Ministry of Earth Sciences, ICAR, ICAR–CIBA, ICAR–CMFRI, NCSCM, and IMIA.

# MESSAGE

The Marine Products Export Development Authority (MPEDA) and the Seafood Exporters Association of India (SEAI) play key roles, alongside the National Fisheries Development Board (NFDB) as a Joint Partner and the Tamil Nadu Fisheries Development Corporation (TNFDC) as the Strategic Partner. Their instrumental contributions are gratefully acknowledged. Furthermore, the Indian Council of Agricultural Research (ICAR) serves as the Technical Partner, with technical cooperation extended by FAO and UNIDO.

I sincerely appreciate the guidance of the International Advisory and National Steering Committee, and thank our industry partners, sponsors, exhibitors, and delegates for their vital contributions.

**World Seafood Congress 2026** will serve as a trusted platform for building partnerships, strengthening global cooperation, and advancing sustainable growth across the seafood sector.

I extend a warm welcome to all delegates and wish you a productive, engaging, and enriching Congress.

# MEET THE IAFI BOARD AT THE WSC2026

**Ian Goulding,**
**President**

Ian is MD of Megapesca Lda of Portugal, fisheries consultants specialising in sanitary controls for international trade in fishery and aquaculture products. A food scientist, who originally qualified in the UK as an Environmental Health Officer, Ian started his fish QC career as a technologist developing new retail products for the UK market, as well as setting up the associated processing lines and QC systems. Since 1986 Ian has worked in developing countries, including four years working at Alexandria University, Egypt establishing a fish technology training centre. Ian is a Fellow of the Institute of Food Science and Technology (UK) and has worked on trade and market access issues in over 80 Pacific, Asian, and Latin American countries. Ian founded the IAFI Peter Howgate Award for young fish technologists and edits the popular monthly newsletter "Fishfiles Lite" on EU fisheries matters. Ian is Co-Chair of the World Seafood Congress and will give an opening address in the inaugural session.

**Jayne Gallagher,**
President Elect

Jayne is CEO & Company Founder Honey & Fox Pty Ltd, where she advises launching, growing and scaling seafood businesses in Australia and internationally. She has particular skills in identifying and commercialising new opportunities, developing market entry strategies, building innovation ecosystems, communicating and presenting complex ideas so that they can be understood, multicultural and multilingual negotiations. She has more than

two decades of experience in the seafood and agribusiness industries. Her career includes roles as General Manager at Australian Seafood CRC, and President of the International Association of Seafood Professionals. She holds an MBA (Executive) from Queensland University of Technology, a BSc from The Australian National University, executive education from Harvard Business School, and a Mini MBA in Brand Management. Jayne will give a presentation entitled "Crisis to Confidence: Proving Traceability as a Biosecurity Game-Changer"

**Clare Winkel,**
Board Member

Clare is Executive Manager- Technical Solutions Integrity Compliance Solutions, Australia. She has worked in the food industry since 1987, in various roles from hands-on processing operations to Australian Government official. Clare now provides consulting services for multiple certification bodies, as a GFSI auditor & trainer. Clare has audited fish and food businesses in 14 countries throughout Europe, North America, South Pacific, Caribbean, Australia and New Zealand. She has audited, trained and consulted in the seafood industry, including the wild caught, farmed, fish, shellfish and crustaceans, and including significant work in recent years on food safety issues and HACCP within the seaweed/aquatic plants sector. Clare has been recognised in auditor/trainer of the year awards by certification standards bodies (BRCGS

and SQF). Clare holds a Bachelor of Science and MBA in Seafood Management. She is the Chair of the Aquatic Plant Names Committee and has contributed to the formulation of a regulatory framework for the Australian seaweed sector. She has also worked for UN agencies on seaweed sector projects in SE Asia and was a technical reviewer for the US Seaweed Hazards & Controls Guide. Clare will give presentations on "A review of Australian Regulations for the Seaweed industry" and "The Development of a USA Seaweed Guide to Food Safety Hazards".

**Ivan Bartolo,**
Regional Representative Europe

Ivan Bartolo is a food scientist and regulatory specialist based in the UK, with qualifications in Applied Toxicology and Food Technology. He is President of the Seafood Importers and Processors Alliance (SIPA) which represents European interests in these activities, advocating on regulatory matters with the European institutions. He has over 40 years of experience in seafood safety and technical management. His background includes roles such as Regulatory Affairs Advisor at the Sea Fish Industry Authority and work in the seafood industry. Ivan will give a presentation entitled "Evaluating Levels Of Perfluoroalkyl Substances (PFAs) In Seafood on the EU Market"

**Marcelo Hidalgo,**
Regional Representative - South America

Marcelo Hidalgo is the Chief Operating Officer of the Fishing Industry Association in Papua New Guinea (FIA PNG), where he plays a pivotal role in advancing the interests of industrial & small-scale fisheries in Papua New Guinea. He is also the founder and director of Seafoodmatter. In his more than 27 years of experience in the aquaculture and fisheries supply chain, he has been advising large retail companies, tuna fleets, seafood processing suppliers, NGOs, and governments on the application and improvement of responsible sourcing & sustainable practices, driving change across the global seafood supply value chain. Marcelo has been instrumental in developing initiatives that empower local fishing communities and enhance their livelihoods. He actively collaborates with NGOs, scientific institutions, and sustainable finance organisations to implement innovative projects that promote responsible sourcing and environmental stewardship. He has experience in farm management, standard development, strategic planning, and stakeholder engagement. He has worked in more than 60 countries assessing and auditing quality, food safety, traceability, labour conditions, and sustainability matters. In 2018, Marcelo developed the Responsible Sourcing Policy (RSP) of FIA PNG, which is an Initiative that has raised the bar in the Pacific region on accountability and transparency of the Tuna Purse Seiner Industry and Small-Scale Fisheries. He is a board member of several NGOs, including GSSI, GDST, IAFI, and MSC. Marcelo will give a presentation entitled "Digitalization Of Fisheries Key Data Elements On Crew Welfare - An Audit Tool to Address SDG and ILOC188"

**Margarida Correia,**
Social Media and Awards Director

Margarida Correia is a veterinarian and food safety consultant specializing in the hygiene and trade of animal products, particularly in the fisheries sector. Her qualifications include a Doctor of Veterinary Medicine (DVM) from the University of Lisbon's Faculty of Veterinary Medicine and advanced expertise in the food safety of animal products, focusing on regulatory compliance for international trade. Her professional history includes work as a consultant for the United Nations Industrial Development Organization (UNIDO) and FAO on projects improving food safety systems and industrial standards, participation in regional fish trade workshops across Africa, Asia, and Latin America, and consulting experience with Megapesca Lda in Africa, Europe, Caribbean and South American regions. will give a presentation entitled "The Nexus of Trade Facilitation and SPS Harmonisation".

**Stella Mbabazi,**
Regional Representative Africa

Stella Mbabazi is a Ugandan professional specializing in fisheries management and aquatic resource governance, currently serving as a Blue Economy Expert at the COMESA Secretariat in Zambia. Her qualifications include a Master of Science in Zoology (Fisheries & Aquaculture) and a Bachelor of Science in Fisheries and Aquaculture from Makerere University. She has also held roles as Senior Fisheries Officer and Fisheries Inspector at Uganda's Ministry of Agriculture, Animal Industry & Fisheries (MAAIF) and serves as the African Focal Point for the International Association of Fisheries Inspectors (IAFI), where she was the winner of the coveted Peter Howgate Award 2019.

# NATIONAL STEERING COMMITTEE MEMBERS

**Dr. Ravishankar C. N.**
Former Vice-Chancellor
ICAR-Central Institute of Fisheries Education (ICAR- CIFE)
Mumbai

**Dr. P. Krishnan**
Director,
Bay of Bengal Programme (BOBP), Chennai

**Dr. C. V. Mohan**
Emeritus Scientist
World Fish,
Malaysia

**Prof. Balaji Ramakrishnan**
Scientist, National Institute of Ocean Technology (NIOT), Chennai

**Dr. Devika Pillai**
Assistant Director General
Inland Fisheries - ICAR
New Delhi

**Dr. Subhadeep Ghosh**
Asst Director General
(Marine Fisheries)
Indian Council of Agricultural Research (ICAR)
New Delhi

**Dr. George Ninan**
Director
Central Institute of Fisheries Technology
Kochi

**Dr. Grinson George**
Director, Central Marine Fisheries Research Institute (CMFRI), Kochi

**Dr. Kuldeep K. Lal**
Director
ICAR - Central Institute of Brackishwater Aquaculture (ICAR - CIBA)
New Delhi

**Prof.Dr. Dinesh Kaippilly**
Registrar
Kerala University of Fisheries &
Ocean Studies (KUFoS)
Ernakulam

**Dr. Venkatesh Salagrama**
Research Director
Integrated Coastal Management (ICM)
Andhra Pradesh

**Dr. Shine Kumar**
Director, National Institute of Fisheries Post Harvest Technology & Training (NIFPHATT), Ernakulam

**Dr. Purvaja Ramachandra**
Scientist G and Division Chair
National Centre For Sustainable Coastal Management (NCSCM)
Chennai

**Mr. Alex Ninan**
Partner
BABY MARINE GROUP
Kerala

**Mr. Jagdish Fofandi**
CEO
Deepmala Marine Exports, Gujarat

**Mr. Ravikumar Yellanki**
President
All India Shrimp Hatchery Association (AISHA)
Chennai

**Mrs. Richa Gupta**
Seafood Trade Promoter
Aquabeats
Uttar Pradesh

# INTERNATIONAL ADVISORY COMMITTEE MEMBERS

**Shri Tarun Shridhar IAS**
Former Secretary
(Animal Husbandry, Dairying & Fisheries) Union Ministry of Agriculture & Farmers Welfare

**Dr. JK Jena**
DDG-Fisheries
Indian Council of Agricultural Research (ICAR)

**Dr. KN Raghavan**
Secretary-General
Seafood Exporters Association of India

**Dr. Ian Goulding**
President - International Association of Fish Inspectors (IAFI)

**Dr. Mike Dillion**
Secretary
International Association of Fish Inspectors (IAFI)

**Dr. Jayne Gallagher**
President elect
International Association of Fish Inspectors (IAFI)

**Mr. Justin Sundarrajan**
Board Member
International Association of Fish Inspectors (IAFI)

**Ms.Stella Mbabazi**
Regional Representative for Africa - BLUE ECONOMY EXPERT
COMESA SECRETARIAT, ZAMBIA

**Mr. Marcelo Hidalgo**
South American Representative - Founder & Director
Seafood Matter

**Mr. Ivan Bartolo**
Regulatory Affairs Advisor
Seafish

**Mr. Tim Numilengi**
Managing Director, Mandekem Limited (Process Authority & Expert in the Food Safety Management Systems & Regulatory Compliances)

**Dr. C. Vasudevappa**
Former Vice-chancellor, NIFTEM (The National Institute of Food Technology Entrepreneurship and Management)

**Mr. Dodda Venkata Swamy**
Chairman
Marine Products Export Development Authority (MPEDA)


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Seafood Exporters Association Of India

Organisers:

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Crab Meat Processors Association

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Foundation For Aquaculture Innovations & Technology Transfer

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Indian Marine Ingredients Association

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# CONFERENCE AGENDA

## 08 February 2026 | Sunday | Pre-conference — Meeting Room

| | |
|---|---|
| 1100 | Registration Open |
| 1130 | WSC 2026 Developing Country Day - Welcome And Opening Remarks<br>Dr.Ian Goulding, President, International Association Of Fish Inspectors |
| **1. The Role Of The Blue Economy In Developing Countries** | |
| Chair: | Mr.Yahya Mgawe, National Task Team for implementation of FAO SSF Guidelines in Tanzania and former CEO-Fisheries Education & Training Agency |
| Co-chair: | Dr. Kuldeep Lal, Director, ICAR-CIBA, Chennai |
| 1140 | Bioeconomy in the aquatic Food System<br>Mr. Omar Riego Peñarubia, Fisheries and Aquaculture Division, Value Chain Development Team Food and Agriculture Organization of the United Nations (FAO), Rome, Italy |
| 1200 | The Leaking Blue Basket: Allocative Inefficiency and the 'Missing Middle' in Asia's Fisheries Value Chain<br>Dr. P Krishnan, Director, Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), Chennai |
| 1220 | Utilisation, Challenges And Prospects Of By-Products Originating From Aquatic Resources In Bangladesh<br>Mr. Sujit Krishna Das, Technical Officer, INFOFISH, Malaysia |
| 1240 | Building A Blue Future: Aquaculture In Colombia<br>Ms. Andrea Carolina Piza Jerez, National Technical Coordinator, Federación Colombiana de Acuicultores Fedeacua |
| 1300 | UNIDO Blue Industry Ports Approach<br>Ms. Yasmin Langendoerfer Atun, Project Administrator, United Nations Industrial Development Organization (UNIDO), Vienna, Austria |
| 1320 | Mainstreaming Post-harvest Innovation For Safe, Sustainable, And Globally Competitive Philippine Seafood Value Chains<br>Ms. Riza Jane Banicod, Senior Science Research Specialist, Department of Agriculture - National Fisheries Research and Development Institute,Metro Manila,Philippines |
| 1340 | Questions And Discussion |
| 1400 | Working Lunch |
| **2.Blue Foods- Safety And Nutrition Challenges For Developing Countries** | |
| Chair: | Dr. P. Krishnan, Director, Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO), Chennai |
| Co-chair: | Dr. Ian Goulding, President, International Association of Fish Inspectors |
| 1440 | The Nexus Of Trade Facilitation And SPS Harmonisation<br>Ms. Margarida Correia, Technical Advisor on Aquaculture and QI, United Nations Industrial Development Organization (UNIDO), Vienna, Austria |
| 1500 | Fish Loss Assessment And Value Chain Analysis On Small-Scale Fisheries In South Sudan<br>Mr. Yahya Mgawe, National Task Team for implementation of FAO SSF Guidelines in Tanzania and former CEO-Fisheries Education & Training Agency |
| 1520 | Exploring The Integration Of Fish Powder In School Meal Programs In Malawi Through A Food Environment Lens: Acceptability, Affordability, And Convenience<br>Ms. Amenye Ndiwo Banda, National Project Coordinator, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy |
| 1540 | Challenges Of Food Safety In Mozambique<br>Mr. Felipe Januário, Head, Internal Control Dept., National Institute of Fisheries Inspection, Mozambqiue |
| 1600 | Redefining Traditional Fish Smoking In The Philippines: Adoption Of FAO-Thiaroye Processing Technique (FTT-Thiaroye) For Safer And Sustainable Seafood Processing<br>Mr. Carl Jefferson Madrid, Science Research Specialist I, Department of Agriculture - National Fisheries Research and Development Institute,Metro Manila,Philippines |
| 1620 | Questions And Discussion |
| 1700 | Hi-Tea and Networking |

# CONFERENCE AGENDA

## 09 February 2026 | Monday | Main Conference Conference Hall - 1

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|---|---|
| **0930** | **Inaugural Ceremony** |
| 0935 | Welcome Remarks on Behalf of PDA Ventures, India Host<br>**Dr. C. K, Murthy, Technical Advisor, WSC2026** |
| 0940 | Opening Remarks And Welcome On Behalf Of IAFI<br>**Dr. Ian Goulding, President, International Association Of Fish Inspectors & Co-Chair WSC2026** |
| 0945 | Inaugural Address from Co-organiser: Ministry of Fisheries, Animal Husbandry and Dairying, Government of India:<br>**Dr. Abhilaksh Likhi IAS, Secretary, Department Of Fisheries, Government Of India** |
| 1000 | Opening Remarks From FAO (By Video Address)<br>**Dr. Manuel Barange, Director, Department Of Fisheries and Acting Director General, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy** |
| 1005 | Opening Remarks From UNIDO<br>**Mr. Alejandro Rivera Rojas, Chief, Division Of MSME Competitiveness, Quality And Job Creation (SME), Directorate Of Technical Cooperation And Sustainable Industrial Development, United Nations Industrial Development Organization (UNIDO), Vienna, Austria** |
| 1010 | Opening Remarks From Worldfish<br>**Dr. Jörn O. Schmidt, Director, Sustainable Aquatic Food Systems Worldfish, Penang, Malaysia** |
| 1015 | Message from Seafood Exporters Association of India<br>**Shri. G Pawan Kumar, National President, Seafood Exporters Association of India &**<br>**Dr. K. N. Raghavan IRS (R), Secretary General, Seafood Exporters Association of India** |
| 1025 | Keynote Address 1: Netting Aqua Potential For Nutrition Security And Economic Prosperity<br>**Dr. Tarun Shridar, Director General, Indian Chamber of Food & Agriculture, New Delhi and Former Secretary, Fisheries, AH & D, Govt of India, New Delhi and Chairman, International Advisory Committee, WSC 2026** |
| 1040 | Special Address:<br>**Dr. N.Subbaiyan, IAS., Secretary, Animal Husbandry, Dairying, Fisheries and Fishermen Welfare, Government of Tamil Nadu*** |
| 1050 | Keynote Address 2:<br>**Dr. D. V. Swamy IAS, Chairman, Marine Products Export Development Authority (MPEDA), Kochi, India** |
| 1105 | Vote of thanks |
| 1110 | Congress Photograph |
| 1130 | Refreshment break |
| **3.Future Of The Global Seafood Trade** | |
| Chair: | Dr. Tarun Shridhar, DG, Indian Chamber of Food & Agriculture, and Former Secretary, Fisheries, AH & D, Govt of India, |
| Co-chair: | Ms. Jayne Gallagher, CEO & Co Founder, Honey & Fox Pty Ltd, Australia |
| 1200 | Maximising Socio-Economic Value For Small Scale Aquaculture And Fisheries Producers<br>Prof. Melanie Siggs, Director of Strategic Engagements, Global Seafood Alliance, USA |
| 1220 | Not Just A Commodity: Aquatic Foods As Strategic Nutrition Pathways For Nations<br>Dr.Jörn O. Schmidt, Director, Sustainable Aquatic Food Systems, Worldfish |
| 1240 | Blue Industry Strategy For Developing Countries<br>Mr. Alejandro Rivera Rojas, Chief, Division of MSME Competitiveness, Quality and Job Creation (SME), Directorate of Technical Cooperation and Sustainable Industrial Development (TCS), United Nations Industrial Development Organization (UNIDO), Vienna, Austria |
| 1300 | Global Trade And Markets Of Aquatic Products Amidst Rising Uncertainities<br>Mr. William Griffin, Fishery Officer (Markets) and GLOBEFISH Coordinator, Trade and Markets Team - Sustainable Trade and Value Chain, Fisheries and Aquaculture Division, FAO, Rome, Italy |
| 1320 | The Evolving World Trade, International Trade Laws & Practices To Be Taken By Exporters/ Importers/Traders.<br>Mr. Biju Jospeh, Managing Partner, Lloyd and Johnson |

# CONFERENCE AGENDA

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| 1340 | Questions And Discussion |
| 1400 | Lunch |
| **4.Ethical Seafood - Labour And Standards** | |
| Chair: | Ms. Clare Winkel, Executive Manager, Integrity Compliance Solutions, Australia |
| Co-Chair: | Dr. K. N. Raghavan IRS (R), Secretary General, Seafood Exporters Association of India, Kochi |
| 1500 | The Market For Ethical And Sustainable Seafood - Trends And Opportunities<br>Mr. Nigel Edwards, Seafood Industry Development Director, Hilton Seafood, UK |
| 1520 | Digitalization Of Fisheries Key Data Elements On Crew Welfare - An Audit Tool To Address SDGs And ILOC 188<br>Mr. Marcelo Hidalgo Chief Executive Officer, Seafoodmatter, Netherlands |
| 1540 | From Blue Foods To Trade Architecture: Embedding Nutrition Outcomes Into Global Seafood Supply Chains<br>Ms. Shreyasi Agarwal, Chief Executive Officer, Development Chamber of Food & Agriculture Trade Association (DeFacto India) |
| 1600 | Questions And Discussion |
| 1615 | Refreshment break |
| 1630 | Creating Sustainable And Scalable Solutions To Forced Labour In Fisheries And Seafood Industry<br>Mr. Andrey Sawchenko, Regional Vice President, Program Impact, Asia Pacific, International Justice Mission, Bangkok,Thailand |
| 1650 | Skilling – Next Revolution In Fisheries<br>Dr. Satender Arya, Chief Executive Officer, Agriculture Skill Council of India |
| 1710 | Biodiversity And Social Impact Assessment Shrimp Farms In Andhra Pradesh Under ASC Standards And Impact Statements<br>Mr. D Rajasekar, Consultant, GreenRanks Global Private Limited, Hyderabad, India |
| 1730 | Questions And Discussion |

# CONFERENCE AGENDA

## 10 February 2026 | Tuesday — Conference Hall - 1

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|---|---|
| **5. Growth Through Value Addition And Processing Technologies** | |
| Chair: | Dr. G. Sugumar, former Vice-Chancellor, TNJFU, Nagapattinam, TN, India |
| Co-chair: | Mr. Ansen Ward, Fisheries and Aquaculture Division, Value Chain Development Team, FAO Rome |
| 0900 | Solar Powered Cold Chain Interventions In Small-Scale Fisheries<br>Mr. Ansen Ward, Fisheries and Aquaculture Division, Value Chain Development Team, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy |
| 0920 | On-Board Propane-Based Refrigeration For Small Fishing Boats: A Clean Cooling Pathway For Quality Preservation, Income Enhancement, And Carbon Reduction<br>Prof. Mani Sankar Dasgupta, Senior Professor, Birla Institute of Technology and Science, Pilani, Rajasthan, India |
| 0940 | Optimization Of Phase Change Material Ice Ratios For Enhanced Thermal Efficiency And Quality Preservation In Indian Mackerel<br>Ms. Harini Ravi PhD, Research Scholar, National Institute of Food Technology, Entrepreneurship and Management – Thanjavur |
| 1000 | CO2 Refrigeration Systems For Individual Quick Freezers In Seafood Processing Industries<br>Ms. Ronanki Suresh, Research Associate, Refrigeration and Air Conditioning Lab, Indian Institute of Technology Kharagpur |
| 1020 | Pathways To A Sustainable Seafood Cold Chain In India Using Natural Refrigerants<br>Dr. Suparna Dhara, Research Scholar, Department of Mechanical Engineering, Indian Institute of Technology Madras |
| 1040 | Questions And Discussion |
| 1100 | Refreshment Break |
| 1120 | Effect Of Different Dagaa Processing Techniques On Nutritional Profile And Sensorial Properties<br>Mr. Aditya Parmar, Post-harvest Scientist, WorldFish Center, Penang, Malaysia |
| 1140 | Towards Total Utilisation Of Australian Wild Abalone: A Framework Approach<br>Prof. Janet Howieson, Assoc Prof Janet., Curtin University, Western Australia |
| 1200 | ICAR-CIFT Shrimp Shell Biorefinery Research And Technology – A Story Of Success And A Futuristic Road Map For Ensuring Sustainable Indian Shrimp Industry<br>Mr. Elavarasan Krishnamoorthy, Senior Scientist, ICAR-Central Institute of Fisheries Technology |
| 1220 | Solar Drying Blue Foods Supports Women And Strengthens Value Chains, Equity, And Climate Resilience In India<br>Mr. Vijay Dharmamony, Senior Manager, Environmental Defense India Foundation (EDIF) |
| 1240 | Questions And Discussion |
| 1300 | Lunch, Poster and Exhibition Viewing |
| **7.Hazards In Seafood** | |
| Chair: | Prof. Iddya Karunasagar, Advisor, Nitte University Mangalore |
| Co-Chair: | Mr.Ivan Bartolo, President, Seafood Importers and Processors Alliance, Belgium |
| 1400 | Evaluating Levels Of Perfluoroalkyl Substances (PFAs) In Seafood On The EU Market<br>Mr. Ivan Bartolo, President, Seafood Importers and Processors Alliance, Belgium |
| 1420 | Joint FAO/IOC/IAEA Guidance On Monitoring Of Algal Toxins In Bivalve Molluscs<br>Dr. Esther Garrido Gamarro, Fishery Officer, FAO, Rome Italy |
| 1440 | Risk Management Options For Pathogenic Vibrio spp In Seafood<br>Prof. Iddya Karunasagar, Advisor, Nitte University, Mangalore,Karnataka,India |
| 1500 | Foundational AI And Digital Twins For Science-Backed, Biosecure, And Resilient Blue Foods<br>Ms. Snehal Verma, CEO & Co-Founder, NatureDots, India |
| 1520 | Questions And Discussion |
| 1540 | Refreshment Break |

# CONFERENCE AGENDA

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|---|---|
| 1600 | The Development Of A USA Seaweed Guide To Food Safety Hazards<br>Ms. Clare Frances Winkel, Executive Manager of Technical Solutions, Integrity Compliance Solutions, Brisbane,Qld,Australia |
| 1620 | Novel Analytical Data On Cadmium, Mercury, Lead, Arsenic And Selenium Content In Fish From Tanzania And Mozambique: Implications For Food Safety<br>Ms. Talhiya Maulid Ali, PhD Student, University of Dar Es Salaam, Tanzania |
| 1640 | Plant Extracts As Antimicrobial Potentiators Against Seafood-Borne Pathogens<br>Dr. Manjusha Lekshmi, Senior Scientist, ICAR-Central Institute of Fisheries Education, Maharashtra,India |
| 1700 | Questions And Discussion |
| **9. Indian Seafood Sector - Development prospects** | |
| Chair: | Dr. K. N. Raghavan IRS (R), Secretary General, Seafood Exporters Association of India, Kochi |
| Co-chair: | Dr. C. K, Murthy, Acting President, Society for Indian Fisheries and Aquaculture, Hyderabad India |
| 1720 | Marine Ingredients: Catalyst For Sustainable Seafood<br>Dr. Mohamed Dawood Sait, President, Indian Marine Ingredients Association (IMIA), Bangalore, India |
| 1740 | Waste to Wealth<br>Dr. Binsi PK, Senior Scientist, Fish Processing Division, ICAR-Central Institute of Fisheries Technology, Cochin |
| 1800 | Value addition of fish and shellfish for international and domestic markets<br>Dr. Viji P, Senior Scientist, Visakhapatnam Research Centre, ICAR-Central Institute of Fisheries Technology, Cochin |
| 1820 | Advances in packaging technologies for fish<br>Dr. Remya Pillai, Senior Scientist, Fish Processing Division, ICAR-Central Institute of Fisheries Technology, Cochin |
| 1820 | Presentation by the Seafood Exporters Association of India<br>Dr. K. N. Raghavan IRS (R), Secretary General, Seafood Exporters Association of India, Kochi |
| 1900 | Congress Dinner And Awards |

# CONFERENCE AGENDA

## 10 February 2026 | Tuesday — Conference Hall - 2

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|---|---|
| **6. Inspection And Control Systems To Meet Seafood Trade Requirements** | |
| Chair: | Dr. M. Karthikeyan, former Director, MPEDA, Kochi |
| Co-chair: | Dr. Esther Garrido Gamarro, Fishery Officer, FAO Rome, Italy |
| 0900 | Border Rejections Of Seafood Imports: What Do They Tell Us?<br>Mr. Nima Bahramalian, Industrial Development Expert, Division of SME Competitiveness, Quality and Job Creation, United Nations Industrial Development Organization (UNIDO), Vienna, Austria |
| 0920 | Food Fraud In Fisheries And Aquaculture - A Joint FAO-IAEA Report<br>Dr. Esther Garrido Gamarro, Fishery Officer, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy |
| 0940 | Assessment Of Food Hygiene Knowledge, Attitudes And Practices Of Dagaa Value Chain Actors<br>Ms. Jovice J. Mkuchu, Fishery Officer, Ministry of Livestock and Fisheries, Tanzania |
| 1000 | Actionable Life Cycle Assessment: A Specialized Impact Management Platform For The Global Seafood Sector<br>Mr. Rajesh Kumaramenon, Co founder, Mariterro Food Solutions |
| 1020 | Sense & Dose For Chemical Treatments<br>Mr. Raju Choppella, General Manager, Initiative Engineering |
| 1040 | Questions And Discussion |
| 1100 | Refreshment break |
| 1120 | Growing Interest In Fisheries Sustainability Certification In India<br>Dr. Vineetha Aravind, MSC Technical Assessor, Sustainable Seafood Network of India (SSNI) |
| 1140 | Role And Responsibilities Of NABL In Ensuring The Quality Of Food, Especially Seafood, For Consumers<br>Ms. Rini Narayan, Joint Director, National Accreditation Board for Testing and Calibration Laboratories (NABL) |
| 1200 | Ensuring Safer Food Chains: Multi-Class Veterinary Drug Residue Analysis In Seafood Using LC–MS/MS<br>Mr. Vinayak Azhaprakalam, Application specialist, Agilent Technologies, India |
| 1220 | Three Major Shrimp Diseases In India, And Practical Challenges For Trade<br>Mr. Madhu Mohan Talluri, Technical Director, SGS Aqua Solutions, Andhra Pradesh,India |
| 1240 | Questions And Discussion |
| 1300 | Judging Of Posters |
| 1300 | Lunch |
| **8.Seaweed - The Blue Food Of The Future** | |
| Chair: | Dr. A. G. Ponnaiah, former Director, ICAR- CIBA, Chennai & former Co-ordinator, INGA, WorldFish, Malaysia |
| Co-chair: | Mr. Nima Bahramalian, Industrial Development Expert, Division of SME Competitiveness, Quality and Job Creation, UNIDO |
| 1400 | United Nations Global Seaweed Initiative: Towards Blue Food Of The Future<br>Mr. Nima Bahramalian, Industrial Development Expert, Division of SME Competitiveness, Quality and Job Creation, United Nations Industrial Development Organization (UNIDO), Vienna, Austria |
| 1420 | A Review Of Australian Regulations For The Seaweed Industry.<br>Ms. Clare Frances Winkel, Executive Manager of Technical Solutions, Integrity Compliance Solutions, Brisbane,Qld,Australia |
| 1440 | Unlocking The Nutritional Power Of Seaweed: A Latin American Perspective<br>Mr. Jogeir Toppe, Fishery Officer, FAO, Rome Italy |
| 1500 | Blue Agriculture Revolution: Scope, Strategies, And Value Chain Development For Seaweed In India<br>Mr. Shine Kumar CS, Director, National Institute of Fisheries Post Harvest Technology and Training |
| 1520 | Questions And Discussion |
| 1540 | Refreshment Break |

# CONFERENCE AGENDA

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|---|---|
| 1600 | Integrated Seaweed Valorization As A Blue Economy Pathway: Technology, Safety, And Coastal Livelihoods In India<br>Prof. Jeyashakila Robinsondhas, Professor & Head of the Department, Fisheries College and Research Institute, Tamil Nadu Dr. J. Jayalalithaa Fisheries University |
| 1620 | Fueling The Global Market: Microalgal Astaxanthin As A Circular Solution For Aquaculture And Human Health<br>Mr. Veeramuthu Ashokkumar, Professor & Head, Center for Waste Management and Renewable Energy, Saveetha UNiversity |
| **8A. Joint UNIDO/FAO Panel On Seaweed - The Blue Food Of The Future - How To Energise The Seaweed Sector** | |
| 1640 | Moderator:<br>Mr. Nima Bahramalian, Industrial Development Expert, Division of SME Competitiveness, Quality and Job Creation, UNIDO<br>Co-moderator:<br>Dr. Esther Garrido Gamarro, Fishery Officer, FAO Rome, Italy |

# CONFERENCE AGENDA

## 11 February 2026 | Wednesday — Conference Hall - 1

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|---|---|
| **10.Traceabilty And Data Tools For Value Chain Efficiency** | |
| Chair: | Mr. Marcelo Hidalgo Chief Executive Officer, Seafoodmatter, Netherlands |
| Co-Chair: | Dr. Shankar Rao, Director, Coastal Aquaculture Authority, Chennai |
| | Prof. Dr. Dinesh Kaippilly, Registrar |
| 0900 | The Global Dialogue On Seafood Traceability (GDST) And The Future Of Interoperable Digital Traceability<br>Mr. Kevin Edwards, VP Global Market Development, Global Dialogue on Seafood Traceability, USA |
| 0920 | Crisis To Confidence: Proving Traceability As A Biosecurity Game-Changer<br>Ms. Jayne Gallagher, CEO & Co Founder, Honey & Fox Pty Ltd, Australia |
| 0940 | Need For Digital Traceability For Indian Aquatic Foods<br>Prof. G. Jeyasekaran, Former Director of Research, Tamil Nadu Fisheries University, India |
| 1000 | Advancing Digital Traceability In India's Seafood Sector Through GDST Adoption<br>Mr. Kevin Edwards, VP Global Market Development, Global Dialogue on Seafood Traceability, USA |
| 1020 | Seafood Traceability Verification In Real Time With Rapid Evaporative Ionization Mass Spectrometry (REIMS), Molecular Spectroscopy Sensors, And Machine Learning<br>Dr. Niladri Sekhar Chatterjee, Senior scientist, Quality assurance & management, National Reference Laboratory, ICAR-Central Institute of Fisheries Technology, India |
| 1040 | Internet Of Things With A Block Chain-Based Traceability Tool For Improving Shrimp Supply Chain Management<br>Dr. R. Ananda Raja, Principal Scientist, ICAR-Central Institute of Brackishwater Aquaculture, Tamil Nadu |
| **10A. Traceability Panel - Overcoming Challenges To Better Traceability** | |
| 1100 | Moderator:<br>Kevin Edwards GDST<br>Co-moderators: Dr. M. Karthikeyan, former Director, MPEDA, Kochi<br>Prof. Dr. Dinesh Kaippilly, Registrar, Kerala University of Fisheries & Ocean Studies (KUFoS) |
| 1130 | Refreshment Break |
| **12. Concluding WSC Panel: Ensuring Sustainable Benefits From The Blue Food Revolution** | |
| 1200 | Dr. Ian Goulding, President and Ms. Jayne Gallagher, President Elect - International Association Of Fish Inspectors |
| **1230** | **Closing Remarks and Valedictory Address** |
| 1232 | Welcome Remarks:<br>Dr. C. K, Murthy, Technical Advisor, WSC 2026 |
| 1235 | Congress Highlights:<br>Dr. Ian Goulding, President, International Association of Fish Inspectors (IAFI). |
| 1245 | Closing Remarks:<br>Dr. C. Vasudevappa, Former VC, NIFTEM, Sonipat and Former CE, National Fisheries Development Board |
| 1255 | Prof. Balaji Ramakrishnan, Director, National Institute of Ocean Technology |
| 1305 | Dr. P. Krishnan, Director, Bay of Bengal Programme Inter-Governmental Organisation |
| 1315 | Valedictory Address:<br>Mr. Sagar Mehra IAS, Joint Secretary (Inland Fisheries), Department of Fisheries, Govt of India, New Delhi |
| 1325 | Announcement concerning future Wortld Seafood Congress<br>Ms. Jayne Gallagher, President Elect - International Association Of Fish Inspectors |
| 1330 | Closing Remarks<br>Dr. Ian Goulding, President IAFI, International Association Of Fish Inspectors |
| 1500 | IAFI General Meeting |

# CONFERENCE AGENDA

## 11 February 2026 | Wednesday — Conference Hall - 2

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|---|---|
| **11. Workshop On Fostering Stewardship For Sustainable Indian Marine Ingredients** | |
| **0910 - 0930** | **Opening Session** |
| Moderator: | Dr. Naveen Namboothri, Founder-Trustee, Dakshin Foundation |
| 0915 - 0920 | Context Setting - Dr. P. Krishnan, Director, BOBP-IGO |
| 0920 - 0930 | Chief Guest Address - Mr. Sagar Mehra, Joint Secretary, Dept. of Fisheries, GoI |
| **0930 - 1015** | **Session I: Realities & Shared Challenges In Marine Ingredients Sector** |
| Chair: | Dr. K.K. Lal, Director, ICAR-CIBA, Chennai |
| 0935 - 0942 | India's Competitive Position in Marine Ingredients - Dr. K.N. Raghavan, CEO, SEAI (TBC) |
| 0942 - 0949 | Current and Future Policies/ Programmes for Marine Ingredients Sector Development - Dr. S. Kannappan, Senior Executive Director, NFDB |
| 0949 - 0956 | Industry Perspectives on Challenges and Opportunities Facing India's Marine Ingredients Sector - Dr. Mohamed Dawood Sait, President, Indian Marine Ingredients Association (IMIA) |
| 0956 - 1002 | Private-sector Innovation & Market-led Sustainability Mechanisms - Mr. A.B.Ch. Mohan, Managing Partner, Seafood Solutions |
| 1002 - 1015 | Moderated Discussion & Interaction |
| **1015 - 1100** | **Session II: Reimagining Sustainability In Marine Ingredients Sector** |
| Moderator: | Ms. Angela Lentisco, Fishery and Aquaculture Officer, FAO-RAP |
| Panelists: | Dr. M.K. Ram Mohan, Director, MPEDA |
| | Prof. G. Jeyasekaran, Safe Fish & Traceability Programme Coordinator, DoF, GoI |
| | Mr. Santhana Krishnan, Chief Executive Officer, Marine Technologies, Chennai |
| | Mr. Jogeir Toppe, Fishery Officer, Fisheries and Aquaculture Division, FAO |
| 1040 - 1100 | Moderated Discussion & Interaction Participants |
| **1100 - 1120** | **Session III: Marine Ingredients Sector: Regional Perspectives** |
| Moderator: | Dr. P. Krishnan, Director, BOBP-IGO |
| 1105 – 1120 | Current Status of Marine Ingredients in the Country: Opportunities for Regional Action<br>Senior Officials from Bangladesh, Maldives and Sri Lanka |
| **1120 - 1145** | **Session IV: Wrap-Up & Next Steps** |
| 1120 - 1140 | Priority Actions & Coalition Possibilities - Dr. Naveen Namboothri, Founder-Trustee, Dakshin Foundation |
| 1140 - 1145 | Closing Remarks & Vote of Thanks - Dr. P. Krishnan, Director, BOBP-IGO |


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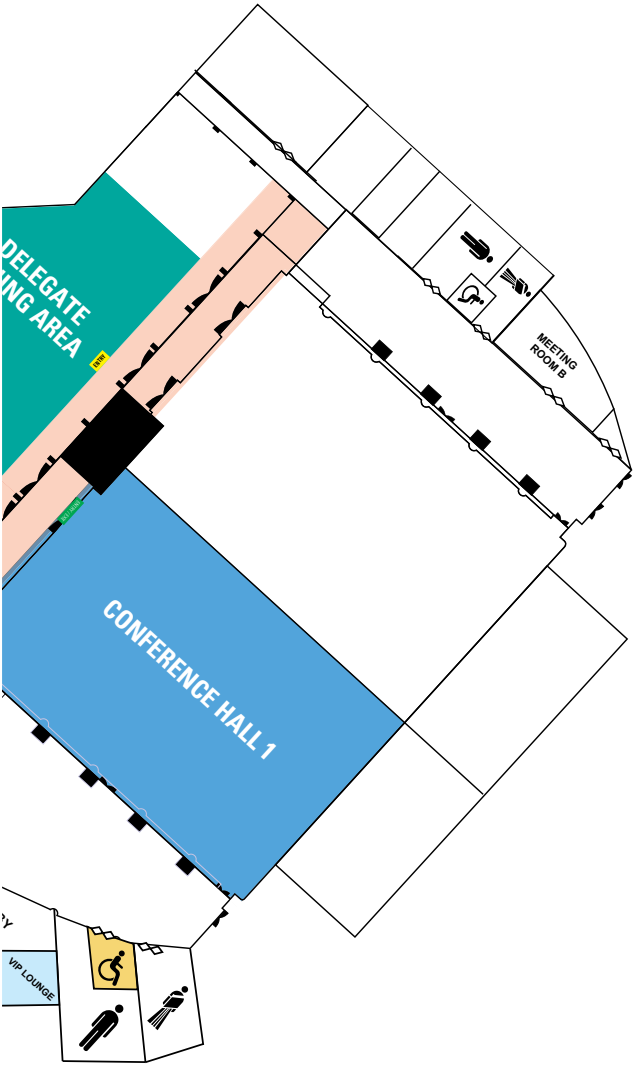
C314
B219
B215
B213
B209
FISH MEAL
PAVILLION
C308
C304
S1
B207
B203
D401
C302
C
B
A
E
N
S
W
A126
S3
VISITOR LOUNGE
A121
S6
B212
A115
A113
B210
B208
A111
A109
POSTER PRESENTATION AREA
B204
A103
C311
A101
A122
A120
A118
A116
A114
A112
A110
A108
A106
A104
A102
ENTRY/EXIT
CLOAK ROOM
REGISTRATION COUNTERS
MAIN ENTRY
MAIN ENTRY
MAIN ENTRY
ORGANISER OFFICE
PANTRY
SPEAKER LOUNGE
TOILET

# FLOOR PLAN

# FLOOR PLAN


DELEGATE
NG AREA
MEETING
ROOM B
CONFERENCE HALL 1
VIP LOUNGE

# LIST OF SESSION CHAIRS AND PANELLISTS

| SESSION | CHAIR | CO-CHAIR | PANELLISTS |
|---|---|---|---|
| THE ROLE OF THE BLUE ECONOMY IN DEVELOPING COUNTRIES | Mr.Yahya Mgawe, National Task Team, FAO, Tanzania | Dr. Kuldeep Lal, Director, ICAR-CIBA, Chennai | |
| BLUE FOODS-SAFETY AND NUTRITION CHALLENGES FOR DEVELOPING COUNTRIES | Dr. P. Krishnan, Director, BOBP, Chennai | Dr.Ian Goulding, President, International Association of Fish Inspectors | |
| FUTURE OF THE GLOBAL SEAFOOD TRADE | Dr. Tarun Shridhar, DG, Indian Chamber of Food & Agriculture, and Former Secretary, Fisheries, AH & D, Govt of India, New Delhi | Ms.Jayne Gallagher CEO & Co Founder Honey & Fox Pty Ltd, Australia | |
| ETHICAL SEAFOOD - LABOUR AND STANDARDS | Ms.Clare Winkel, Executive Manager, Integrity Compliance Solutions, Australia | Dr. K. N. Raghavan IRS (R), Secretary General, Seafood Exporters Association of India, Kochi | |
| GROWTH THROUGH VALUE ADDITION AND PROCESSING TECHNOLOGIES | Dr.G. Sugumar, former Vice-Chancellor, TNJFU, Nagapattinam, TN, India | Mr.Ansen Ward, Fisheries and Aquaculture Division, Value Chain Development Team, FAO Rome | |
| INSPECTION AND CONTROL SYSTEMS TO MEET SEAFOOD TRADE REQUIREMENTS | Dr. M. Karthikeyan, former Director, MPEDA, Kochi | Dr.Esther Garrido Gamarro, Fishery Officer, FAO Rome, Italy | |

| SESSION | CHAIR | CO-CHAIR | PANELLISTS |
|---|---|---|---|
| HAZARDS IN SEAFOOD | Prof. Iddya Karunasagar, Advisor, Nitte University Mangalore | Mr.Ivan Bartolo, President, Seafood Importers and Processors Alliance, Belgium | |
| SEAWEED - THE BLUE FOOD OF THE FUTURE | Dr. A. G. Ponnaiah, former Director, ICAR- CIBA, Chennai & former Co-ordinator, INGA, WorldFish, Malaysia | Mr. Nima Bahramalian, Industrial Development Expert, Division of SME Competitiveness, Quality and Job Creation, UNIDO | |
| A. JOINT UNIDO/ FAO PANEL ON SEAWEED - THE BLUE FOOD OF THE FUTURE | Mr. Nima Bahramalian, Industrial Development Expert, Division of SME Competitiveness, Quality and Job Creation, UNIDO | Dr.Esther Garrido Gamarro, Fishery Officer, FAO Rome, Italy | Mr.Jogeir Toppe, Ms.Clare Winkel Dr. A. G. Ponnaiah Dr. Shine Kumar |
| INDIAN SEAFOOD SECTOR - DEVELOPMENT PROSPECTS | Dr. K. N. Raghavan IRS (R), Secretary General, Seafood Exporters Association of India, Kochi | Dr. C. K, Murthy, Acting President, Society for Indian Fisheries and Aquaculture, Hyderabad India | |
| TRACEABILTY TOOLS FOR VALUE CHAIN EFFICIENCY | Mr.Marcelo Hidalgo Chief Executive Officer, Seafoodmatter, Netherlands | Dr. Shankar Rao, Director, Coastal Aquaculture Authority, Chennai | |
| A. TRACEABILITY PANEL | Mr.Kevin Edwards, Global Dialogue On Seafood Traceability | Dr. M. Karthikeyan, former Director, MPEDA, Kochi | Mr.Marcelo Hidalgo Ms.Jayne Gallagher Dr. Shankar Rao Prof.G. Jeyasekaran |
| WORKSHOP ON FOSTERING STEWARDSHIP FOR SUSTAINABLE INDIAN MARINE INGREDIENTS | Chairs: Dr. P. Krishnan, Ms. Angela Lentisco, Dr. K.K. Lal and Dr. Naveen Namboothri | | |
| CONCLUDING WSC PANEL: - ENSURING SUSTAINABLE BENEFITS FROM THE BLUE FOOD REVOLUTION | Moderators: Ms.Jayne Gallagher and Dr.Ian Goulding | | Mr.Nigel Edwards Prof.Melanie Siggs Dr. K. N. Raghavan IRS Dr. Kuldeep Lal Dr.Jorn Schmidt Dr.Iddya Karunsagar |

*Colours represent concurrent sessions (run in parallel)

# KEYNOTE SPEAKER & PROFILE

**Mr. Alejandro Rivera Rojas,**

Mr. Rivera-Rojas is the Chief of the MSME Competitiveness, Quality and Job creation Division at UNIDO. He has over 25 years of professional experience in the development of innovation policies and strategies; quality infrastructure, SMEs upgrading and digital transformation; science, technology, and innovation ecosystems; industrial resource efficiency use and circular economy; development of technology parks, smart manufacturing centres, and innovation clusters. He currently leads the UNIDO Health Industry Framework and coordinates the UNIDO Blue Industry Programmatic Framework. Alejandro graduated as Chemical Engineer from Havana Technical University (1994); and holds a Master's In Sciences degree with distinction from Delft Int. Inst. of Water Education (2001),The Netherlands.

**Dr. Jörn Schmidt**
J.Schmidt@cgiar.org
Director, Sustainable Aquatic Food Systems at WorldFish
+60129370751 (Whatsapp)

Dr. Jörn Schmidt is the Director for Sustainable Aquatic Food Systems at WorldFish, where he leads a globally distributed team advancing research and innovation across four interconnected thematic areas: Production Systems, Governance and Policy, Inclusive Markets, and Data and Digital Innovation. His work aims to provide the evidence base for inclusive, resilient aquatic food systems that deliver healthy diets, sustainable livelihoods, and biodiversity conservation.

Jörn has conducted research in the Baltic and North Seas, Senegal, Cabo Verde, Haida Gwaii (Canada),

# KEYNOTE SPEAKER & PROFILE

Sitka (USA), and Peru. He is also a Senior Research Fellow at the Center for Ocean and Society, Kiel University, and an adjunct professor in the Marine Affairs Program at Dalhousie University.

From 2020 to 2024, he served as Chair of the Science Committee of the International Council for the Exploration of the Sea (ICES), guiding one of the largest marine science networks in the world. He currently serves on the Group of Experts for the World Ocean Assessment and advises the Empowering Women in the UN Ocean Decade initiative.

Jörn is committed to transdisciplinary approaches, knowledge co-production, and serious games as tools to connect science, policy, and community action toward a sustainable blue future.

https://www.linkedin.com/in/jörn-schmidt-a9b03933/

https://worldfishcenter.org/person/jorn-schmidt

# KEYNOTE SPEAKER & PROFILE

**Dr. Manuel Barange**
Assistant Director-General,
Food and Agriculture
Organization (FAO)

Dr. Manuel Barange, a national of South Africa and Spain, is Assistant Director General in addition to being Director of the Fisheries and Aquaculture Division.

Professor Barange has a BSc in Biology from the University of Barcelona, Spain, and a PhD in Marine Ecology. Before joining FAO he was Deputy Chief Executive and Director of Science at the Plymouth Marine Laboratory (UK) and Chair of the Science Committee of the International Council for the Exploration of the Sea (ICES). He is an Honorary Professor at the College of Life and Environmental Sciences, University of Exeter (UK). He is a recognized expert on climate and anthropogenic impacts on marine ecosystems and on the role of aquatic foods in ending hunger and poverty. He has over 130 academic publications, and in 2010 he was awarded the UNESCO-IOC Roger Revelle Medal for his contributions to ocean science.

# KEYNOTE SPEAKER & PROFILE

**Dr. K. N. Raghavan**

Dr. K. N. Raghavan completed his MBBS from Calicut Medical College in 1988. Later, while pursuing postgraduate studies in Physical Medicine and Rehabilitation, he joined the Indian Revenue Service (Customs and Central Excise) in 1990. He held key posts in field formations of the Central Board of Indirect Taxes and Customs (CBIC) and Directorate of Revenue Intelligence. He has also served on deputation to the Government of Kerala, besides serving a tenure as First Secretary (Commerce) in the High Commission of India, Singapore. He was the Commissioner of Customs in Kochi from 2012-2017 and Principal Commissioner of Central GST in Mumbai from 2017-2019.

Dr Raghavan worked as the Executive Director of the Rubber Board of India in Kottayam from 2019 till 2023. During this period, he also held charges as Chairman Rubber Board, Chairman Tea Board, Chairman of Marine Products Export Development Authority (MPEDA) and Chairman of Tobacco Board of India. He was working as Director General of National Academy of Customs, Indirect taxes and Narcotics (NACIN) when he superannuated in May 2024. He contributed towards commissioning the new campus of academy at Palasamudram and it was inaugurated by Hon. Prime Minister in January 2024.

Post retirement, Dr Raghavan has taken up an assignment as Secretary General of Seafood Exporters Association of India (SEAI) besides serving in advisory capacity to a startup working in the area

# KEYNOTE SPEAKER & PROFILE

of environment protection and sustainability.

Dr Raghavan was accredited as an umpire with the Board of Control for Cricket in India (BCCI) in 1991. He has umpired two One-Day International matches (one on field and one as third umpire), and was reserve umpire in three matches. He has umpired numerous Duleep, Deodhar and Ranji Trophy matches, besides matches in other BCCI tournaments. He was also the first umpire in the world to uphold the appeal for 'Timed Out' in first class cricket.

His book, *Dividing Lines*: *Contours of India- China Conflict*, won critical acclaim as one of the best researched books on the topic of the Sino-Indian war of 1962. He is also the author of *World Cup Chronicle and Vanishing Shangri La: History of Tibet and Dalai Lamas in the Twentieth Century*. His works in fiction category are *A Slice of Calicut Halwa, Reverse Swing and Bouncer* (Malayalam) and *Mantras: Lessons from Ramayana for the modern day manager*. His latest book "Rubber Board: Mithyayum Yatharthyavum" was released in February 2025.

He is a long distance runner and regularly takes part in marathons.

Dr. Raghavan is married to Dr. Ranjini, a consultant ENT surgeon, who specialises in surgery for Obstructive Sleep Apnoea. They have a daughter, Aiswarya, who is married to Emil Fjord. The couple work in Apple Inc and are presently based in San Francisco, USA

# KEYNOTE SPEAKER & PROFILE

**Shri. Sagar Mehra**
Joint Secretary, Ministry of Fisheries, Animal Husbandry and Dairying, Govt. of India

Shri Sagar Mehra is Joint Secretary in the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India. He is responsible for policy formulation and the implementation of schemes and programmes aimed at the development of fisheries and aquaculture in the country. In addition, he oversees matters relating to international cooperation, single-window systems, traceability, biosecurity, Antimicrobial Resistance (AMR), and the One Health approach. He is also involved in the implementation of flagship initiatives such as the Pradhan Mantri Matsya Sampada Yojana (PMMSY), Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY) a World Bank and AFD supported project, and the Fisheries and Aquaculture Infrastructure Development Fund (FIDF), including the Aquaculture Insurance, Kisan Credit Card (KCC), as well as welfare of fishers and fish farmers. Shri Mehra serves as the national focal point for the World Organisation for Animal Health (WOAH) and chairs several national bodies, including the National Committee on the Introduction of Exotic Aquatic Species into Indian Waters, the Standardization Cell, the Seafood Export Promotion Cell, and initiatives related to ornamental fish promotion and development of Coldwater and reservoir fisheries. He has been closely associated with the drafting of the Exclusive Economic Zone (EEZ) and High Seas Guidelines, as well as related Acts and Rules. He has also contributed to the formulation of policies and frameworks for the Coastal Aquaculture Authority (CAA) and the development of smart and

# KEYNOTE SPEAKER & PROFILE

integrated fishing harbours.

Prior to this, served as Joint Secretary in the erstwhile Department of Animal Husbandry, Dairying and Fisheries handled the matters relating to international cooperation in livestock sector with different countries and international trade in dairy, livestock and livestock products including fisheries and animal feed and fish feed etc. Handled the matters relating to Bilateral and Multilateral Free Trade Agreements, Comprehensive Economic Partnership Agreement, Regional Comprehensive Economic Partnership and negotiation sanitary protocols for import/export of various livestock and livestock products. Also handled matters relating to CODEX, "WTO Trade Facilitation Agreement", and flagship programme of the Government of India like "Ease of Doing Business" and "Trading Across Borders".

Previously, he served in the Department of Economic Affairs, Ministry of Finance, Govt of India and handled the matters pertaining to bilateral development cooperation with European and Nordic countries apart from bilateral assistance to various Asian and African countries.

# KEYNOTE SPEAKER & PROFILE

**Dr. Tarun Shridhar**
Director General of the Indian Chamber of Food and Agriculture (ICFA) and a former IAS officer of the Himachal Pradesh & Delhi, Govt. of India, New Delhi

DR.Tarun Shridhar is the Director General of the Indian Chamber of Food and Agriculture (ICFA) and a former IAS officer of the Himachal Pradesh cadre (1984). He has served as Member (Administrative), Central Administrative Tribunal from 2020 to 2024.

Over three decades of experience across agriculture, animal husbandry, fisheries, rural development, public policy, and governance. At the Government of India level, he served as Secretary, Ministry of Fisheries, Animal Husbandry and Dairying, where a key role was played in the creation of the Ministry in 2019 and in the launch of major national programmes in dairy development, livestock health, disease control, fisheries infrastructure, and aquaculture. Earlier, as Joint Secretary, Department of Animal Husbandry, Dairying and Fisheries, national initiatives were led in shrimp aquaculture, aquatic disease surveillance, fisheries development, and international negotiations, contributing to India's emergence as the world's largest shrimp exporter.

At the state level, leadership roles were held as Additional Chief Secretary and Principal Secretary in Himachal Pradesh across Animal Husbandry, Fisheries, Environment, Forests, Power, and Horticulture, along with responsibilities as Chairman and Managing Director of key public sector undertakings. He also served as Deputy Director (Senior) at the Lal Bahadur Shastri National Academy of Administration and as Director, Ministry of Petroleum and Natural Gas.

# KEYNOTE SPEAKER & PROFILE

Mr. Shridhar has been conferred several national honours, including the Policy Leadership Award for the Dairy Sector, the Animal Health Policy Leadership Award, an honorary Doctorate (Ph.D.) in Veterinary and Animal Sciences, Fellowship of the National Academy of Veterinary Sciences, and multiple Lifetime Achievement Awards from leading industry bodies.

Mr. Shridhar has authored over 230 articles on agriculture and allied sectors, has advised national and international institutions, including FAO, and has been conferred multiple leadership and lifetime achievement awards.

**Mr. Gunturu Pawan Kumar**
National President
Seafood Exporters Association of India (SEAI)

Gunturu Pawan Kumar is the National President of the Seafood Exporters Association of India (SEAI). He plays a key role in representing and advancing the interests of the Indian seafood export industry. Kumar is the Managing Director of Sprint Exports Pvt. Ltd., a seafood processing and export company based in India. His leadership at SEAI has been instrumental in advocating for the industry and ensuring its growth and success. He has done his Bachelors in Civil Engineering and Masters (MBA) from London. He is in the seafood industry since 1997 with expertise in production and sales.



# Aqua Star

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# KEYNOTE SPEAKER & PROFILE

**Mr. D V SWAMY, IAS,**
Chairman, MPEDA

Mr. D V Swamy belongs to the 2001 batch of Indian Administrative Service. He joined as the Chairman of Marine Products Export Development Authority of India (MPEDA) during August 2022. He is a Post Graduate in Political Science. He has a master's in public administration (MPA) from Harvard University, Cambridge Massachusetts, John F Kennedy School of Government.

Mr. Swamy has served in various capacities under the State Government of Odisha in India. He was District Collector in three districts of Odisha. He was State Mission Director for National Rural Livelihood Missions in Karnataka and Odisha. He had functioned as Revenue Divisional Commissioner in Sambalpur district of Odisha.

Mr. Swamy held additional charge of Vice Chancellor, Education Department, Higher and Technical Education, Rourkela, Odisha.

Mr. Swamy served as Development Commissioner of Cochin Special Economic Zone.

Mr. Swamy joined MPEDA on 17.08.2022 as Chairman-MPEDA and after joining MPEDA, he held the additional charge as Development Commissioner of Cochin Special Economic Zone as well as Visakhapatnam Special Economic Zone in India. He also held the additional charge as Chairman of Tobacco Board. Currently, Mr. Swamy is holding the additional charge as Chairperson of the Coastal Aquaculture Authority.

# KEYNOTE SPEAKER & PROFILE

**Dr. P. Krishnan**
MFSc., MBA., PhD. PGDEL
DIRECTOR, BOBP-IGO

Dr. P. Krishnan is a fisheries expert by training. He served as a scientist for over 20 years in different research organizations under the Indian Council of Agricultural Research (ICAR) under Government of India. Dr. P. Krishnan has undertaken over 30 multi-institutional and trans-disciplinary R&D projects with funding from national and international agencies. He has published over 100 research papers in peer reviewed journals, and many books and policy papers on diverse subjects viz., fisheries resource management, coastal zone management, biodiversity and ecosystem conservation, environmental law, policy and governance.

Dr. Krishnan is a distinguished Fellow of the National Academy of Agricultural Sciences (NAAS), New Delhi and is a recipient of many national awards for his outstanding contributions in fisheries science.

Dr. Krishnan is currently the Director of Bay of Bengal Intergovernmental Organization (BOBP-IGO), a regional fisheries body with Bangladesh, India, Sri Lanka and Maldives as members.

https://bobpigo.org/pages/view/director-bobp

# KEYNOTE SPEAKER & PROFILE

**Prof. Balaji Ramakrishnan,**
Director, National Institute of Ocean Technology (NIOT), Ministry of Earth Sciences (MoES), Govt. of India

Prof. Balaji Ramakrishnan has assumed the role of Director of NIOT, with effect from September 6, 2024.

Dr. Balaji is Professor in the Department of Civil Engineering, IIT Bombay, since 2011, was working as Senior Coastal/Port Engineer at Sogreah Consultants, in Dubai, UAE. Apart from teaching and research, he has been involving in several major waterfront development projects in the middle-east countries, India and other Asian countries. His primary area of expertise include port, harbor, marina, coastal infrastructural design and developments, in general.

He has obtained his Bachelor degree in Civil Engineering from Madurai Kamarajar University, obtained his Masters and Ph.D degrees in Ocean Engineering field of research from IIT Madras. Dr.Balaji has published his research works through 3 monographs, 75 Peer-Reviewed Journals, 82 Conference papers.

Dr.Balaji has earned many honours, to mention a few; "Professor S.P. Sukhatme Excellence in Teaching Award" in 2024; "Distinguished Alumni Award" under Academic and Research category in 2022; Institution of Engineers India (IEI) awarded him "Marine Engineering Prize" in 2018 & 2022 and "Institution Prize" in 2015. Indian Society for Hydraulics honored him with "R J Garde Research Award", in the year 2012, under the category of young scientist for outstanding contribution in the field of hydraulics and coastal engineering. He had received "Maritime award", in the year 2006, from Ministry of Shipping,

# KEYNOTE SPEAKER & PROFILE

Road Transport and Highways, Government of India, for part of his Ph.D thesis research work. He won the "Best Graduate Student Paper award", in the year 2002, from American Society of Mechanical Engineers (ASME), Ocean, Offshore and Arctic Engineering Division, for part of his Master's thesis research work.

Some of the other research recognitions for the team members, include; fellowships from UNESCO-IHE; POGO-SCOR; DST; CSIR; UKIERI; IGARSS; DAAD; AGU; PIANC-COPEDEC; OMAE-ASME and COPRI-ASCE.

Dr. Balaji has presented several invited talks and research topics in many national and international forums. He has been supervising number of Masters and PhD thesis research works in the field of Ocean Engineering.

Dr. Balaji has been actively involved in several Government/Ministry sponsored research projects, from Ministry of Shipping, Ministry of Earth Sciences and DST. He has also been an active consultant for major ports, Maritime Boards, State Govt. agencies and private companies. He had successfully completed several consulting projects pertaining to coastal & marine infrastructures, in India, Asia and middle-eastern countries.

Project Management: Worked at various capacities; part of a team, team lead and project lead in variety of R&D and industry projects, in India and Overseas; overall outlay exceeding 23crores and multi-billion

# KEYNOTE SPEAKER & PROFILE

USD, respectively.

Development: Research facilities, technology demonstration, development efforts, Patents; methods, models and tools; sustained efforts towards better understanding of complex ocean dynamics, in long-term.

Collaborations & Networking: Spearheaded a unique, one-of-its kind, 5-institutes (IITB, NIOT, NCCR, NIO and NCU) joint field measurement campaign to demonstrate the collaborative capability. Headed & facilitated several students/scientists/faculty exchange visits from India to overseas universities/ institutions and vice-versa, for training purposes.

Outreach: Created opportunities for scholarships through R&D projects for several PhD and Masters students. Several National level technical workshops, seminars, hands-on training. Offered full-financial support to bring young research scholars/scientists/ faculty from all 9 maritime states across India to attend National Workshops (in 2019 & 2022), speaking of his strong commitment towards knowledge dissemination.


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Okkiyam, Thoraipakkam, CHENNAI - 600097.
Contact number : +91 70133 12272, +91 77028 46777
E-mail: info@faitt.org | Website: www.faitt.org

# THE ROLE OF THE BLUE ECONOMY IN DEVELOPING COUNTRIES

# BIOECONOMY IN THE AQUATIC FOOD SYSTEMS

**Omar Riego Peñarubia, Lingyan Li, Jogeir Toppe**
Food and Agriculture Organization of the United Nations (FAO), Rome, Italy
Omarriego.penarubia@fao.org

The bioeconomy refers to the production, utilization, conservation, and regeneration of biological resources - alongside the associated knowledge, science, technology, and innovation - to deliver sustainable solutions across all economic sectors. These solutions may include information, products, processes, and services that support the transition to a more sustainable economy. Put simply, the bioeconomy involves using biological resources more intelligently to produce biobased goods, processes, and services, including alternatives to fossil-based products, driven by scientific and technological advancements. Aquatic food processing generates substantial by-products, such as heads, skins, bones, scales, visceral organs, shells, and more - accounting for 30% to 70% of the total biomass, depending on the species and processing methods. If not properly managed or disposed of, these by-products can pose serious environmental risks. However, with appropriate processing, they can be transformed into value-added, marketable products through a bioeconomy approach. Because of their nutritional and bioactive properties, they can serve as raw materials for low-cost nutritious foods or high-value products in the food, pharmaceutical, cosmetic, and materials industries. Therefore, effective utilization of fish by-products offers significant social and environmental benefits, helping to reduce waste in aquatic value chains, optimize resource use, and contribute to the sustainable development of the

global blue bioeconomy.

Despite their potential, scaling up from laboratory research to industrial production presents several challenges. These include difficulties in limited data, low consumer awareness, variability in raw materials and processing methods, technology and capacity gaps, and differences in cultural, dietary, and regulatory contexts across countries. To fully realise the potential of the bioeconomy in the aquatic food system, countries need comprehensive and supportive legislation that fosters innovation, investment, and sustainable growth.

# THE LEAKING BLUE BASKET: ALLOCATIVE INEFFICIENCY AND THE 'MISSING MIDDLE' IN ASIA'S FISHERIES VALUE CHAIN

**P Krishnan and Rajdeep Mukherjee**
Bay of Bengal Programme
Inter-Governmental Organisation
(BOBP-IGO), Chennai
krishnanars@bobpigo.org

Over the past three decades Asia emerged as the fish basket of the world. However, regional analysis of eleven major fish-producing nations (Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Maldives, Philippines, Sri Lanka, Thailand, and Vietnam) reveals systematic inefficiencies across aquatic food value chains, with fish loss and waste (FLW) rates ranging from 20% to 60% of total catch. This "leaking basket" syndrome results in aggregate annual economic losses exceeding USD 10 billion, representing a profound failure to translate massive production gains into stable economic returns or nutritional outcomes. The root of this "leaking basket" is not an overabundance of resources but are driven by specific infrastructure gaps as 43.5% of losses occur at landing sites due to inadequate icing and high ambient temperatures, while weak cold-chain integrity during distribution further exacerbates deterioration.

India serves as a definitive case study for this disproportional investment strategy. The nation has seen impressive production growth achieving a CAGR of 6.55% during 2014-2023. However, per capita supply in India is amongst the lowest in the world and instances of malnutrition is widespread indicating a distributional problem. An evaluation of India's fisheries sector schemes reveals a skewed disbursement in favour of production centric activities and missing the middle. In this perspective, under the Fisheries and Aquaculture Infrastructure

Development Fund (FIDF) scheme, approximately 80% of total sanctioned investment (₹5,195.72 crore) was spent on large-scale fishing harbours, while critical "management" components such as cold storage, ice plants, and integrated cold chains each account for less than 1% of the total project cost pool. In case of the Pradhan Mantri Matsya Sampada Yojana (PMMSY), while it was more diversified than the FIDF scheme, the "Management" component often operated on lower fiscal thresholds compared to the capital-intensive "Production" and "Infrastructure" sectors enhancing the imbalance. Addressing these losses represents a high-return investment opportunity that enhances regional food security without the need to increase fishing pressure on already depleted stocks. The newly launched Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY), is a strategic pivot towards improving value-chain efficiency, favouring soft infrastructure and micro-enterprises.

The paper would present the key features of the aquatic food value chain in Asia and discuss strategies for their upgradation, by drawing success stories from different countries in the region.

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# BUILDING A BLUE FUTURE: AQUACULTURE AND FISHERIES AS DRIVERS OF SUSTAINABLE DEVELOPMENT IN COLOMBIA

**Andrea Carolina Piza-Jerez**
National Technical Coordinator,
Federación Colombiana de Acuicultores – FEDEACUA, Colombia,
coordinaciontecnica@fedeacua.org.

Colombia, located at the northern tip of South America and bordered by the Pacific and Atlantic oceans, possesses vast freshwater resources and significant agricultural potential, with nearly 38% of its territory classified as agricultural frontier. Within this context, aquaculture and fisheries have emerged as key drivers of rural transformation, engaging around 1.5 million people and reaching approximately 370,000 tons of fish production. While fishing has deep ancestral roots and industrial activity since the 1970s, aquaculture has developed over the past six decades, positioning itself as a strategic activity for rural development. Importantly, 95% of aquaculture producers are small-scale and subsistence farmers, while around 300,000 artisanal fishers depend directly on fisheries for their livelihoods. The evolution of fish production in Colombia from 1980 to 2023 shows a marked increase in aquaculture output while fishing production has fluctuated and declined in recent years (Figure 1). The promotion of Good Aquaculture and Fisheries Practices has fostered sustainability through public–private cooperation, international partnerships, and public financing. These initiatives have strengthened small-scale producers, boosted local economies, generated employment, and expanded exports. However, persistent challenges remain: access to licenses, business formalization, technological innovation, improved processing conditions, and the adoption strategies to address climate change. Additionally, the decline of fish stocks and aquatic

resources poses a major threat to artisanal fishers, demanding urgent actions. Aquaculture and fisheries thus represent not only a source of food security and economic growth but also a pathway toward building a resilient and sustainable blue future for Colombia and the region.

**Figure 1.** *Fish production evolution in Colombia*

# MAINSTREAMING POSTHARVEST INNOVATION FOR SAFE, SUSTAINABLE, AND GLOBALLY COMPETITIVE PHILIPPINE SEAFOOD VALUE CHAINS

**Riza Jane S. Banicod**
Department of Agriculture - National Fisheries Research and Development Institute, Quezon City, Philippines
riza.banicod@nfrdi.da.gov.ph

The Philippines possesses vast fisheries and aquatic resources that substantially contribute to food security, national revenue, and coastal livelihoods. The postharvest sector plays a decisive role in ensuring that seafood reaches consumers safely. However, this segment is increasingly challenged by climate stressors, environmental degradation, resource depletion, market competition, and the growing demand for traceable, high-quality, safe, and responsibly sourced aquatic products. In response, the Fisheries Postharvest Research and Development Division of the National Fisheries Research and Development Institute has strengthened research efforts to modernize seafood processing and elevate competitiveness across domestic and export markets. This presentation synthesizes recent and ongoing initiatives encompassing the development and verification of innovative postharvest and processing technologies, comprehensive safety and health risk assessments of hazards in aquatic foods, integrated supply and value chain analyses of commercially important fishery commodities, climate vulnerability assessment, and efforts to address technical trade barriers through alignment with Codex standards and other international benchmarks, including recognition of locally important species. Findings underscore the heightened vulnerability of Philippine seafood value chains to climate change, but also reveal concrete opportunities to reduce postharvest losses, add value to underutilized resources, and enhance seafood

safety and quality assurance for domestic and export markets. Harnessing these insights can support science-based policy development, strengthen compliance with international market requirements, and position the Philippine seafood industry toward more inclusive, sustainable, resilient, and competitive value chains, while empowering seafood producers to participate more equitably in global seafood systems.

# UTILISATION, CHALLENGES AND PROSPECTS OF BY-PRODUCTS ORIGINATED FROM AQUATIC RESOURCES IN BANGLADESH

**Md Jakiul Islam[1], Sujit Krishna Das[2], Mohd Hazmadi Zakaria[2] and Omar R. Peñarubia[3]**

[1]Department of Fisheries Technology and Quality Control, Sylhet Agricultural University, Sylhet-3100, Bangladesh, jakiulmi@sau.ac.bd

[2]INFOFISH, Malaysia

[3]Food and Agriculture Organization of the United Nations, Rome, Italy

This study examines wide range of by-products originated from aquatic resources (fresh, brackish, and marine) in Bangladesh focusing on their current utilisation, economic significance, market potential for developing high value-added co-products. It highlights the economic and environmental benefits of using bio-materials that would otherwise be wasted and also outlines the key challenges faced by seafood processors, such as dearth of technologies, inadequate infrastructure, traditional collection methods, limited market access, and lack of coordinated and long-term financing, R & D. The study also provides policy recommendations based on successful case studies to ensure sustainable fisheries management and to promote blue-circular economy. Fish scales, dried shrimp shells, pituitary glands, and fish maws show growing demand, although limited data available at national level except for scales, shrimp shells, and shark fins. Utilisation of shrimp heads and shells for making snacks, chitin, and chitosan offers major economic and environmental benefits, whereas application in nutraceuticals, pharmaceuticals, cosmeceuticals, animal feed, and bioplastics remains unexplored. This study further emphasises the need for advanced technologies, improved processing facilities, diversified products and markets to unlock the potential of by-products. Viscera and guts; and certain small pelagic fishes could support the production of high-value fishmeal and fish oil for feed mills. Collection of carp pituitary glands remains a

reasonable and important alternative to synthetic hormones for local and international market. Strengthening capacity, supportive policies, and investment in R&D are the key drivers for developing high-value co-products like collagen, gelatine, chitin, fishmeal and fish oil. Effective enforcement of Wildlife Conservation Act is vital to reduce the shark and ray by-catch and continuation of conservation of marine biodiversity.

# UNIDO BLUE INDUSTRY PORTS APPROACH

**Langendoerfer Atun, Yasmin**
United Nations Industrial Development Organization (UNIDO)
Vienna, Austria
y.langendoerferatun@unido.org

Ports play a vital role in global trade and economic development, acting as gateways that connect industrial zones, special economic zones and inland corridors with international markets. For coastal developing countries, they are central to the performance of seafood value chains, supporting fisheries, aquaculture, landing operations, processing, cold chain logistics and market access. As hubs for Blue Industries, ports influence city development, community livelihoods and the broader competitiveness of aquatic food systems. In a period of significant global transitions—including climate action, energy transformation, digitalisation and the need for resilient and transparent supply chains—ports in the Global South face mounting pressures but also significant opportunities to drive sustainable seafood sector growth.

UNIDO defines Blue Industry Ports as hubs that generate economic, environmental and social impact while promoting Blue Industries and strengthening industrial development across maritime and inland trade linkages. This encompasses cargo ports, industrial fishing ports and cruise ship ports, recognising the importance of integrated infrastructure, value chain connectivity and services that support seafood quality, safety and traceability. Through its technical expertise, UNIDO assists ports in enhancing MSME competitiveness, quality infrastructure and compliance systems,

trade facilitation, decarbonisation, circular economy solutions, renewable energy transitions and climate-resilient coastal planning.

By embedding industrial development, environmental stewardship and community wellbeing into port operations, Blue Industry Ports can significantly strengthen seafood value chains and enhance participation in regional and global aquatic food markets.

# BLUE FOODS-SAFETY AND NUTRITION CHALLENGES FOR DEVELOPING COUNTRIES

# EXPLORING THE INTEGRATION OF FISH POWDER IN SCHOOL MEAL PROGRAMS IN MALAWI THROUGH A FOOD ENVIRONMENT LENS: ACCEPTABILITY, AFFORDABILITY, AND CONVENIENCE

**Molly Ahern[1]*, Tijoy Lowore[2], Mihasina Harinaivo Andrianarimanana[1], Amenye Banda[3], Jogeir Toppe[1], Tinna Ng'ong'ola-Manani[2]**

[1]Food and Agriculture Organization of the United Nations (FAO), Fisheries and Aquaculture Division, Rome, Italy

[2]Department of Food Science and Technology, Lilongwe University of Agriculture and Natural Resources (LUANAR), Lilongwe, Malawi

[3]Food and Agriculture Organization of the United Nations (FAO), Malawi Country Office, Lilongwe, Malawi

Fish is a powerful yet overlooked resource for school feeding in Sub-Saharan Africa. Rich in essential fatty acids, high-quality protein, and key micronutrients, fish could address persistent child malnutrition, but animal-source foods remain rare in school meal programs. In Malawi—where fish supplies 14.2% of animal protein and sustains 217,000 livelihoods—it is notably absent from school menus.

This study tested whether locally produced fish powders could be integrated into Malawi's school meals by assessing acceptability, practicality, and cost. Methods included: (1) acceptability trials with 6–13-year-old learners, (2) time assessments for fish powder preparation, (3) evaluation of ease-of-use by school volunteers, and (4) cost analyses of production and affordability for school programs.

Nearly 90% of children ate more than 75% of porridges containing pan-roasted usipa powder, with high ratings for taste, smell, and appearance across both lakeshore and inland schools. Pan-roasting improved acceptability but increased fuelwood use, time, and costs, raising sustainability concerns compared with simpler processing methods.

These results show that fish powders are not only feasible but highly acceptable for school meals. Incorporating them could improve child nutrition, enhance food security, and create new markets for local fish producers. The trade-off between preferred

sensory quality and processing efficiency highlights the need for innovation in fish powder preparation.

Integrating fish into school feeding is a missed opportunity, however our evidence shows it can work. Fish powders should be actively promoted as a cost-effective, nutritious, and locally sourced ingredient in Malawi's school meal programs and beyond.

# FOOD SAFETY OF FISHERY AND AQUACULTURE PRODUCTS IN MOZAMBIQUE

**Filipe Eugenio Silvestre Januario[1], Lúcia Sumbana Santo[2], Sonia Bianca Perreira[3], Argentina Cossa[4]**

[1] National Institute for Fish Inspection (INIP, IP), Maputo, Mozambique,

[2] Director General of INIP IP,

[3] Technical Director of Sanitary Certification of INIP IP,

[4] Technical Director of Sanitary Licensing of INIP, IP

filipe.januario1@gmail.com

Mozambique, is located on the southeast coast of Africa and bordered by the Indian Ocean, has fisheries and aquaculture as strategic sectors for food, nutritional, and socioeconomic security. Fishery products represent a primary source of animal protein, income, and livelihoods for coastal and rural populations, with artisanal fisheries contributing for more than 90% of national production and aquaculture showing increasing growth potential.

Ensuring food safety of fishery and aquaculture products is therefore essential to protect public health, enhance consumer confidence, and secure access to domestic and international markets. In Mozambique, food safety is addressed through an integrated system covering the entire value chain, from primary production to processing, transport, inspection, and certification. This system involves several national institutions, including the National Institute for Fish Inspection (INIP, IP), the National Institute for Standardization and Quality (INNOQ), the National Institute for the Development of Fisheries and Aquaculture (IDEPA), the Oceanographic Institute of Mozambique (InOM), and the Ministry of Health (MISAU), operating in coordination with local authorities.

National legislation and standards are aligned with internationally recognized frameworks such as HACCP, ISO 22000, and ISO 17025, supporting sanitary licensing, laboratory testing, and health certification

for export and import. Despite notable progress, challenges remain, particularly in artisanal fisheries, including inadequate infrastructure, inconsistent application of good hygiene practices, and the high cost of maintaining laboratory accreditation.

This paper highlights current food safety measures, institutional roles, challenges, and opportunities, emphasizing the need for strengthened inspection systems, capacity building, international partnerships, and expanded adoption of food safety standards to ensure safe, sustainable, and competitive fishery and aquaculture products in Mozambique.

# THE NEXUS OF TRADE FACILITATION AND SPS HARMONIZATION: THE FUTURE OF BORDER CONTROLS AND IMPLICATIONS FOR AFRICAN FISH TRADE

**Margarida Correia**
United Nations Industrial Development Organisation (UNIDO)
Vienna, Austria
m.dossantoscorreia@unido.org

The trade of fishery products across borders in Africa remains heavily shaped by non-tariff measures, particularly sanitary and phytosanitary (SPS) requirements, which often fragment regional trade and constrain market access. Based on operational experience with One Stop Border Posts (OSBPs) in Africa this paper examines how trade facilitation measures and borders are evolving and what their future role may be in facilitating safe and efficient fish trade. Complementarily, it draws on regional markets, such as the EU internal market, as an illustrative example where regulatory harmonization, mutual recognition and trade facilitation measures have demonstrably improved cross border trade.

Fishery products pose demanding SPS challenges due to the products' perishability, potential public health risks and traceability requirements. In Africa, the fisheries sector plays a critical role in providing livelihoods with fish and fishery products well positioned to meet the needs for high protein and affordable foods in the context of rising populations and growing regional demand for food products. In many African border contexts, fragmented inspection regimes and inconsistent conformity assessment practices tend to constrain market access, increase post-harvest losses and divert trade of fishery products into informal channels. While OSBPs provide an effective institutional platform for coordinated border management and are recognized under the African Continental Free Trade Agreement (AfCFTA)

as key trade facilitation instruments, experience shows that their full potential in fish trade is often constrained in practice by the absence of mutual recognition or equivalence arrangements and insufficient risk based approach to border controls, thus reducing efficiency gains of the OSBP concept.

Comparative experience from other markets demonstrates that the effectiveness of integrated border controls depends not primarily on infrastructure investment and shared facilities, but on bilateral confidence in legally anchored harmonization and robust conformity assessment systems that lead to information sharing and transparent enforcement. Addressing this trust deficit requires strengthening national and regional quality infrastructure systems—an area where UNIDO's work under the ProFishBlue programme provides practical guidance to support equivalence, cooperation and mutual recognition between Member States of the SADC region, demonstrating that shifting from end-product inspection toward harmonized, process-risk based controls across the fishery value chain is essential for building trust, enabling mutual recognition, and unlocking the full trade facilitation potential of OSBPs while maintaining SPS integrity of fish products.

# FISH LOSS ASSESSMENT AND VALUE CHAIN ANALYSIS ON SMALL-SCALE FISHERIES IN SOUTH SUDAN

**Yahya Ibrahim Mgawe[1], Omar Riego Peñarubia[2],**

[1]National Task Team (NTT) on implementation of SSF Guidelines, Dar es Salaam, United Republic of Tanzania

ymgawe@yahoo.com

[2]Food and Agriculture Organization of the United Nations (FAO), Rome, Italy

The Republic of South Sudan is endowed with diverse water bodies including rivers, tributaries, lakes, dams and wetland areas. The network of these water bodies has made fishing industry to become an important economic sector in the country, in terms of food security and nutrition, employment and income generation. The government of South Sudan through the financial support from The Kingdom of the Netherlands, commissioned a comprehensive study to assess losses in the context of value chain improvement. The study employed various methods including Exploratory Fish Loss Assessment Method (EFLAM), Gender Responsive Fish Loss Assessment Method (GRFLAM), Questionnaire Loss Assessment Method (QLAM), and the Value Chain Analysis for Development (VCA4D). The study was conducted from the year 2022 to 2023, covering all the ten (10) states. It was found that physical loss is about 11 percent of total catch while quality loss is about 57 percent. In monetary value, the losses can be equated to over SSP 200 billion (USD 200M)) lost income per annum. Critical fish loss hot spots have been identified, together with causes of the loss and potential solution for mitigation and value addition. From the findings, it is evident that no single approach can resolve the intertwined challenges, and thus the need for developing a Multidimensional Solution (MDS) strategy through stakeholders' consultation. Specifically, the focus should be placed on policy and regulatory frameworks, skills and knowledge, application of appropriate technologies, services and infrastructure, social and gender equity, and markets.

# REDEFINING TRADITIONAL FISH SMOKING IN THE PHILIPPINES: ADOPTION OF FAO-THIAROYE PROCESSING TECHNIQUE (FTT-THIAROYE) FOR SAFER AND SUSTAINABLE SEAFOOD PROCESSING

**Carl Jefferson Madrid,**
**Deserie M. Peralta,**
**Riza Jane S. Banicod,**
**Gezelle C. Tadifa,**
**Charlotte Ann M. Ramos,**
**Karl Bryan S. Perelonia, and**
**Ulysses M. Montojo**

Department of Agriculture - National Fisheries Research and Development Institute, Quezon City, Philippines

carljefferson.madrid@nfrdi.da.gov.ph

Fish smoking is a traditional preservation technique widely employed in the Philippines, yet conventional methods present major drawbacks related to food safety, product quality, and occupational health. A critical concern is the presence of polycyclic aromatic hydrocarbons (PAHs), which is classified as human carcinogens and tightly regulated in international markets. In this study, PAH concentrations in several smoked fish samples produced using traditional methods exceeded the 12 ng/g European Union limits for PAH4 by roughly tenfold, posing serious risks to consumer safety. Physicochemical analyses also revealed moisture contents above optimal levels for shelf stability, whereas microbiological tests showed aerobic plate counts surpassing national safety thresholds. To address these problems, the FAO-developed processing technology (FTT-Thiaroye) was adapted and optimized for the Philippine context. Production trials with milkfish, tilapia, and sardines processed using different agricultural biomass and sawdust as fuel sources demonstrated that PAH levels in FTT products consistently fell below EU regulatory limits, regardless of species or fuel type. Additional safety and quality parameters, including moisture content and microbiological stability, were maintained within optimum ranges. Refinements in design and operation were also carried out to meet local needs and industry requirements. The findings denote the transformative potential of FTT-Thiaroye in attenuating PAH contamination, improving hygienic

quality, and enhancing worker safety, while ensuring compliance with both national and international food safety standards. Adoption of this technology provides a viable pathway for advancing the Philippine smoked fish industry toward greater competitiveness, higher yields, as well as improved livelihoods across the seafood value chain.

# FUTURE OF THE GLOBAL SEAFOOD TRADE

# THE EVOLVING WORLD TRADE, INTERNATIONAL TRADE LAWS & PRACTICES TO BE TAKEN BY EXPORTERS / IMPORTERS/TRADERS.

**Biju Joseph**
Lloyd & Johnson International
(Shipping & International Trade)
India
accounts@ljinternational.ai

The global trade in fishery products is increasingly shaped by geopolitical shifts, evolving trade policies, and heightened regulatory and enforcement frameworks. Key challenges encountered in India in our work as Shipping & International Trade specialists are:

- Tariffs, protectionism, and evolving world trade order - Challenges & opportunities in foreign trade.
- Changing world trade landscape, role of UN, IMO, WTO, & Law enforcement concerns.
- Domestic concerns of countries and their impact on foreign trade – Precautions to be taken to protect the value of goods & remittances for exporters.
- Changes in carriage, shipping & Bill of Lading laws in India - Need for documentation and agreements.
- Legal disputes - Challenges like legal expenses, jurisdictional issues, enforcement of law, and execution of judgment.

By identifying key legal and commercial risks, this presentation aims to provide stakeholders with actionable insights to navigate an increasingly complex global trading environment.

# NOT JUST A COMMODITY: AQUATIC FOODS AS NUTRITION PATHWAYS FOR NATIONS

**Jörn O. Schmidt**
Director, Sustainable Aquatic Food Systems, Worldfish
J.Schmidt@cgiar.org

As international seafood markets expand and diversify, aquatic "blue foods" are emerging as a powerful avenue for countries to manage nutrition security and climate risks to their food production, alongside ambitions to grow their blue economies. This keynote will explore how the global seafood trade can play a more deliberate role in supporting food and nutrition security across regions, recognizing that the priorities and pressures differ sharply between developed and developing country contexts.

In developed economies, the seafood sector faces rising expectations for sustainability, traceability, and responsible sourcing, as consumers demand healthier proteins and lower environmental footprints. Strategic investments in innovation, such as digital transparency tools, improved certification systems, and climate-smart, sustainable production, enable companies to secure stable supply, meet regulatory requirements, and protect brand value while contributing to global nutrition resilience.

For developing countries, blue foods represent an essential source of micronutrients, affordable protein, income, and employment. Strengthening local aquaculture and fisheries systems through improved seed, feed, aquatic animal health, cold-chain infrastructure, and market access can increase productivity, reduce losses, ensure quality, and connect small- and medium-sized producers to regional and international markets.

Inclusive scientific and digital innovations, along with conducive trade partnerships, fair value chains, and inclusive procurement models, can amplify the benefits, enabling countries to improve nutrition and livelihoods for their people while expanding global supply.

From a WorldFish perspective, aligning science, policy, and market incentives across both ends of the trade system is key to improving food and nutrition security and livelihoods in the geographies we serve.

When global seafood companies, governments, and research organizations collaborate, blue foods become more than commodities: they become strategic pathways for nourishing nations, stabilizing markets, and creating shared value in an increasingly uncertain world.

# MAXIMISING SOCIO-ECONOMIC VALUE FOR SMALL SCALE AQUACULTURE AND FISHERIES PRODUCERS

**Melanie Siggs**
Director of Strategic Engagement,
Global Seafood Alliance,
melanie.siggs@globalseafood.org

Small-scale aquaculture and fisheries are the quiet engines of global food security, nutrition, and coastal prosperity—yet their potential remains largely untapped. Representing nearly half of the world's catch and supports the livelihoods of billions. These producers supply nutrient-dense seafood essential for healthy diets, which is particularly important in vulnerable communities where livelihood opportunities are limited, and nutrition sources restricted.

They are pivotal to local economies: providing employment, sustaining cultural heritage, and serving as a cornerstone of women's economic empowerment through their prominent roles across harvest and post-harvest value chains. As climate pressures intensify, small-scale producers stand at the frontlines of environmental change, practicing low-impact, energy-efficient production that can enhance ecosystem resilience and support biodiversity restoration. Enabling them is not only a moral imperative, it is a strategic investment in a sustainable, climate-positive food future.

This keynote will explore how targeted empowerment through cooperative models, digital platforms, fairer trade practices, infrastructure development, knowledge sharing and access to responsible production training can unlock transformative opportunities for small-scale fishers and farmers. It will also look at how circularity and maximising value from full utilisation models can help to create greater

value and prevent lost nutrition.

Successful initiatives, including those supported by the Global Seafood Alliance, demonstrate that when producers are equipped with knowledge and the tools to meet global standards, their economic power grows and communities thrive.

# BLUE INDUSTRY STRATEGY FOR DEVELOPING COUNTRIES

**Rivera Rojas, Alejandro**
United Nations Industrial Development Organization (UNIDO)
Vienna, Austria
a.rivera-rojas@unido.org

Developing countries hold significant potential within the Blue Economy, yet structural constraints continue to limit their ability to advance in higher-value ocean-based industries. UNIDO defines Blue Industry as the full spectrum of water-related productive activities that enhance sustainable and climate-resilient livelihoods, strengthen industrial value chains, and foster innovation and environmental stewardship. This paper outlines how developing countries can strategically position themselves to benefit from emerging Blue Industry opportunities by drawing on insights from UNIDO's Blueprint for Sustainable Development.

Key Blue Industry sectors such as blue food systems, marine biotechnology, ocean renewable energy, circular economy solutions and digital marine technologies remain underdeveloped in many regions due to fragmented policies, insufficient capacities and limited access to finance. The Blueprint emphasises that much of the Blue Economy's potential lies in industrial activities and highlights the importance of coordinated policy frameworks, strong governance and robust science–industry linkages to unlock this potential.

UNIDO's programme experience demonstrates that integrated approaches combining industrial policy, innovation systems, quality infrastructure and climate-resilient development can accelerate capability building and strengthen participation

in global value chains. By adopting coherent Blue Industry strategies, developing countries can enhance competitiveness, support resilient coastal livelihoods and contribute more meaningfully to a sustainable Blue Economy.

# GLOBAL TRADE AND MARKETS OF AQUATIC PRODUCTS AMIDST RISING UNCERTAINITIES

**Shirlene Maria Anthonysamy, William Griffin**

Trade and Markets Team, Fisheries and Aquaculture Division, Food and Agriculture Organization of the United Nations, Rome, Italy

ShirleneM.Anthonysamy@fao.org

Global trade in aquatic products continues to grow in 2025, with volumes increasing by an estimated 2.1 percent, reflecting steady demand across both developed and emerging markets. At the same time, trade policy developments have introduced a heightened level of uncertainty into global markets for fishery and aquaculture products. In anticipation of new or higher tariffs, many importers have adjusted procurement strategies, accelerating purchases to mitigate potential cost increases and supply disruptions.

The possibility of additional trade policy measures has further amplified uncertainty, making market conditions more volatile and creating further challenges throughout the global value chain for aquatic products, from producers and processors to traders and retailers. These dynamics are occurring alongside other contemporary challenges, including shifting consumer preferences, rising input costs, and sustainability and regulatory pressures.

This presentation will provide an overview of current global market trends for aquatic products, analyze the impacts of recent trade policy developments and other emerging challenges, and explore their implications for trade patterns, market flows, and future growth prospects in the sector.

# ETHICAL SEAFOOD - LABOUR AND STANDARDS

# CREATING SUSTAINABLE AND SCALABLE SOLUTIONS TO FORCED LABOUR IN FISHERIES AND SEAFOOD INDUSTRY

**Andrey Sawchenko,**
Regional Vice President, Program Impact– Asia Pacific, International Justice Mission
asawchenko@ijm.org

Fisheries and aquaculture in India provide livelihood and employment opportunities to about 30 million fishers and fish farmers at the primary level and several millions along the value chain. India is the 2nd largest fish producing country with around 8% share in global fish production. Globally, India is one of the top shrimps producing and exporting nations and 3rd largest capture fisheries producer. India's fisheries sector is a powerful economic driver, with seafood exports projected to grow from $5 billion in 2020 to $18 billion by 2030 , supporting livelihoods of millions across marine ecosystems and aquaculture value chains. This promise of economic growth requires inclusive and sustainable approaches, to protect the most vulnerable workers trapped in exploitative work in the unregulated markets of the fishery and marine ecosystem.

Every year, many workers in the fishing and seafood industry globally are lured by middlemen with false promises of good jobs and trapped in unhygienic, difficult and exploitative working conditions. Crimes ranging from illegal fishing and document fraud to labour exploitation, human trafficking and money-laundering —remain deeply embedded in this sector, involving migrant and coastal labour. Such activities create unsafe, opaque and highly unequal working conditions for thousands of fishermen, many from low-income, marginalised communities and developing regions, including India.

Media reports suggest that governments are identifying forced labour cases in the fishing industry in the Asian region, including in India. Given the potential for inclusive growth in the fisheries and seafood sector, sustainable and scalable solutions are critical to ensure brand reputation and market opportunities.

This paper describes a typology of labour exploitation in the fisheries sector, drawing from IJM's research and program activities in Thailand and other examples in the Asia Pacific region. It summarizes IJM's collaborative interventions with governments around the world, and how these efforts have helped contribute to progress in reducing the prevalence of forced labour. IJM comes alongside governments and their institutional arms to support efforts toward building a justice system that deters exploitation and fosters sustainable economic progress. The Indian government's efforts to address forced labour are highlighted, with a focus on India's mandatory corporate social responsibility (CSR) law as an additional lever for change.

[1]Statement by Union Minister for Fisheries, Animal Husbandry & Dairying, Shri Rajiv Ranjan Singh in Sept 2024, https://www.pib.gov.in/PressReleasePage.aspx?PRID=2055709

[2]See response of Minister for Fisheries, Animal Husbandry and Dairy, in Lok Sabha, Parliament of

India, 4th Feb 2025.

[3]See Witbbooi et al, "Organised Crime in the Fisheries Sector threatens a sustainable Ocean Economy,", Researcp Paper, University of St. Andrews, https://research-repository.st-andrews.ac.uk/bitstream/handle/10023/23152/Witbooi_2020_Organised_crime_in_fisheries_Nature_AAM.pdf?sequence=1

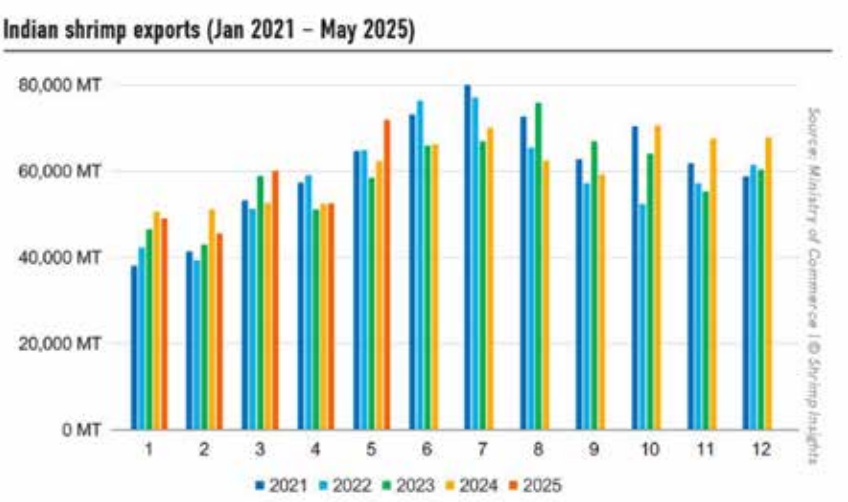
[4]Organised Crime Associated with Fisheries, https://oceanpanel.org/wp-content/uploads/2022/05/Organised-Crime-Associated-with-Fisheries.pdf

# BIODIVERSITY AND SOCIAL IMPACT ASSESSMENT SHRIMP FARMS IN ANDHRA PRADESH UNDER ASC STANDARDS AND IMPACT STATEMENTS

**D. Rajasekar, Sandeep Kumar, J. Yogalakshmi**
Greenranks Global Services Private Limited, Hyderabad
assessments@greenranks.com

India exported India exported 1,698,170 tonnes of seafood valued at Rs 62,408.45 crore ($7.45 billion) in 2024-25. Export volumes suggest not only stable volumes but also an improved product mix and better average prices. A staggering 60% of this comes from Andhra Pradesh alone. Andhra Pradesh contributes around 32 per cent of marine seafood exports and covers 2.26 lakh acres under aquaculture. The need for traceability and certifications aligned with global standards is enhancing the credibility of Indian shrimp in discerning markets. Studies on Environmental and Social Impact Assessment were conducted in Coastal districts of Andhra Pradesh in about 70 shrimp farms selected based on their size and proximity to coastal zones under ASC standards through Independent Assessments; Results may vary due to limited sample size and selection criteria. Studies revealed that majority of farms don't have any negative impact on Native Mangrove vegetation as most of them were located away from Naturally occurring or protected Mangroves. Majority of the farms were in Coastal Aqua zone except in Krishna and Godavari districts where farmers have converted their agriculture farms into aquaculture for higher income and due to non-availability of labour due to increased costs. Most of these farms are drawing canal water with salinity ranging from 5-30 ppt and occasionally use saline borewell water for culture. The farms under these studies also revealed that the farms were away from wildlife protected areas and away from biodiversity rich areas and don't possess High Conservation Value species as located mostly in aqua zones in coastal districts. The social Impact studies revealed that there is an overall improvement in the standard of living, earning per family through gainful employment in aqua sector from hatchery to processing and related sectors. Mostly the feedboys are from adjoining states such as West Bengal, Odisha and other regions thus providing gainful employment. Shrimp farming in Andhra Pradesh represents a sector that is future-ready, environmentally conscious, and globally competitive that captured the imagination of world seeking sustainable prosperity through blue

economies. Thus, the study concludes that there could be neutral impact on biodiversity and positive impact on society with best sustainable management practices and statements are discussed.



# DIGITALIZATION OF FISHERIES KEY DATA ELEMENTS ON CREW WELFARE - AN AUDIT TOOL TO ADDRESS SDG AND ILOC 188

**Marcelo Hidalgo[1,2], Nialangis Posanau[1], Stephanie Pokajam[1], and Donald Papaol[1]**

[1]Fishing Industry Association of Papua New Guinea

[2]Seafoodmatter

The Seafoodmatter benchmark labour tool developed in 2014 was updated and replaced by the FISH standard checklist based on ILO Convention 188 and with worker voice requirements (e.i, WIFI availability onboard). This paper presents analyses and shares the inclusion of innovative Key Data Elements (KDEs) in a digital platform (iFIMS) towards developing an assurance digital platform for the social accountability certification of the tuna fleet.

**Objectives:**

1. To develop an assurance model for our Tuna Industrial Fleet Crew's decent working and living conditions,
2. To control several Key Data Elements (KDE) of social accountability onboard supported by a digital platform.
3. To implement an auditing tool per fishing trip.

**Methodology:**

A checklist was developed specifically for this project based on ILOC 188 and addressing Sustainable Development Goals # 8, # 9 and # 14. A Technical Working Group (TWG) voluntarily offered to provide feedback and review the proposal including Fishing Company representatives, Crew members, and a National Fisheries Authority NFA officer.

**Discussion:**

There are agreements and disagreements in some proposed KDEs, the discussion and rationale assessed the practicality of the KDE, the strength of the verifiable evidence, the availability of the evidence, the sources of this information (authorities, FIAO, regulators), and also the needed resources.

**Conclusion of KDE:**

Fishing companies need a few documents already available to support the inclusion of these KDEs in a digital platform per fishing company initially and later per fishing vessels. The documents needed to support these 23 KDEs on Crew Welfare per fishing trip.

# THE MARKET FOR ETHICAL AND SUSTAINABLE SEAFOOD - TRENDS AND OPPORTUNITIES

**Nigel Edwards**
Seafood Industry Development Director, Hilton Seafood
Nigel.Edwards@hfgplc.com

This presentation will outline the need for a strategic approach to ensuring sustainable business in fisheries and aquaculture products in the current business environment. The author will draw on a background of experiences gained though senior management roles at Hilton Foods and the U.K Seafood Federation, with practical examples demonstrating how seafood industry collaboration is driving a shared agenda to address current and future challenges.

A brief analysis of the global market for seafood and its relative size to other proteins, will provide context for a growing awareness of consumer concerns over ethical and sustainability issues. In particular, the ethical aspects of human labour along the supply chain will be considered, illustrating how this can impact on investment and business processes, especially to meet market entry demands for assurance, certification, and transparency.

For operators who can meet these requirements, there is a positive outlook for Blue Foods, especially where there is leverage for through innovation to achieve health benefits and reduced carbon footprint and demonstrating leadership in ethical seafood.

# ASSESSMENT OF VULNERABILITY AND FORCED LABOUR RISKS AMONG FISHERY WORKERS: EVIDENCE FROM THE PEARL CITY OF TAMIL NADU, TUTICORIN, INDIA

**Oviya Ananthi Saravanan[1], A. S. Gokula Krishnan[2], Kingston Jeyaashriee[3]**

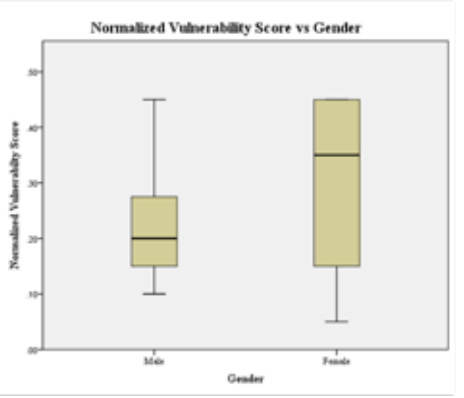
[1]UG Scholar, Fisheries College and Research Institute, TNJFU, Thoothukudi, India.

oviyaananthi.sfcri@gmail.com

[2]PG Scholar, DFRM, Faculty of Fisheries Science, KUFOS, Panagad, Kochi, India.

[3]PG Scholar, DAQ, Fisheries College and Research Institute, TNJFU, Thoothukudi, India.

The fisheries sector, though central to livelihood and food security in coastal India, faces growing concerns of forced labour, largely influenced by socioeconomic vulnerabilities among fishery workers.




This study used a random sample of 44 labours from the field of fisheries, including primary and secondary sector in 4 villages of Tuticorin district, Tamil Nadu to examine the extent of gender and job type parameters are vulnerable to forced labour, and also to study the relation between the education, age, experience and annual income with the normalized vulnerability score. In regard to this objective a pre-prepared questionnaire focussing on the

| | Normalized Vulnerability Score | Age | Education | Annual Income | Experience |
|---|---|---|---|---|---|
| Normalized Vulnerability Score | 1 | 0.033 | -0.4 | -0.572 | -0.074 |
| Age | 0.033 | 1 | -0.533 | -0.046 | 0.655 |
| Education | -0.4 | -0.533 | 1 | 0.73 | -0.482 |
| Annual Income | -0.572 | -0.046 | 0.73 | 1 | -0.223 |
| Experience | -0.074 | 0.655 | -0.482 | -0.223 | 1 |

parameters that supporting to build the vulnerability score were considered and survey was conducted. The result for the gender study indicate that the female labour (0.3088) exceeded that of men (0.2278), highlighting gender-based exposure to informal and unstable work. In assessment between the job types labours of primary sector showed a higher mean rank (27.07) than secondary ones (18.33), reflecting heavier workload and pressure in direct fishing operations. The correlation analysis of normalized vulnerability score with multiple variables such as age, experience, education and annual income showed a slight positive ($r = 0.033$), negative ($r = -0.400$), strong negative ($r = -0.572$) and slight negative ($r = -0.074$) correlations, that depicts a serious insight about the necessity about the awareness of major government schemes and rules, and importance of education among the labours. This study signalling an urgent need for the need of building framework, aimed at safeguarding human rights and promoting decent work within the fisheries sectors.

# SKILLING – NEXT REVOLUTION IN FISHERIES

**Dr. Satender Singh Arya,**
Chief Executive Officer, Agriculture Skill Council of India, Gurugram,
ceo@asci-india.com

India stands at the juncture of agrarian transformation and uprising of technology led fisheries. The workforce in fisheries is 0.32% of total. Output to workforce ratio is better in fisheries (22:1) in comparison to crops (1.4:1) and livestock (4.9:1). The sector has faster growth rate contributing to significant portion of agricultural exports. Waste coastline and thrust on development of technologies for farming, identify catch, vessel and fishermen safety at sea, post-harvest management and related infrastructure leading to faster growth. Fisheries evolving from traditional to GPS/drones, intuition-based to AI-based and digital markets and carbon trading. However, over 70% of the fisheries workforce are lacking formal skilling which shows clear risk of outpacing technological progress over human preparedness and remain underprepared for this rapid shift.

Agriculture Skill Council of India (ASCI) is a skill Awarding Body under MSDE, facilitating skilling and building capacity by bridging the skill gaps, reskilling/ upskilling the existing and skilling the prospective workforce, extension, schools & colleges as per NEP and other stakeholders. ASCI has developed over 170 Qualification Packs and corresponding curriculum in agriculture including fisheries. New courses like solar applications, FPOs, digital and climate resilient technologies, etc. are developed from time to time.

Under Indo-Australian project, ASCI rolled out courses in Digital Agriculture, Organic, renewable energy

and GHG emissions. ASCI has trained more than 15 lakh candidates in this sector and also organised Employment Melas and apprenticeship. Skilling led to improved income levels, good management practices, higher yields and better information in comparison to pre-skilling.

Therefore, India's advantage in demographic dividend can be reaped with the skill development only.

# GROWTH THROUGH VALUE ADDITION AND PROCESSING TECHNOLOGIES

# TOWARDS TOTAL UTILISATION OF AUSTRALIAN WILD ABALONE: A FRAMEWORK APPROACH

**Howieson, J.R[1]; Loo, L[1]; Chung WH[1]; Jackson, EJ[2]; Lisson; D[3]**

[1] School of Molecular and Life Sciences, Curtin University,

[2] Curtin Business School, Curtin University
Kent St, Bentley. 6107.

[3] Abalone Council of Australia
Kent St, Bentley. 6107.

j.howieson@curtin.edu.au

The Australian Wild Harvest Abalone industry is facing profitability challenges due to a range of issues including spatial squeeze; disease; quota reduction; competition and increasing operational costs. The industry is therefore researching a range of new options for total utilisation of the catch, including emerging and potentially value-added outcomes for the traditional by-products of viscera, blood and shell.

The research has been developed to align with the principles of SDG 12.3, including using at least 50% of the target by-product for upcycling. A food byproduct utilisation framework was developed and has been tested in this (and other) case studies. The framework steps include detailed supply chain mapping; upcycled options development including market appraisals; consultation for prioritisation; food science investigation for functionality, processing and new product development and pre-feasibility assessment incorporating economic, technical, operational and regulatory considerations.

The results of the supply chain mapping, as well as functionality; new product development and processing innovations for the viscera; blood and shell will be presented. Regulatory (including food safety and novel food approvals) and operational challenges and mitigation actions will be explained, and pre-feasibility results demonstrated.

The developed food by-product utilisation framework is being applied to other seafood and food business case studies and examples of developed and evaluated sector specific extension activities and materials will conclude the presentation.

# ON-BOARD PROPANE-BASED REFRIGERATION FOR SMALL FISHING BOATS: A CLEAN COOLING PATHWAY FOR QUALITY PRESERVATION, INCOME ENHANCEMENT, AND CARBON REDUCTION

**Mani Sankar Dasgupta** [1], **Sonam Gopaldasji Rajpuriya** [1], **Alex Reimer** [2] **Kristina N Widell** [2]

[1]Department of Mechanical Engineering, BITS Pilani, Pilani, 333031, India

[2]SINTEF Ocean AS, 7034-Trondheim, Norway

dasgupta@pilani.bits-pilani.ac.in

India is among the world's leading producers and exporters of fish and seafood; however, post-harvest losses and quality degradation remain persistent challenges, especially in small motorised and mechanized fishing vessels that depend largely on crushed ice for preservation. The absence of on-board refrigeration restricts fishing duration, compromises product quality, and results in significant economic and environmental losses. This presentation introduces a compact, engine-driven on-board refrigeration and flake ice production system using the natural refrigerant propane (R290), specifically designed for small fishing boats. The system employs an indirect loop R290 configuration, driven by a belt-coupled open-type compressor connected to the main engine, with auxiliary battery support. The design emphasizes mechanical simplicity, robustness, and ease of maintenance, making it suitable for harsh marine environments. Thermodynamic simulations indicate a 14–15% improvement in cooling coefficient of performance (COP) compared to conventional refrigerants. Carbon footprint analysis shows a net reduction of approximately 6.7 tonnes of $CO_2$ equivalent per fishing trip, primarily due to reduced ice transport, lower fuel consumption, and minimized fish wastage. Economic assessment demonstrates a rapid payback period of about four fishing trips, driven by improved fish quality, higher market value, and reduced operating costs. Beyond technical performance, the system offers broader

socio-economic benefits, including enhanced fisher income, improved working conditions, skill development, and support for sustainable fishing practices. System architecture, component selection, propane safety considerations, and the field demonstration roadmap is discussed. The proposed technology represents a scalable clean cooling solution for strengthening small-scale fisheries and Indian seafood cold chain.

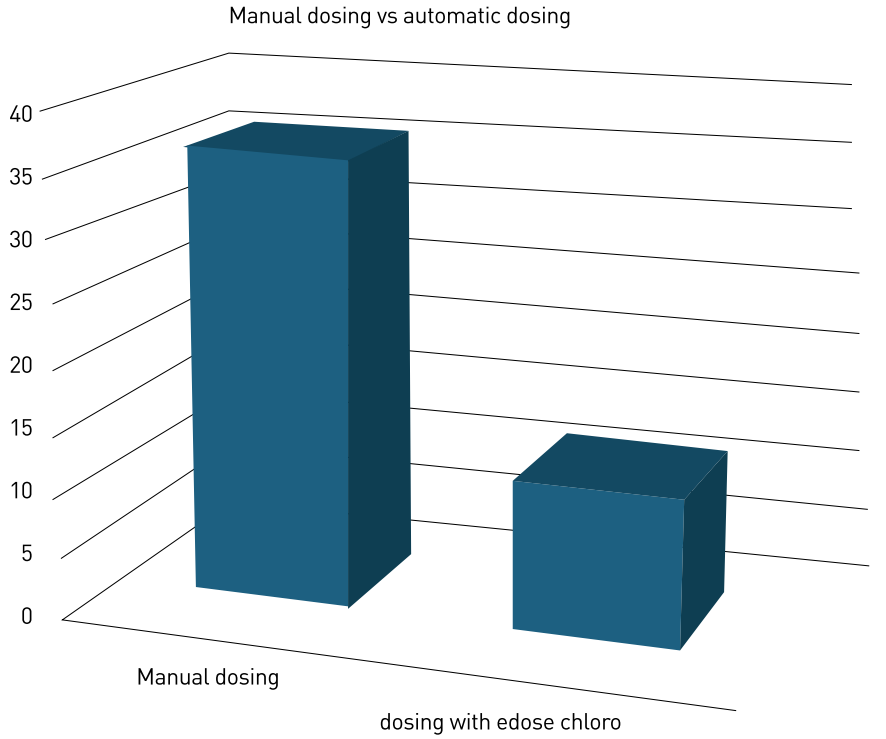
# SENSE & DOSE FOR CHEMICAL TREATMENTS

**Raju Choppella N.**
**Ananthakrishnan, Rajesh M**
Initiative Engineering, Pune, Maharastra, India
raju@initiativeengineering.com

The fisheries industry relies on a range of chemical inputs throughout processing operations, including disinfectants, pH adjusters, and medicinal additives. These chemicals are essential for maintaining product safety, water quality, and effective disease control. However, traditional manual dosing methods, limited real-time monitoring, and fluctuating water conditions often result in chemical overuse, underuse, or inconsistent application. Such inefficiencies increase operational costs, negatively impact product quality, and raise environmental sustainability concerns.

Integrating sensor-based chemical monitoring with automated dosing systems presents a transformative solution to these challenges. Continuous measurement of key parameters—such as residual disinfectant levels, pH, turbidity, and chemical concentration—enables precise, demand-driven chemical application. Automated dosing improves accuracy, minimizes human error, and enhances process reliability. The implementation of smart control systems supports regulatory compliance, optimizes chemical consumption, and promotes sustainable fisheries operations.

Initiative Engineering offers a range of patented (439478), innovative solutions—including *eDose Neutra and eDose Chloro*—designed to deliver advanced control over critical chemical dosing processes in the fisheries industry.


Manual dosing vs automatic dosing
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# $CO_2$ REFRIGERATION SYSTEMS FOR INDIVIDUAL QUICK FREEZERS IN SEAFOOD PROCESSING INDUSTRIES

**Ronanki Suresh, Sumit Kumar, Maddali Ramgopal**
Department of Mechanical Engineering, Indian Institute of Technology Kharagpur, India
suresh.ronanki111@gmail.com

Seafood processing industries employ various freezing technologies, such as plate freezing, blast freezing, and Individually Quick Freezing (IQF), to preserve product quality. Among these, IQF technology has gained more attention for processing high-value seafood products, such as shrimp, prawns, and squid, due to its ability to rapidly freeze individual species, prevent cluster formation, reduce drip loss, and maintain superior texture and appearance. However, due to the large temperature lifts involved, the systems used for IQF applications are highly energy intensive. In addition, use of refrigerants that have high global warming potential (GWP) affects the overall sustainability of these systems. To achieve rapid heat removal and uniform freezing, IQF systems require very low evaporator temperatures, typically at −45°C. However, achieving such low temperatures using conventional single-stage vapour compression cycles results in high energy consumption and reduced system efficiency. Though multi-stage refrigeration systems can be used for these applications with synthetic refrigerants such as R134a, R404a, R152a, or natural refrigerants such as ammonia (R717), these systems suffer several environmental and/or safety concerns. In recent years, CO2 (R744) has gained renewed attention as a refrigerant for low-temperature applications due to its excellent thermodynamic, environmental and safety properties. Due to its low critical temperature and high critical pressure, CO2 is best suited as a low-

temperature refrigerant in cascade systems. Hence, cascade refrigeration systems with CO2 on the low-temperature side and a suitable low GWP refrigerant such as ammonia on the high-temperature side are being promoted for refrigeration applications such as deep freezing. Due to high volumetric cooling capacity, superior heat transfer characteristics and improved performance, these systems have huge potential in seafood processing industries that use IQFs. In the present work, the current state-of-the-art of IQF used in seafood industries is discussed in detail. This is followed by a discussion on the unique properties of CO2, that favour its use in low-temperature freezing for the seafood industry. Then, a few case studies demonstrating the performance of CO2 systems for IQF are presented. Finally, the steps required in making these systems commercially viable in countries such as India are discussed.

# SOLAR DRYING BLUE FOODS SUPPORTS WOMEN AND STRENGTHENS VALUE CHAINS, EQUITY, AND CLIMATE RESILIENCE IN INDIA

**Vijai Dharmamony**
Environmental Defense India Foundation (EDIF)
M. S. Swaminathan Research Foundation (MSSRF)
vijaid@EDIF.org.in

Post-harvest innovations are critical to strengthen the equity, quality, and climate resilience of blue food systems. In coastal India, small-scale fisherwomen have adopted portable mini solar dryers in response to issues of poor hygiene in open-air drying, fish and invertebrate spoilage and contamination, and market exclusion. The initiative combined technical innovation with capacity building in species selection, hygiene, processing methods, packaging, and basic digital record-keeping and marketing. The solar dryers improved seafood quality and shelf life, reduced losses, and opened access to higher-value domestic and regional dried seafood markets, retail outlets, and institutional buyers. Women's physical workload was also reduced, and their bargaining power within value chains was increased. Beyond immediate livelihood gains, the technology also fostered more stable, climate-resilient post-harvest processes and more localized food distribution networks. This perspective highlights how small-scale co-developed innovations can advance blue food transformation goals – linking product safety, women's economic empowerment, and nutrition security. By situating post-harvest improvements within the broader blue food system, this study shows how technology can help reconfigure value chains to deliver more sustainable, equitable, and resilient outcomes.

# PATHWAYS TO A SUSTAINABLE SEAFOOD COLD CHAIN IN INDIA USING NATURAL REFRIGERANTS

**Suparna Dhara**
Research Scholar and Advaith S,
Assistant Professor,
Department of Mechanical Engineering, Indian Institute of Technology, Madras
me24d407@smail.iitm.ac.in

India is one of the world's largest seafood producers and exporters, yet its cold chain remains energy-intensive and heavily dependent on high global warming potential (GWP) synthetic refrigerants. Due to their high moisture and protein content, seafood products are extremely perishable and require rapid freezing, strict low-temperature storage, and reliable temperature control throughout processing and distribution. These requirements are further intensified by India's tropical coastal climate, where high ambient temperatures challenge conventional refrigeration systems and contribute to significant post-harvest losses.

This presentation explores practical pathways toward a sustainable seafood cold chain in India through the adoption of natural refrigerant-based refrigeration systems, with a primary focus on carbon dioxide ($CO_2$). Drawing from recent literature and industrial case studies, the talk highlights the thermodynamic advantages of transcritical $CO_2$ systems for seafood processing applications such as blast freezing, cold storage, ice production, and refrigerated transport. $CO_2$ systems offer excellent heat transfer performance at low temperatures, compact equipment design, and compatibility with cascade configurations capable of achieving temperatures down to −40 °C.

The presentation also discusses how advanced performance-enhancement techniques—including parallel compression, ejector technology, and

optimized gas cooler operation—can significantly improve system efficiency under high ambient coastal conditions. In addition, the potential for gas cooler heat recovery to simultaneously meet refrigeration and process heating demands, such as cleaning-in-place (CIP) and hot water generation, is emphasized as a key sustainability advantage.

Finally, implementation challenges related to cost, technical expertise, safety, and infrastructure are addressed, alongside enabling strategies such as policy support, workforce training, and pilot demonstrations. The presentation concludes by positioning natural refrigerant-based $CO_2$ systems as a viable, climate-resilient, and future-ready solution for strengthening India's seafood cold chain.

# EFFECT OF DIFFERENT DAGAA PROCESSING TECHNIQUES ON THE NUTRITIONAL PROFILE AND SENSORIAL PROPERTIES

**Aditya Parmar***
**Patrick Ngwenyama[1], Siwema Luvanga[1], Mwijage Alistidia[2], Innocent Mwaka[2], Yahya I. Mgawe[3], Ansen Ward[4]**

[1] WorldFish Center, Jalan Batu Maung, Batu Maung, 11960, Bayan Lepas, Penang, Malaysia, A.Parmar@cgiar.org

[2] Tanzania Fisheries Research Institute (TAFIRI), P.O Box 9750 Kunduchi, TAFIRI 1 Street, Dar es Salaam, Tanzania, alistidia.mwijage@tafiri.go.tz

[3] Fisheries & Coastal Resources Management. Consultant, P.O Box 4, BAGAMOYO, United Republic of TANZANIA, ymgawe@yahoo.com

[4] Products, Trade and Marketing Branch, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy, Ansen.Ward@fao.org

* Presenting and Corresponding Authors: A.Parmar@cgiar.org - Oral Presentation

Small fish (*Dagaa*) is a crucial protein source, but its potential is limited by substantial postharvest losses. Small-scale fisheries predominantly utilise salting, boiling, and drying for processing, yet a critical research gap exists concerning the impact of these methods on the nutritional and sensory qualities of the final product. The study investigated the effect of cooking/boiling and drying on *Dagaa* nutrition and acceptability. The boiling stage included four treatments ranging from fresh *Dagaa* (control) to salted and boiled for 3, 5, and 8 min, while the drying stage involved four treatments, including both untreated and salted-boiled samples that were sun-dried on raised platform. Collected samples were analysed for proximate and micronutrient content and sensory attributes. Fresh *Dagaa* contained a mean protein, calcium, and iron content of 16.7%, 103.25 mg/kg, and 151.52 mg/kg, respectively. An increase in boiling time significantly reduced the protein, iron, and calcium content by 11, 29, and 38 %, respectively ($P<0.05$). The salted *Dagaa* boiled for 3 min had significantly higher protein, iron, and calcium content than the other two treatments ($P<0.05$). The salted and boiled treatment had significantly higher protein, calcium, and iron content than untreated dried *Dagaa* ($P<0.05$); and exhibited better drying efficiency. The salted, boiled, sun-dried *Dagaa* treatments

were the most acceptable and preferred product by final consumers. The findings will inform the optimisation of marine *Dagaa* processing techniques to maximise nutritional and organoleptic attributes retention.

# SOLAR POWERED COLD CHAIN INTERVENTIONS IN SMALL-SCALE FISHERIES

**Ansen Ward [1], Luis Rincon[2]**

[1] Food and Agriculture Organization of the United Nations, P.O. Box 00153, Rome, Italy

Ansen.ward@fao.org

[2] Food and Agriculture Organization of the United Nations, P.O. Box 00153, Rome, Italy

Access to reliable and affordable energy is essential for maximizing the utilization of fish and supporting the development of associated livelihoods. Energy is vital for many post-harvest activities related to processing, preservation, storage and value addition. In particular, electricity is vital for cold chain operations including ice production, refrigerated storage and freezing. In addition to helping reduce the reliance on fossil fuels and reduce greenhouse gas (GHG) emissions, using PV solar energy to improve the cold chain for small-scale fisheries will contribute to reducing fish loss and waste, assuring food safety and improving market access for fishery products; in doing so this will benefit the livelihoods of fishers, processors and traders. This is particularly the case for those small-scale fisheries (SSF) stakeholders based in locations where access to grid electricity is not possible or unreliable. Investing in solar energy also contribute to the achievement of the United Nations' Sustainable Development Goals (SDGs), as well as FAO's four betters. Specifically, it can help achieve goals related to affordable and clean energy (SDG 7), sustainable use of ocean resources for sustainable development (SDG 14), and the promotion of sustainable industries and innovation (SDG 9). This presentation draws on emerging evidence from the evolving field of renewable energy in small-scale fisheries (SSF) development. It aims to provide decision-makers, development specialists and fisheries stakeholders with an explanation of the

basic principles of solar energy and defines what it is and how it can be used in cold chain applications for the benefit of SSF development. It also highlights the pros and cons of solar energy while providing technical information illustrated with case studies. The content of the presentation will be based on:

Rincon, L., Ward, A., Vaskalis, I., Milani, M., Gallego, J. & Morese, M.M. 2025. Solar energy and the cold chain – A guide for small-scale fisheries interventions. Environment and Natural Resources Management Working Paper, No. 104. Rome, FAO. https:// doi.org/10.4060/cd5864e

# ICAR-CIFT'S SHRIMP SHELL BIOREFINERY RESEARCH AND TECHNOLOGY – A STORY OF SUCCESS AND A FUTURISTIC ROAD MAP FOR ENSURING SUSTAINABLE INDIAN SHRIMP INDUSTRY

**Elavarasan Krishnamoorthy*, Renuka Vijayakumar, Jeyakumari A.A, Tejpal C.S., Sathish Kumar, K., Sreejith, S, Mohan C.O. Ashok Kumar, K., Bindu J, C.N. Ravishankar and George Ninan.**

*Fish Processing Division, ICAR-Central Institute of Fisheries Technology, Matsyapuri, Willingdon Island, Cochin – 682 029

elafishes@gmil.com

With the production and export of 11 and 7.41 lakhs MT respectively, India is positioned 3rd in the global shrimp production and 2nd in international trade. Shrimp shell waste accounting to 3.17 lakhs MT at an estimated waste generation of 30% will further increase as a result of India's efforts to enhance the production. Achieving sustainability in post-harvesting is the key for driving the growth of Indian shrimp industry and blue bioeconomy forward. ICAR-CIFT has marked its significant contribution through shrimp shell biorefinery technology which recovers 72% dry matter as protein and chitin derivatives and enhanced the value realization and responsible raw material utilization by 3-fold. The technology is proven successful at a scale of 2-ton/day (Longshore Technology LLP, Maharashtra; 7 employments; 500 tons/year). Further, ICAR-CIFT is working hand-in-hand with new start-ups from various Indian states to bring up the large-scale industries of 25 – 40 MT shrimp waste/day. Stepping out beyond the lab research, understanding the gaps, incubating the start-ups, collaborating and linking the key inputs suppliers, advising on the machineries, modifications and integrations in the process lines were some of the key strategies for successful implementation of CIFT's shrimp shell biorefinery technology. ICAR-CIFT's futuristic goals under this technology are developing low-cost inputs and machineries of indigenous origin, continuous refinement of process for maximizing the recovery (minerals, pigments, functional lipids at

industrial scale), expanding to novel applications, down streaming tailor-made bioactive peptides from shrimp proteins, functions-specific chitosan as industrial and pharmaceutical inputs for ensuring the sustainability in Indian shrimp industry.

# OPTIMIZATION OF PHASE CHANGE MATERIAL ICE RATIOS FOR ENHANCED THERMAL EFFICIENCY AND QUALITY PRESERVATION IN INDIAN MACKEREL (RASTRELLIGER KANAGURTA): IMPLICATIONS FOR BIOGENIC AMINE AND PROTEIN LIPID OXIDATION IN FISH SUPPLY CHAINS

**Harini Ravi[1], Venkatachalapathy Natarajan[2]**

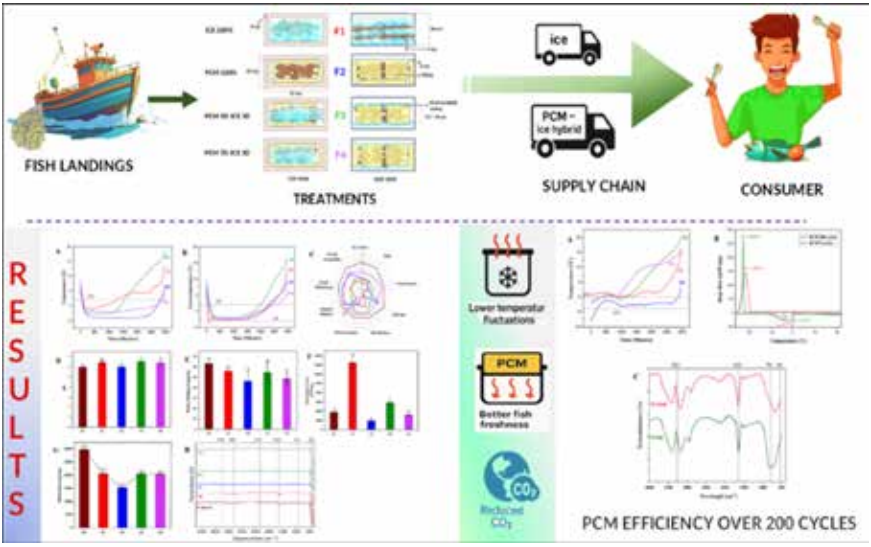
[1] PhD Research Scholar,

[2] Professor & Dean (Research, Consultancy & International Relations),
Department of Food Process Engineering, National Institute of Food Technology, Entrepreneurship and Management – Thanjavur, Ministry of Food Processing Industries, Government of India, Thanjavur – 613005, Tamil Nadu, India.

hariniravi50@gmail.com

Optimizing phase change material (PCM) ice ratios provides a sustainable approach to enhance product quality and thermal efficiency in India's fish cold chain. Four cooling treatments ice (100%), PCM (100%), and hybrid PCM–ice blends (50:50 and 70:30) were evaluated using Indian mackerel (Rastrelliger kanagurta). The 70:30 PCM–ice blend maintained sub-2 °C for 46.5 h with minimal surface–core gradient (1.01 °C) and achieved 21 % overall energy efficiency. PCM treatments reduced total plate counts by ~86 % versus ice ($1.9 \times 10^3$ vs $1.44 \times 10^4$ CFU $g^{-1}$) and lowered histamine accumulation by 31 % (20,594 µg $kg^{-1}$ vs 29,735 µg $kg^{-1}$). Lipid oxidation decreased by ~34 % (TBARS), and FTIR spectra showed a 28 % higher Amide I/II ratio in PCM systems, indicating preserved α-helical structure and protein stability. Textural hardness reached 1.64 N in PCM 70:30, with 21 % higher resilience than PCM 100, ensuring firmness retention. Sensory analysis confirmed PCM 70:30 as the most acceptable treatment (score > 8.5/9), characterized by clear eyes, red gills, and fresh odour, while PCM 100 % performed comparably, both significantly outperforming ice-stored fish. Thermal cycling showed enthalpy stability ($\Delta H$ = 340.9 J $g^{-1}$ after 200 cycles) and improved conductivity (0.73 W $m^{-1}K^{-1}$), confirming material reliability. Collectively,

PCM-based super chilling minimized lipid hydrolysis, protein oxidation, and biogenic amine accumulation while enhancing sensory and microbial quality. The optimized PCM 70:30 hybrid thus offers a robust, energy-efficient, and eco-innovative alternative for sustainable tropical fish logistics.



# INSPECTION AND CONTROL SYSTEMS TO MEET SEAFOOD TRADE REQUIREMENTS

# FOOD FRAUD IN FISHERIES AND AQUACULTURE- A JOINT FAO-IAEA REPORT

**Esther Garrido Gamarro**
Fishery Officer, FAO
Esther.GarridoGamarro@fao.org

The global fisheries and aquaculture sector, producing over 185 million tonnes of aquatic products in 2022 and valued at USD 195 billion, faces growing vulnerability to food fraud. This complexity stems from the diversity of traded species (over 12,000) and the involvement of multiple inspection authorities across international supply chains, among other things. Common fraudulent practices include species substitution, mislabelling, adulteration, counterfeiting, and misrepresentation of origin or production methods. These actions, often economically motivated, pose serious risks to public health, consumer trust, and marine conservation.

The Food and Agriculture Organization of the United Nations (FAO) and the International Atomic Energy Agency (IAEA) have worked together to provide an overview of the common food fraud cases in the aquatic sector and the health risks associated with it. The report resulting from this collaboration provides information on tools that can be used to fight food fraud for aquatic products, and international case studies illustrate the scope and impact of fraud. The report reviews regulatory frameworks as well as standards such as those set by Codex Alimentarius, FAO guidelines, and GFSI-benchmarked schemes, advocating for harmonized labelling, mandatory scientific names, and improved traceability. It emphasizes the role of consumer awareness and industry transparency in combating fraud.

In addition, the report highlights that addressing food fraud in the aquatic sector requires coordinated enforcement, technological innovation, and stakeholder collaboration to ensure authenticity, safety, and sustainability in global seafood supply chains.

# ASSESSMENT OF FOOD HYGIENE KNOWLEDGE, ATTITUDES AND PRACTICES OF DAGAA VALUE CHAIN ACTORS

**Jovice J. Mkuchu** [1],
**Melkizedeck K. Koddy** [1],
**John K. Kilian** [1],
**Alistidia P. Mwijage** [2],
**Jerome J. Fundi** [1],
**Omar R. Penarubia** [3]

[1] Ministry of livestock and Fisheries; Department of Fisheries Development, P. O. Box. 2847, Dodoma, Tanzania.

[2] Fisheries Research Institute, P.O Box. 9750 Dar es Salaam, Tanzania

[3] Food and Agriculture Organization, Italy

jovicemkuchu@gmail.com

The Dagaa (*Rastrineobola argentea, and Engraulidae spp*) value chain is one of the most complex value chains, starting at the actual fishing, processing, trading, and marketing to the end consumers. Improper handling constitutes one of the primary sources of deterioration and contamination of the end products. In this regard, evaluating knowledge, attitude, and practice (KAP) of food safety in food handling is essential to minimizee food borne diseases. A structured questionnaire, featuring both open and close-ended questions, was used alongside interviews and observations of practices and available infrastructures to assess food safety knowledge across the chain. This approach aimed to evaluate the understanding of food safety at various stages, considering both individual responses and real-time practices. The study included 255 participants involved in handling activities along the chain. The study revealed that actors along the chain had a moderate level of KAP of food safety and hygiene. Most processors don't wear PPE: 99.2% (apron), 93.7% (mask), and 95.3% (gloves), with 85% citing lack of facilities, poverty, and awareness as reasons. However, 85.1% agree that proper cleaning is crucial for food safety. The gap between awareness and practice highlights the need to enhance infrastructure, implement training programs, and multi stakeholders' involvement along the chain. Addressing these differences could lead to improved standards in food safety and hygiene among dagaa processors,

ultimately benefiting consumers and the entire supply chain. The study concluded that improving food safety is possible through better knowledge supported with appropriateinfrastructure, through multidimensional solution approach.

# THREE MAJOR SHRIMP DISEASES IN INDIA AND PRACTICAL CHALLENGES FOR TRADE

**Madhu Mohan Talluri**
Technical Director
SGS Aqua Solutions, Andhra Pradesh, India
madhutmohan@gmail.com

India's shrimp aquaculture sector, a vital contributor to the national economy and rural livelihoods, faces significant threats from disease outbreaks. Among the most impactful are White Spot Syndrome Virus (WSSV), Enterocytozoon hepatopenaei (EHP), and Running Mortality Syndrome (RMS). Each disease presents unique challenges in terms of diagnosis, management, and prevention. WSSV is a fast-spreading viral infection leading to mass mortalities, often within days of onset. EHP, a microsporidian parasite, causes growth retardation and chronic productivity losses, particularly in intensively farmed Penaeus vannamei. RMS, an emerging complex condition, is associated with multifactorial causes, including opportunistic pathogens, environmental stress, and compromised gut health, leading to unexplained mortalities.

Despite advancements in diagnostics and management strategies, practical field-level challenges persist. These include delayed detection due to subclinical presentations, improper sample handling, inconsistent diagnostic capabilities, and lack of awareness among small-scale farmers. Biosecurity lapses, such as poor pond preparation, water exchange from unverified sources, movement of infected seed or broodstock, and inadequate disinfection practices, further exacerbate the spread and recurrence of these diseases.

This presentation highlights the current status, field observations, and diagnostic trends related

to WSSV, EHP, and RMS in India. It also emphasizes the critical need for farmer education, standardized diagnostic protocols, and site-specific biosecurity plans to mitigate disease risks. Strengthening disease surveillance and enhancing hatchery and farm-level biosecurity compliance will be vital in sustaining India's shrimp production and global market competitiveness.

# BORDER REJECTIONS OF SEAFOOD IMPORTS: WHAT DO THEY TELL US?

**Nima Bahramalian1, Spencer Henson[2] , Edward Olale[3],**

[1] United Nations Industrial Development Organization (UNIDO), Vienna, Austria

[2] Department of Food, Agricultural & Resource Economics, University of Guelph, Canada

[3] Senior Economic Advisor at Government of Canada

n.bahramalian@unido.org

Technical regulations and standards governing international trade in agri-food products have become increasingly prevalent and complex. Many low and middle-income countries (LMICs) face persistent challenges in meeting evolving safety and quality requirements in import markets, while governments and development partners must allocate scarce resources across competing capacity-building needs. Identifying where compliance challenges are most acute, namely, the products and markets with the highest rates of non-compliance as reflected in border rejections is therefore critical. The analytical use of border rejection data is, however, constrained by several limitations. Data on import rejections are limited in terms of coverage and the markets for which these available and differ markedly in how they are collected and recorded. Differing inspection rates and regimes and reporting practices render comparisons across importing countries problematic. In addition, rejection counts alone provide an incomplete picture of compliance performance, in that they do not account for trade volumes or export structures.

Since 2008, the United Nations Industrial Development Organization (UNIDO) has systematically collected and harmonised border rejection data from five major import markets, namely Australia, China, Japan, European Union, and United States. Linking these data with import statistics enables the construction

of aggregate, unit-based and relative rejection indicators over time, including proportional and high-low measures that rank exporting countries by relative compliance performance. These indicators cover all food and feed products (HS Chapters 1–23) and are compiled within UNIDO's Rejection-Import Database, which supports its Standards Compliance Analytics platform and related publications. Seafood represents a particularly important case for analysis. According to FAO, global exports of fishery and aquaculture products reached approximately US$175 billion in 2023, making seafood one of the most heavily-traded food commodities worldwide. Owing to its perishability and associated public health risks, seafood is subject to especially stringent food safety, quality, and traceability requirements and border inspection across importing markets.

Using UNIDO's harmonized border rejection dataset, this paper examines long-term global trends in seafood rejections across the five major import markets. It provides a comparative analysis of market-specific rejection patterns, assesses the relative performance of major seafood-exporting countries across destinations, and explores regional trends and dominant causes of rejection. The findings offer insights into systemic compliance challenges in global seafood trade and highlight priority areas for targeted capacity-building interventions.

# ENSURING SAFER FOOD CHAINS: MULTI-CLASS VETERINARY DRUG RESIDUE ANALYSIS IN SEAFOOD USING LC–MS/MS

**Prasanth Joseph,**
**Vinayak Azhakaprakalam**
Agilent Technologies, India
vinayak.azhakaprakalam@agilent.com

Veterinary drugs are widely employed in animal husbandry to treat and prevent disease, promote growth and improve feed efficiency. However, their administration to food-producing animals can result in residues persisting in edible tissues, including fish, Shrimp and other animal products. Such residues pose potential public health risks, ranging from allergic reactions and direct toxic effects to the emergence of antimicrobial resistance in bacteria exposed to sub-therapeutic concentrations of antibiotics.

To mitigate these risks, regulatory authorities in regions such as the United States and India, FSSAI and European Union, and other countries have established Reference Point of Action (RPA for Class A analytes) and maximum residue limits (MRLs for Class B analytes) for diverse food commodities. Analytical monitoring of veterinary drug residues presents two major challenges, the wide diversity of analytes and the complexity of food matrices. Prolonged global veterinary drug usage has contributed to the persistence of residues in the food chain, necessitating robust, high-throughput analytical strategies capable of handling large sample volumes efficiently.

Advances in liquid chromatography coupled with tandem mass spectrometry (LC–MS/MS), particularly multiple reaction monitoring (MRM) approaches, have enabled the simultaneous detection of multi-class veterinary drug residues across varied matrices, including shrimp and animal tissues. These methods

provide enhanced sensitivity, reproducibility, and compliance with regulatory guidelines, thereby strengthening the confidence of authorities and stakeholders in residue surveillance. Furthermore, the ability to analyse multiple classes of compounds within a single method significantly increases laboratory throughput, offering a practical solution to the growing demand for comprehensive residue monitoring in food safety programs.

# ACTIONABLE LIFE CYCLE ASSESSMENT: A SPECIALIZED IMPACT MANAGEMENT PLATFORM FOR THE GLOBAL SEAFOOD SECTOR

**Rajesh Kumaramenon**
Co-Founder, Mariterro Food Solutions, Pvt Ltd. India
2ND Floor, Kamala Varma Building, Kochi MG Road, Kochi, Ernakulam, Kerala - 682016
rajeshk@mariterro.com

Providing verifiable proof of sustainability is becoming a critical requirement for the global seafood sector. This industry, encompassing both rapid-growth aquaculture and capture fisheries, faces intense "compliance driven" export demands and pressure for sustainability certification. Life Cycle Assessment (LCA) (ISO 14040/44) is the internationally standardized methodology for quantifying environmental impacts and providing a scientific basis for eco-labelling criteria. However, a critical gap exists between complex global LCA standards and practical implementation by producers. Traditional assessments are "resource-intensive," suffer from "data gaps" and "Low level of data quality," and must rely on generic, global emission factors. These factors are "inherently conservative and less precise," fail to capture the "region & industry specific nuances" and ultimately lead to inaccurate data. While the primary environmental hotspots are well established - feed production for aquaculture's global impacts (e.g., climate change), the on-farm stage for local eutrophication, and vessel fuel consumption for capture fisheries operators lack accessible tools to act on this information. A specialized impact management platform is necessary to bridge this gap. Such a tool moves beyond reporting by offering AI-assisted guided data mapping, offline low-bandwidth capabilities, and "practice-aware" localized data to establish an accurate, verifiable baseline. It enables a cyclical management process: Measure, Interpret,

recommend (with ROI estimates), Implement, Verify and Report. This empowers producers to pinpoint hotspots, optimize key metrics like the Feed Conversion Ratio (FCR) (or its fishery equivalent, fuel use per tonne of catch), integrate "Quality & Food-Safety Linkages," and generate the "Buyer-Ready Verification Scorecards" required for global market access.

# ROLE AND RESPONSIBILITIES OF NABL IN ENSURING THE QUALITY OF FOOD, ESPECIALLY SEAFOOD, FOR CONSUMERS

**Rini Narayan**
Joint Director, National Accreditation Board for Testing and Calibration Laboratories (NABL), India
rin@nabl.qcin.org

Ensuring food safety and quality is critical for public health and international seafood trade. With increasing global market requirements for marine and aquaculture products, laboratories must comply with stringent regulatory requirements of the European Union (EU), Codex Alimentarius Commission, and country-specific import Maximum Residue Limits (MRLs). Reliable and competent testing systems are therefore essential.

The National Accreditation Board for Testing and Calibration Laboratories (NABL), operating in accordance with ISO/IEC 17011, accredits food testing laboratories under ISO/IEC 17025 to ensure technical competence and reliability of test results. As a signatory to ILAC and APAC Mutual Recognition Arrangements (MRAs), NABL facilitates international acceptance of test reports, reduces technical barriers to trade, and supports seamless market access for Indian seafood exports.

NABL-accredited laboratories verify compliance with residues, contaminants, microbiological and quality parameters mandated by EU, Codex and importing countries. This strengthens regulatory oversight, protects consumer health, enhances exporter confidence, and improves global credibility of marine and aquaculture products.

# GROWING INTEREST IN FISHERIES SUSTAINABILITY CERTIFICATION IN INDIA

**K Sunil Mohamed, Ranjit Suseelan, Vineetha Aravind**
Sustainable Seafood Network of India (SSNI), Thiruvananthapuram, Kerala, India
drvineethaa@gmail.com

Certification or ecolabelling is a market-based tool to promote the sustainable use of natural resources. Ecolabels are seals of approval given to products that are deemed to have fewer impacts on the environment than functionally or competitively similar products. The ecolabel itself is a tag or label placed on a product that certifies that the product was produced in an environmentally friendly way. The label provides information at the point of sale that links the product to the state of the resource and/or its related management regime.

India obtained the prestigious Marine Stewardship Council (MSC) ecolabel for its Ashtamudi Lake short-neck clam fisheries in 2014 and since then several export-oriented fisheries have moved into fishery improvement projects (FIPs) to achieve MSC certification. Some of the prominent fisheries which are in FIPs are trawl-caught coastal shrimp, squid, cuttlefish, octopus, deep sea shrimp and threadfin breams. Besides gillnet-caught blue swimming crabs and groupers are in the certification process. Some of the other fisheries planning to move towards certification are the pole and line caught-skipjack tuna and oil sardines. There have also been many fish feed manufacturers who have entered FIPs to achieve the Marin Trust certification for fish meal and marine ingredients.

Certification of Indian seafood appears poised for further growth because of the tremendous interest and support of all stakeholders that it is currently receiving. The government's support in terms of policy and regulations is also helpful in this regard. However, there is a long road ahead before Indian marine fisheries can fully meet all the standards of sustainability certification. Meanwhile, the certification initiatives are driving the research institutions and the government to urgently tackle sustainability issues in fisheries.

# SEAFOOD TRACEABILITY VERIFICATION IN REAL TIME WITH RAPID EVAPORATIVE IONIZATION MASS SPECTROMETRY (REIMS), MOLECULAR SPECTROSCOPY SENSORS, AND MACHINE LEARNING

**Niladri Sekhar Chatterjee, Pankaj Kishore**

National Reference Laboratory, ICAR-Central Institute of Fisheries Technology, Matsyapuri, Cochin, India.

niladri_icar@hotmail.com

Mislabelling of seafood species and origin identity is an important economic fraud, a food safety concern, and a sustainability issue. Verifying species identity and geographical origin is crucial to ensuring traceability in the seafood value chain. While DNA-based methods have been used for species authentication, authentication of geographical origin requires more complex analytical methods. Moreover, in a fast-moving supply chain of perishable commodities, faster turnaround times for authenticity test results are crucial. This study presents a rapid evaporative ionization mass spectrometry (REIMS) metabolite fingerprinting and machine learning method for real-time authentication of species identity of a range of commercially important seafoods. Further, REIMS metabolite fingerprinting and machine learning were used to develop an analytical method to authenticate the geographical origin of Vannamei shrimp. The method was validated by demonstrating transferability between two labs. In an independent validation set, the method achieved more than 95% accuracy in prediction. For on-field rapid authentication, a molecular spectroscopy sensor-based method was developed for species authentication of commercially important shrimps and squids. The sensor-based species authentication achieved more than 80% accuracy in an independent validation set.

Keywords: Seafood authentication, Mass Spectral Library, Ambient Mass Spectroscopy, Machine Learning.

# HAZARDS IN SEAFOOD

# THE DEVELOPMENT OF A USA SEAWEED GUIDE TO FOOD SAFETY HAZARDS

**Clare Winkel** [*], **Michael Ciaramella** [1], **Jennifer Perry** [2], **Anoushka Concepcion** [3], **Indu Upadhyaya** [4], **Zachary Gordon** [5], **Catherine Janasie** [6], **Christina DeWit** [7], **Razieh Farzad** [8], **Brian Himelbloom** [9],

*Presenter on behalf of authors: Integrity Compliance Solutions, Brisbane Australia;

[1] New York Sea Grant, Cornell University,

[2] University of Maine, USA. Amanda Shore, Farmingdale State College, USA,

[3] Connecticut Sea Grant, UConn Extension USA;

[4] University of Connecticut Extension, USA;

[5] Connecticut Sea Grant, UConn Extension, Connecticut, USA,

[6] The University of Mississippi, Mississippi, USA,

[7] Oregon State University, Oregon, USA,

[8] Florida Sea Grant, University of Florida, Florida, USA,

[9] University of Alaska Fairbanks – Kodiak, Alaska, USA.

clare.winkel@integritycompliance.com.au

Macroalgae, commonly known as seaweeds, are photosynthetic organisms found in marine and freshwater environments. They serve diverse purposes—from food and animal feed to biofuels, fertilizers, pharmaceuticals, and cosmetics. Growing awareness of its health benefits, sustainability, and culinary versatility of seaweed is driving increased demand in the U.S., leading to more seaweed products, restaurant offerings and cookbooks.

Like all foods, seaweed products carry potential food safety risks. However, due to the relative novelty of seaweed as a food commodity in the U.S., there is limited guidance and few seaweed-specific food safety guidelines or regulations. To support safe growth of this nutritious food, clear national guidance is needed to identify and mitigate key food safety hazards.

The Seaweed Food Safety Guidance document was developed to help food regulators, producers, processors and retailers to assess and manage risks associated with seaweed products in the U.S.

The Guide includes 16 chapters that cover the following aspects: iodine, pathogens in the harvest area, environmental chemicals, target pathogen growth conditions, naturally occurring toxins and survival conditions and a list of known seaweed-related food safety outbreaks. The final report is located here

https://www.nyseagrant.org/Images/Uploads/PDFs/Seafood-Seaweed-FoodSafetyGuidance.docx

As domestic aquaculture expands, this emerging industry offers opportunities for sustainable food production and economic growth. The guidance document can support safe practices, regulatory compliance, and consumer confidence. Building on existing national and international resources, this guide provides a flexible framework tailored to diverse species, environments, and regulations—promoting consistency and safety across regional and national markets.

# JOINT FAO/IOC/IAEA GUIDANCE ON MONITORING OF ALGAL TOXINS IN BIVALVE MOLLUSCS

**Esther Garrido Gamarro**
Fishery Officer, FAO
Esther.GarridoGamarro@fao.org

Harmful algal blooms (HABs) are naturally occurring phenomena that can severely impact aquatic ecosystems and aquaculture operations. Certain algal species produce potent toxins that can pose serious risks to human health through the consumption of contaminated seafood, especially bivalve molluscs. A variety of gastrointestinal and neurological illnesses associated with these seafood products have been reported over the years and the Food and Agriculture Organization of the United Nations (FAO), the International Atomic Energy Agency (IAEA) and Intergovernmental Oceanographic Commission of UNESCO (IOC) called for a Joint Expert Meeting on Marine Biotoxins and Harmful Algal Blooms Monitoring to develop the Joint FAO IOC IAEA guidance on monitoring of algal toxins in bivalve molluscs.

This guidance is intended to support the development of sampling, analysis, and management approaches for harvesting and production areas to determine the level of toxins in bivalve molluscs and the occurrence of toxic microalgae, and to comply with market requirements.

This guidance can be used as a roadmap by regional and national authorities and institutions to establish and implement monitoring and management programmes for marine toxins and HABs, or to expand or enhance existing systems. The guidance also covers aspects related to pre-harvest monitoring or

post-harvest batch testing. Additionally, it includes monitoring of microalgae, which can help in managing the risk of toxins contaminating bivalve molluscs intended for human consumption.

# RISK MANAGEMENT OPTIONS FOR PATHOGENIC *VIBRIO* SPP IN SEAFOOD

**Iddya Karunasagar**
Rtd Senior Fisheries Officer of FAO
FAO Reference Center for Antimicrobial Resistance and Aquaculture Biosecurity
Nitte University, Mangalore 575018, India
Iddya.Karunasagar@nitte.edu.in

Pathogenic *Vibrio* spp such as *V. parahaemolyticus,* non-01/0139 V. cholerae and V. vulnificus are indigenous to aquatic environment and are distributed globally. According to a recent (2025) Lancet report, vibriosis cases reached a peak of 722,780 cases globally in 2024. FAO/WHO Joint Expert Meeting on Microbiological Risk Assessment (JEMRA) risk assessment on *Vibrio parahaemolyticus* indicated the levels of *V. parahaemolyticus* in seafood vary globally and their behavior in various shellfish species varies widely. Genomic studies indicate the involvement of certain Sequence Types (ST) eg VpST3 and VpST36 in outbreaks in different parts of the world. The contributing factors for increasing incidence of vibriosis seems to be those related to climate change. Increase in Sea Surface Temperature and other climate change related factors caused increase in exposure of population living in coastal areas to pathogenic *Vibrio* spp. For example, VpST3 that was noticed in India in 1996 was thought to have spread to Latin America. But more recent studies indicate that VpST3 existed in Latin America even before emergence in India, but what caused outbreaks was the emergence of climatic conditions favourable for causing outbreaks. Close monitoring of factors that lead to such exposures would be required to manage the risk.

# EVALUATING LEVELS OF PERFLUOROALKYL SUBSTANCES (PFAS) IN SEAFOOD ON THE EU MARKET

**Ivan Bartolo**[1], **Jan Kwakman**[1,2]

[1]Seafood Importers and Processors Alliance ivzw, Heiveldekens 4, BE-2550 Kontich, Belgium

[2]Mooijer-Volendam bv, Dwarskuul 2, 1131 PS Volendam, The Netherlands

i.bartolo@seafoodalliance.org

Statutory maximum levels of perfluoroalkyl substances (PFAS) have applied in the EU since 1 January 2023. They are based on an Opinion by the European Food Safety Authority published in July 2020.

Some information on PFAS levels in fishery products typically caught or harvested in the EU was available, but information on PFAS levels in imported seafood products was less easy to obtain. This made it difficult for seafood business operators to characterise the PFAS-related risk associated with their products.

To address this, the Seafood Importers and Processors Alliance (SIPA) collected PFAS data on the seafood available on the EU market, with a focus on imported seafood. SIPA used the following sources: published scientific literature, data made available by national authorities, data made available by seafood businesses and data obtained through SIPA's own targeted sampling and analysis.

This research provided new information for EU processors and importers:

- Farmed products, whether fish, crustaceans or bivalve molluscs, tend to have very low PFAS levels, but there are significant exceptions.
- Decapod crustaceans, including whiteleg shrimp (*Penaeus vannamei*), and domestic and imported mussels on the EU market show levels of PFAS well within the statutory limits. Some North Atlantic

brown shrimp (*Crangon crangon*) occasionally have higher levels.

- Paphia clams imported from Vietnam may show levels of PFAS above statutory limits.
- In general, PFAS levels are encountered at levels that vary between fish groupings: white fish < pelagic fish < flatfish

# PLANT EXTRACTS AS ANTIMICROBIAL POTENTIATORS AGAINST SEAFOOD-BORNE PATHOGENS

**Manjusha Lekshmi, Nada Fathima, Dipin KM, Sanath Kumar, Binaya Bhusan Nayak**
Fish Processing Technology, ICAR-Central Institute of Fisheries Education, Mumbai
manjusha@cife.edu.in

Plant-derived antimicrobials have emerged as promising alternatives to conventional antibiotics and synthetic preservatives due to their natural origin, broad-spectrum activity, and potential for synergism with established antimicrobial agents. The present study investigated the antimicrobial efficacy and antibiotic-potentiation activity of extracts from *Acorus calamus*, *Embelia ribes*, and T*erminalia chebula*. The antimicrobial activities and plant extract-antibiotic synergism of ethanolic and aqueous plant extracts were evaluated against seafood-associated pathogenic bacteria such as the Shiga toxin-producing *Escherichia coli* (STEC), *Vibrio parahaemolyticus, V. cholerae, Salmonella* Typhimurium, *Staphylococcus aureus*, and *Listeria monocytogenes*. The effect of plant extracts on the biofilm formation ability of *L. monocytogenes* on various surfaces was also studied. Combinations of *T. chebula* and *E. ribes*, as well as *T. chebula* and *A. calamus*, showed significant synergistic effects, compared to individual extracts. A significant improvement in the efficacy of conventional antibiotics such as kanamycin, gentamycin, ampicillin, ciprofloxacin, tetracycline, and imipenem, to which the tested pathogens were previously resistant, was observed, demonstrating a remarkable synergistic plant extract-antibiotic interaction. When applied to chilled tuna slices, the ethanolic and aqueous extracts of *E. ribes* and *T. chebula*, respectively, reduced

*L. monocytogenes* counts significantly by 2-3 log units, along with marked reductions in its biofilm-forming ability on plastic and stainless-steel surfaces. The synergistic interactions between plant extracts and conventional antibiotics highlight their value in enhancing antimicrobial efficacy and combating antibiotic resistance. Plant-derived compounds can serve as sustainable options for managing seafood-associated microbial threats and their antimicrobial resistance, enhancing seafood safety and public health.

# NOVEL ANALYTICAL DATA ON CADMIUM, MERCURY, LEAD, ARSENIC AND SELENIUM CONTENT IN FISH FROM TANZANIA AND MOZAMBIQUE: IMPLICATIONS FOR FOOD SAFETY

**Talhiya Maulid Ali[1,2], Daniel Shilla[1], Haji Mwevura[3], Mackrina Patrick Nombo[1,4], Edel O. Elvevoll[5], Maria Wik Markhus[6], Quang Tri Ho[6], Henriques Bustani[7], Marian Kjellevold[6]**

[1] School of Aquatic Science and Fisheries Technology, University of Dar Es Salaam, P.O. Box 60091, Dar Es Salaam, Tanzania

[2] School of Natural Science, The State University of Zanzibar, P.O. Box 146, Zanzibar, Tanzania

[3] Faculty of Sciences, SUMAIT, P.O. Box 1933, Zanzibar, Tanzania

[4] Fisheries Education and Training Agency (FETA), P.O. Box 83, Bagamoyo, Tanzania

[5] Norwegian College of Fishery Science, UiT-The Arctic University of Norway, 9019 Tromsø, Norway

[6] Institute of Marine Research, P.O. Box 1870 Nordnes, NO-5817 Bergen, Norway

[7] Institute Oceanographic of Mozambique (InOM), Coastal and Marine Environmental Research Centre (CEPAM) P.O. Box 312, Pemba, Mozambique

talhiyaali@yahoo.com

marian.kjellevold@hi.no

Fish are important for food security and nutrition in many coastal communities; however, fish consumption is also a major source of metal(loid)s exposure to humans. Data on metal(loid)s content in fish from Tanzania and Mozambique marine waters are limited. This study analysed the content and assessed the risk of exposure from 17 fish species sampled off the coast of Tanzania and Mozambique by research vessel Dr. Fridtjof Nansen during an ecosystem survey in 2018. The samples were prepared according to local consumption habits (fillet, whole and dressed) and were analysed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Three metals, cadmium (Cd), mercury (Hg) and lead (Pb), and two metalloids, arsenic (As) and selenium (Se), were measured. The content varied among the species and tissues analysed. Hg content was higher in fillets from large predatory fish, while As, Se, Cd and Pb were higher in small fish that traditionally are consumed whole. The mean Se-Hg molar ratio was higher in whole and dressed small fish compared to fillets from large fish. In all analysed samples,

HQCd and HQHg values were <1 except for *O. bartramii*, where HQCd was marginally above 1. Thus, the consumption of the fish species, prepared to resemble the eating habits collected in this study, has no adverse health effects on humans, and the consumption of whole fish is highly recommended from a nutritional point of view. However, species diversification and the use of safe consumption limits may also be important in reducing multiple contaminant exposure.

# FOUNDATIONAL AI AND DIGITAL TWINS FOR SCIENCE-BACKED, BIOSECURE, AND RESILIENT BLUE FOODS

**Snehal Verma**
CEO & Co-Founder, NatureDots, India
snehal.verma@naturedots.com

Global fisheries and aquaculture, now supplying more than 223 million metric tonnes of aquatic food annually, are entering a phase of rapid growth accompanied by increasing vulnerability. In 2025 we estimated ~30 million USD worth of avoidable stock loss due to deteriorating water quality, intensifying climate variability and disease threats. With escalating biosecurity concerns, and rising demands for transparent and verifiable supply chains are placing unprecedented pressure on production systems to adapt. Yet most operations continue to rely on fragmented data, delayed risk detection, and reactive management, exposing producers, markets, and regulators to systemic risks and failures. Existing solutions in industry rely on sparse IoT/hardware based sensing and reactive control, with limiting generalization across species, environments, and production systems - (open systems such as farm-ponds, cage-culture; and closed systems of RAS, BioFlocs, Tanks).

To tackle these challenges, we developed Twingills, an AI-native platform built on over 8 billion data points and 30+ AI- and science-backed models, powered by the AquaNurch Digital Twin foundational model. The platform targets the climate–water–disease nexus at a place-based scale. Client deployments demonstrate up to a 30% increase in productivity and a 50% reduction in biological asset risk across the production cycle, while supporting traceability and

biosecurity compliance. By integrating environmental, biological, climatic, and operational intelligence, Twingills unifies real-time system data, advanced risk modeling, and end-to-end digital provenance from hatchery to market, enabling proactive health management and resilient aquatic food systems for safer supply chains and trusted global trade.

# SEAWEED - THE BLUE FOOD OF THE FUTURE

# FUELING THE GLOBAL MARKET: MICROALGAL ASTAXANTHIN AS A CIRCULAR SOLUTION FOR AQUACULTURE AND HUMAN HEALTH

**Ashokkumar Veeramuthu**
Centre for Waste Management and Renewable Energy, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai
rvashok2008@gmail.com

The global natural astaxanthin market, valued at USD 1.5 billion in 2024, is projected to reach USD 5.86 billion by 2034, with microalgae-derived, 100% pure astaxanthin dominating 63% of this premium segment. This growth is strategically driven by two primary industries: aquaculture, which consumes 45% of the supply to enhance livestock health and pigmentation, and the nutraceutical sector, which leverages its potent antioxidant properties. This presentation will explore the immense opportunity for a circular bioeconomy model centered on *Haematococcus sp.* cultivation. We will demonstrate how integrated biorefinery processes can transform this single microalgal biomass into a dual-stream revenue source, simultaneously supplying high-value feed additives for sustainable aquaculture and premium ingredients for human health products. This approach not only capitalizes on a proven multi-billion-dollar market but also establishes a scalable, sustainable framework that aligns with global goals for resource efficiency and nutritional security, offering a compelling investment in the future of food and health.

# A REVIEW OF AUSTRALIAN REGULATIONS FOR THE SEAWEED INDUSTRY.

**Clare Winkel, Vinay Narayan**
Integrity Compliance Solutions,
Brisbane Australia
clare.winkel@integritycompliance.com.au

In 2024 a comprehensive review of existing Australian regulations & industry guidelines relating to seaweed products, was undertaken. This review included: human consumption food safety, animal food safety, product labelling & claims, bioproducts, novel food requirements, pharmaceutical & cosmetic requirements & bio-stimulants in agriculture. The purpose of the review was to identify gaps & inconsistencies to identify areas requiring harmonization, clarification or change.

In addition to identifying and reviewing all available regulations, 127 interviews were undertaken with state/federal government staff, seaweed industry stakeholders & product users including seaweed growers, harvesters, processors, sellers, animal feeders, stock feed manufacturers, seaweed pharmaceutical manufacturers & researchers.

Despite compliance guidelines & regulations being in place, significant knowledge gaps remain in the area of seaweed processing & its effect on chemical & microbiological hazards that may be present in the final product. The unique composition of seaweed means that its response to processing methods may differ, & therefore, applying findings from other food industries could lead to inaccurate conclusions. National regulations should be reviewed to ensure consistency in definitions within the existing regulations & the limits for the relevant contaminants should be added to the existing requirements.

The current classification of seaweed products by FSANZ, under the Novel Foods process is a very real impediment to growing the seaweed bio-products industry in Australia. The current Novel Foods Assessment process should be reviewed to include a mutual recognition of products already approved within the EU & USA along with recognition of indigenous use of seaweed species.

# INTEGRATED SEAWEED VALORIZATION AS A BLUE ECONOMY PATHWAY: TECHNOLOGY, SAFETY, AND COASTAL LIVELIHOODS IN INDIA

**R. Jeya Shakila, S. Saravanan, S. Sundhar, U. Arisekar**

Dept. of Fish Quality Assurance and Management Fisheries College and Research Institute, Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Thoothukudi – 628008

jeyashakila@gmail.com

Seaweeds are increasingly recognized as "blue foods" owing to their nutritional richness, ecosystem services, and potential to strengthen coastal livelihoods. In coastal regions of India, particularly the Gulf of Mannar (GoM), seaweed harvesting and cultivation are traditionally practiced by fisherwomen. However, seaweed utilization remains largely confined to raw biomass supply, constrained by inconsistent availability of quality planting material, limited value addition, quality and safety concerns, and weak livelihood integration. The present work documents an end-to-end integrated valorization framework for tropical seaweeds, spanning tissue culture–based biomass production, decentralized processing, quality assurance, and food safety validation.

At the upstream level, tissue culture and micropropagation protocols were standardized for native green and red seaweeds (*Ulva lactuca* and *Gracilaria spp.*) to ensure rapid, uniform, and disease-free biomass production. An optimized growth medium enabled a fourfold biomass increase of *U. lactuca* within 10 days, demonstrating productivity comparable to fast-growing exotic species such as *Kappaphycus alvarezii*, while *Gracilaria* spp. showed a fourfold increase within five weeks (20–25% weekly growth). These protocols provide reliable native seedstock for sustainable cultivation and reduced dependence on wild harvesting. Downstream valorization encompassed improved drying systems

for quality retention, production of liquid seaweed biostimulants, granulated seaweed formulations, semi-refined carrageenan and seaweed gel extraction, and systematic utilization of post-extraction residues. Low-cost, backyard-scale processing units were developed using simple equipment, enabling decentralized adoption by fisherwomen self-help groups. Residue valorization ensured a zero-waste, circular bioeconomy approach.

To address food safety, an extensive assessment of heavy metals (HMs) and pesticide residues (PRs) was conducted in raw and processed edible seaweeds (*U. lactuca, Caulerpa racemosa*, and *K. alvarezii*) collected seasonally from four GoM locations (Thoothukudi, Erwadi, Mandapam, and Rameswaram) during 2022–2023. While Cr, As, Pb, and Hg were prevalent, thermal processing (boiling, steam-cooking, microwave cooking) reduced HMs by up to 100% and PRs by up to 99%, with boiling being most effective. Bio-digestion and bio-absorption studies, coupled with human health risk assessment (THQ, TTHQ, HQ, LCR), indicated no non-carcinogenic or carcinogenic risk (values <1 and within acceptable limits). Maximum allowable consumption limits confirmed the safety of regular seaweed intake.

# UNLOCKING THE NUTRITIONAL POWER OF SEAWEED: A LATIN AMERICAN PERSPECTIVE

**Jogeir Toppe[1], Molly Ahern[1], Omar Peñarubia[1], Graciela Pereira[2], David Mendoza[2]**

[1]Food and Agriculture Organization of the United Nations, 00153, Rome, Italy

[2]INFOPESCA, Julio Herrera y Obes 1296, Montevideo, Uruguay

Jogeir.topptf@fao.org

Global algae production has grown more than 3.5 times in volume, from 10.6 million tonnes in 2000 to 37.8 million tonnes in 2022, with seaweed making up over 99.8% of the total. About 97% of seaweed is farmed. Latin America and the Caribbean contribute only about 1.4% of global production, mostly from wild harvests. Some seaweed species, such as yuyo (*C. chamissoi*) and cochayuyo (*P. columbina*) are endemic to Peru and have been consumed dating back to pre-Inca times.

Roughly 85% of seaweed is used for human consumption, the remainder goes into feed, fertilizers, and cosmetics. Although long overlooked, seaweed's role in food security and nutrition is increasingly recognized. It can be produced sustainably with a low carbon footprint and offers key nutrients like minerals, vitamins, quality proteins, essential fatty acids, and unique carbohydrates.

A recent study in Latin America identified local seaweed species and assessed their potential uses. Nutrient analyses revealed that these seaweeds are important sources of minerals such as calcium, potassium, and iron, while levels of heavy metals (lead and cadmium) were below detection limits. Seaweeds are also known for their high iodine content—a micronutrient deficient in the diets of nearly 2 billion people worldwide.

Given their nutritional profile, seaweed has significant potential to help combat malnutrition if incorporated into human diets. The study developed and tested several local recipes using seaweed, all of which were well received: 80–90% of participants rated them as "very good," while the remainder rated them as "good."

Seaweed and other algae represent unique, nutrient-rich resources with vast potential for sustainable production. The experience from Latin America demonstrates that reinvigorating the use of local seaweed varieties in traditional recipes is feasible and highly acceptable to consumers.

# UNITED NATIONS GLOBAL SEAWEED INITIATIVE: TOWARDS BLUE FOOD OF THE FUTURE

**Nima Bahramalian**
United Nations Industrial Development Organization (UNIDO), Vienna, Austria
n.bahramalian@unido.org

Seaweed has significant potential to contribute to sustainable food systems, nutrition, and climate resilience, yet its development as a food commodity remains constrained by regulatory, market, and production bottlenecks. Despite rapid growth in global trade—nearly doubling in value over the past decade—food-grade seaweed is governed by fragmented regulatory frameworks, limited international standards, and incomplete recognition within food and trade classification systems. At the global level, Codex Alimentarius guidance remains largely absent, creating uncertainty around food safety, quality, labeling, and market access, particularly for developing countries and small-scale producers.

This paper examines structural constraints affecting the scaling of seaweed as a food product across production, trade, and policy dimensions. It reviews evidence on the concentration of food-grade production in a limited number of species and monoculture systems, highlighting associated risks related to disease, climate shocks, and supply stability. While production technologies such as coastal mariculture and community-based farming are well established and demonstrate strong productivity gains, diversification, improved seed systems, and climate-resilient practices remain limited. In parallel, weak quality infrastructure, non-harmonized standards, and limited certification capacity increase compliance costs

and restrict participation in formal food markets.

Market analysis indicates growing demand for seaweed-driven by plant-based, low-carbon food trends—but value addition remains concentrated outside producing countries, reflecting weak integration of small-scale producers into food value chains and limited market intelligence at origin. Policy analysis further reveals weak coherence across food safety, trade, climate, and coastal management frameworks, with seaweed for food largely absent from food security strategies.

Against this backdrop, the paper presents the United Nations Global Seaweed Initiative (UNGSI) as a coordinated, multi-stakeholder platform to address regulatory gaps, strengthen standards, promote inclusive value chains, and position seaweed as a strategic blue food of the future.

# BLUE AGRICULTURE REVOLUTION: SCOPE, STRATEGIES, AND VALUE CHAIN DEVELOPMENT FOR SEAWEED IN INDIA

**Shine Kumar C. S.**
Director National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT), Kochi, India
nifphatt@nic.in

The escalating constraints on terrestrial agriculture—driven by land degradation, freshwater scarcity, climate change, and rising food and livelihood demands—have intensified global interest in marine-based production systems. Within this emerging paradigm of blue agriculture, seaweed cultivation represents a resource-efficient, climate-resilient, and high value opportunity for sustainable development. This paper examines the global evolution of seaweed farming, highlighting dominant species, production trends, technological pathways, and expanding market applications, and situates India's seaweed sector within this broader international context. Drawing upon recent policy frameworks, scientific literature, and institutional innovations, the presentation evaluates India's current status of seaweed cultivation, biodiversity potential, and regional distribution, while identifying key constraints related to germplasm availability, cultivation technologies, processing infrastructure, and value-chain integration.

Particular emphasis is placed on the strategic transition from near shore farming to offshore and tank-based cultivation systems, as well as the role of biosecurity, hatchery development, and elite seed banks in enabling scalable growth. The presentation further underscores the multifaceted economic, social, and environmental benefits of seaweed farming, including livelihood diversification

for coastal communities, women's empowerment, nutrient bio-remediation, carbon sequestration, and integration within regenerative aquaculture models.

In addition, the paper highlights the critical importance of value addition and product innovation, with case illustrations from the National Institute of Fisheries Post-Harvest Technology and Training (NIFPHATT), demonstrating how seaweed-based functional foods and agri-marine products can strengthen inclusive blue–green value chains.

The study concludes that with targeted policy support, technological advancement, and market-driven value-chain development, seaweed cultivation can serve as a cornerstone of India's blue economy, catalysing a transformative blue agriculture revolution with substantial socio economic and environmental dividends.

# JOINT UNIDO/FAO PANEL: SEAWEEDS AND MACRO/ MICROALGAE AS THE BLUE FOOD OF THE FUTURE - CHALLENGES AND OPPORTUNITIES

# SESSION 8A. JOINT UNIDO/FAO PANEL: SEAWEEDS AND MACRO/ MICROALGAE AS THE BLUE FOOD OF THE FUTURE - CHALLENGES AND OPPORTUNITIES

**Moderator: Nima Bahramalian,**
Industrial Development Expert,
Division of SME Competitiveness,
Quality and Job Creation, UNIDO
Vienna
N.BAHRAMALIAN@unido.org
Panellists – TBA

**Background:**

Seaweed has strong potential as a sustainable food source, contributing to nutrition, food security, and climate-resilient food systems. However, the development of seaweed as a food product is constrained by fragmented regulatory frameworks, weak international standards, and underdeveloped food markets. Seaweed is often governed under fisheries or aquaculture laws rather than food systems, and at the global level there is no dedicated Codex Alimentarius guidance for seaweed, except for a single species. This regulatory gap creates uncertainty for food safety, quality, labelling, and market access, particularly for developing countries and small-scale producers.

International trade in food-grade seaweed has expanded significantly, with global trade values nearly doubling over the past decade. Yet seaweed is not fully recognized as a plant-based food commodity in trade and statistical systems and is covered by only a few HS codes. Limited harmonization of food standards, testing, and certification increases compliance costs and restricts participation in global and regional food markets. Strengthening national quality infrastructure and developing science-based food standards are therefore critical to support safe, transparent, and inclusive trade.

Food production technologies for seaweed are well established, including coastal mariculture and

small-scale community-based farming, which have demonstrated rapid productivity gains. However, food-grade production remains dominated by a small number of species and monoculture practices, increasing vulnerability to disease and climate shocks. Greater diversification of edible species, improved seed systems, and climate-resilient farming practices are needed to ensure stable food supply and product quality. Technology transfer and extension services remain limited, especially for smallholders and women producers.

Food markets for seaweed are growing, driven by demand for nutritious, low-carbon, and plant-based foods. Nevertheless, market development is constrained by limited consumer awareness, lack of market intelligence, and weak integration of small-scale producers into formal food value chains. Most value addition occurs outside producing countries, reducing income opportunities at origin.

Policy coherence across food safety, trade, climate adaptation, and coastal management remains weak. Although oceans are increasingly recognized in national climate strategies, seaweed for food remains marginal in food security and nutrition policies. Aligning food regulations, trade frameworks, and climate-resilient aquaculture policies—supported by targeted public and blended finance—is essential to scale sustainable seaweed food production and position it as a strategic component of future food systems.

About United Nations Global Seaweed Initiative (UNGSI):

The UNGSI is a collaborative platform that brings together Member Stats, UN entities, research

institutions, industry stakeholders, and civil society to accelerate the sage and sustainable, and inclusive development of the global seaweed sector. The UNGSI is comprised of the FAO, UNIDO, UNCTAD, IOC-UNESCO, UN Global Compact, Global Seaweed Coalition, and its growing membership includes Indonesia, France, Madagascar, Chile and Brazil.

**Objective of the Panel:**

This panel aims to address core questions related to seaweeds and macro/microalgae as the blue food of the future:

- What are the novel products and applications for seaweeds and macro/microalgae?
- Which emerging technologies are used in the production and processing of seaweeds and macro/microalgae?
- What are the prospects and mechanisms for market development for seaweeds and macro/microalgae for human and animal nutrition?
- What are the food safety risks in the consumption of seaweed and macro/microalgae?
- What are the environmental and social impacts of seaweeds and macro/microalgae production; and what are the organisational challenges?

# INDIAN SEAFOOD SECTOR - DEVELOPMENT PROSPECTS

# MARINE INGREDIENTS: CATALYST FOR SUSTAINABLE SEAFOOD

**Dr. Mohamed Dawood Sait,**
President, Indian Marine Ingredients Association (IMIA), Bangalore, India – 560027
president@imia.co.in

Since the 1960s, Fishmeal use was primarily driven by the pig and poultry industries. From the 1980s onward, Aquaculture emerged as the major consumer, recognizing fishmeal as a superior protein and nutrient source. Today, marine ingredients — including fishmeal and fish oil — are indispensable for aquaculture and livestock nutrition, providing affordable protein, essential nutrients, and sustaining coastal employment and incomes.

Current global fishmeal production stands at roughly 5–6 million tonnes per year, of which aquaculture consumes over 80%. The global aquafeed market is projected to rise from USD 61.8 billion (2023) to USD 88.0 billion by 2028 (CAGR 7.3%). Demand for sustainable marine ingredients continues to increase as producers align with low-carbon and circular bioeconomy principles.

Seafood and fishmeal are key foreign exchange earners within India's blue economy. While the seafood sector benefits from dedicated policy frameworks, the marine ingredients subsector remains relatively underserved. The policy priorities are to a) ensure consistent product quality and traceability; b) enhance stakeholder welfare and livelihood security and c) safeguard marine biodiversity while meeting domestic protein demand.

The Indian Marine Ingredients Association (IMIA) serves as a non-profit catalyst for sustainable development in India's fishmeal and fish oil industry

by collaborating with scientific and academic institutions for innovation and technology transfer, partnering with fisher organizations to secure livelihoods and promote responsible raw material sourcing and engaging with government bodies and global initiatives to align with sustainability certifications and international standards.

India's marine ingredients sector is poised for a transformative leap, with an emphasis on responsible harvesting, quality assurance, and transparency to reinforce the sustainability of global aquaculture systems while strengthening India's food and nutritional security.

# WASTE TO WEALTH: REPOSITIONING VALUE STREAMS IN THE SEAFOOD SECTOR

**Binsi P.K.**
ICAR- Central Institute of Fisheries Technology, Cochin, India
binsipillai@gmail.com

Every fish we consume leaves behind more than a meal—it leaves a vast, largely untapped reservoir of functional resources. Fish and shellfish processing, from both marine and freshwater systems, generates enormous quantities of residues, most of which are ignored or underutilized, resulting in substantial economic losses along the supply chain. Studies indicate that a significant fraction of potential revenue remains unrealized due to inadequate recovery and low-value disposal practices. While traditional uses—such as silage, composting, and feed—address volume management, they capture only a fraction of the intrinsic biochemical and industrial value embedded in these residues. Strategic, knowledge-driven valorisation can convert this "so called waste" into a renewable molecular inventory with high-margin potential.

Fish processing residues are uniquely rich in structurally diverse proteins, bioactive peptides, lipid fractions, minerals, and functional biopolymers—molecules rarely found in terrestrial sources. Their superior bioavailability, functional versatility, and targeted physiological properties make them ideal for high-value applications spanning nutraceuticals, clinical nutrition, biomedical and regenerative technologies, and advanced health formulations. By prioritizing fractions with the highest functional and market potential, industries can unlock unprecedented economic and functional gains.

Integrating these high-value streams with conventional low-value uses under a circular economy and biorefinery framework not only reduces environmental burdens but also positions fish processing residues as strategic bioresources. Applying these unique functional properties across high-value applications enables the industry to convert lost opportunities into sustainable, high-value outputs, supporting industrial resilience, environmental sustainability, and long-term growth of the blue bioeconomy.

# ADVANCES IN PACKAGING TECHNOLOGIES FOR FISH

**Dr. Remya S.**
ICAR-Central Institute of Fisheries Technology, Kochi, India
remya03cof@gmail.com

Packaging plays a vital role in preserving fish and fishery products during storage, transportation, and marketing by protecting them from physical, chemical, and biological deterioration. Effective packaging safeguards seafood against moisture changes, temperature fluctuations, mechanical damage, oxidation, contamination, and microbial growth, thereby maintaining sensory attributes, quality, and safety while extending shelf life. In the seafood sector, the appropriate selection of packaging systems from primary to tertiary levels, along with ancillary materials, is essential to meet the diverse requirements of different product forms, processing conditions, and distribution systems. Recent advances in packaging technologies such as vacuum packaging, vacuum skin packaging, modified atmosphere packaging, active packaging, and intelligent packaging have significantly improved product preservation, quality monitoring, and consumer convenience. These modern packaging approaches enhance freshness, ensure food safety, support traceability, and contribute to sustainability within the seafood supply chain. With the continuous expansion of global seafood markets, innovative packaging technologies remain essential for delivering high-quality fish and fishery products to consumers and for strengthening the resilience of the seafood industry. In addition, food packaging systems must comply with national regulatory frameworks to ensure consumer safety and product integrity. In

India, packaging materials used for fish and fishery products are governed by regulations prescribed by the Food Safety and Standards Authority of India, which specify requirements related to food contact materials, labelling, and hygiene. Compliance with these regulations, along with the adoption of advanced packaging technologies, supports quality assurance, consumer confidence, and market acceptance of seafood products.
**Key words:** Vacuum skin packaging, Oxygen scavenger, Freshness indicators, Migration

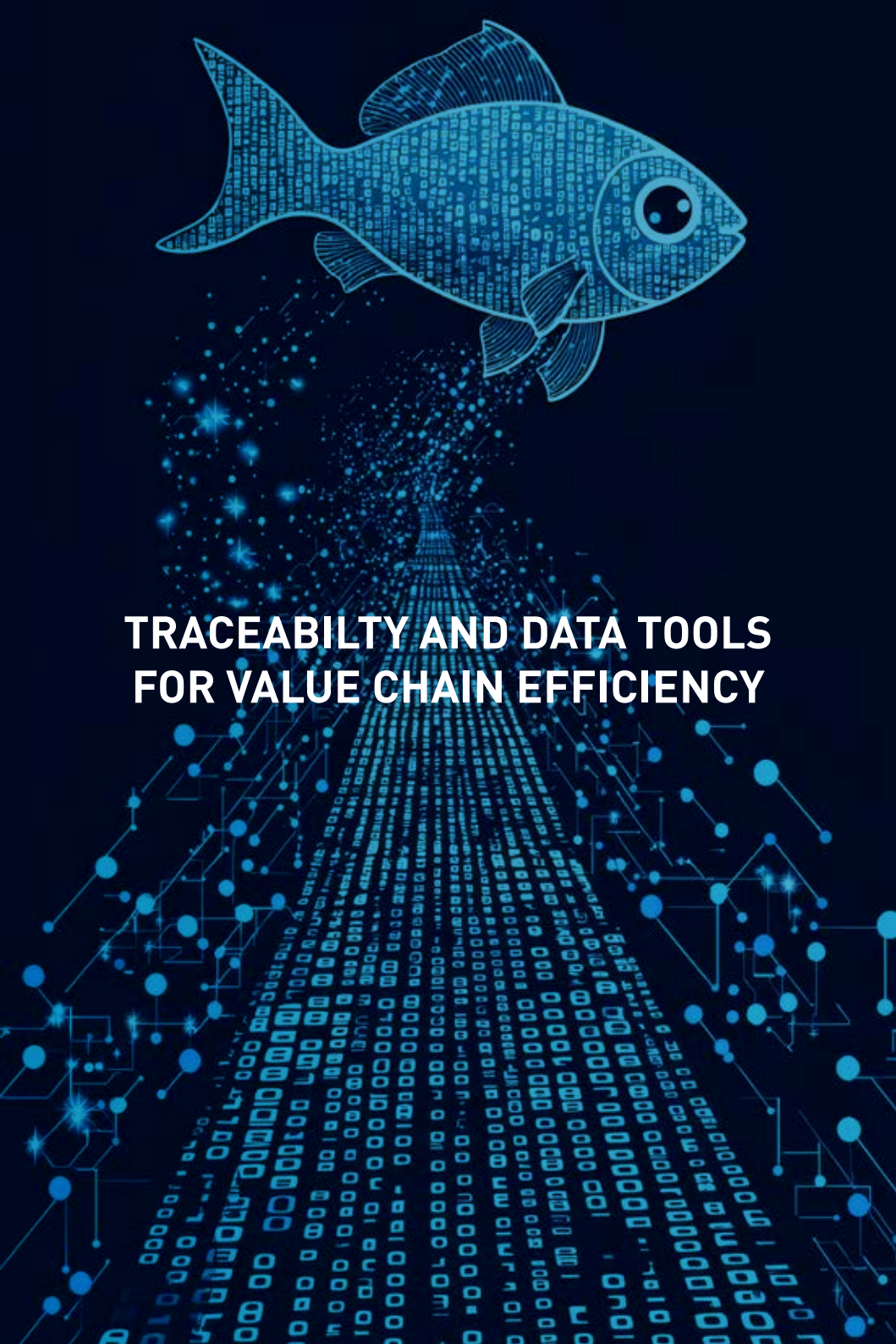
# VALUE ADDITION OF FISH AND SHELLFISH FOR INTERNATIONAL AND DOMESTIC MARKETS

**Viji P.**
Senior Scientist,
Visakhapatnam Research Centre of ICAR-Central Institute of Fisheries Technology, Andhra Pradesh. India
pankyammavijil@gmail.com

Increased standardization in seafood production and processing, enabled by innovative technologies, helped seafood become increasingly perceived by consumers as a functional source of protein. As dietary habits shift towards the most convenient and healthy products, there are enormous opportunities for value-added fish and shellfish products. Value addition is a viable approach to transform raw material to high quality and convenient end products. The products range from live fish to ready-to-eat convenience products. It can be improved market forms, speciality fish products, battered and breaded fish products and Ready-to-Eat curries in retort pouches. Technology developments in fish processing offer scope for innovation, increase in productivity and shelf life, improved food safety, and a reduction in waste during processing operations. A large number of value-added and diversified products, both for export and the international market based on fish, shrimp, lobster, squid, cuttlefish, bivalves etc., have been identified. While the international market primarily focuses on IQF frozen and RTE seafood products, the domestic sector is driven by mince-based value-added products and traditional cured products, with an emerging demand for Ready-to-Cook products in consumer pack. A rapid growth in the share of value-added products in Indian seafood export is anticipated as the Government of India seeks to increase the duty-free limit on the imported ingredients. Simultaneously, the expansion of organised retail and online delivery platforms will

scale up the marketing of value-added products in the domestic sector.

Key words: Value addition, convenient products, RTE curry, mince based products, export market



# TRACEABILTY AND DATA TOOLS FOR VALUE CHAIN EFFICIENCY

# INTERNET OF THINGS WITH BLOCK CHAIN-BASED TRACEABILITY TOOL FOR IMPROVING THE SHRIMP SUPPLY CHAIN MANAGEMENT

**Ananda Raja, R[1], Lal, K.K[1]., Panigrahi, A., Ambasankar, K[1]., Muralidhar, M[1]., Patil, P.K[1]., Kanagachidambaresan, G.R[2]**

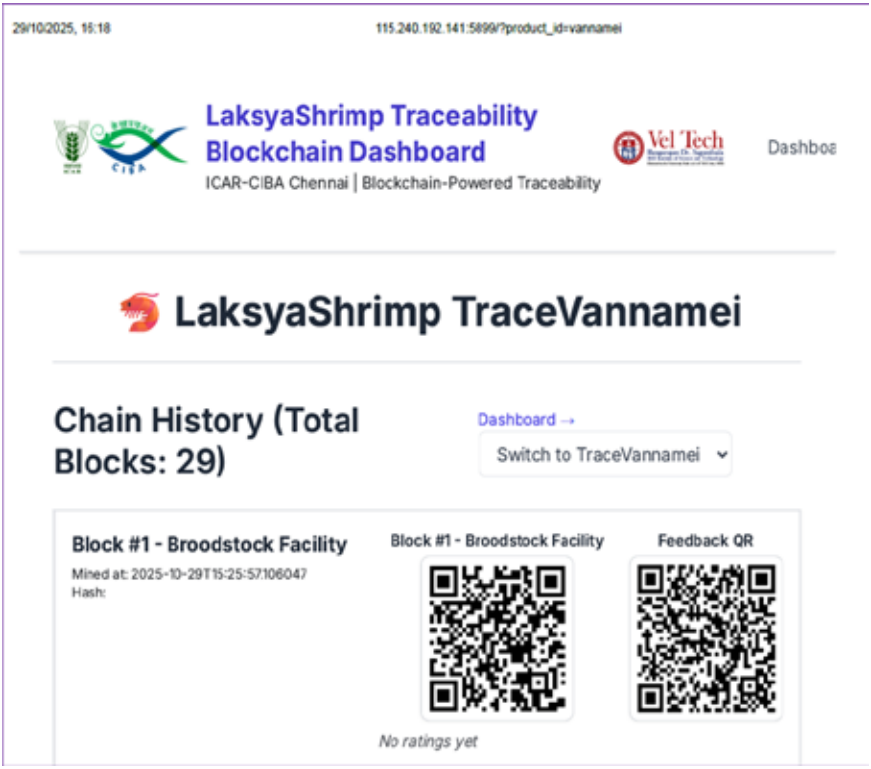
[1] ICAR-Central Institute of Brackishwater Aquaculture, 75 Santhome High Road, MRC Nagar, R.A. Puram, Chennai-600028, Tamil Nadu, India

[2] Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Avadi, Chennai – 600062

anandarajars@gmail.com

Aquaculture is currently one of the most important sources of high-quality animal protein in the world. Shrimp farming has drawn its importance within this industry due to its significant global trade potential, high economic returns, and ability to create jobs. Pacific whiteleg shrimp (Penaeus vannamei), black tiger shrimp (Penaeus monodon) and Indian white shrimp (Penaeus indicus) are the most often cultivated shrimp species because of their quick growth, adaptability to various habitats, and high market value. Brackishwater shrimp aquaculture has grown dramatically, but it still faces significant challenges that affect farm-level production, global competitiveness and traceability for food safety concern. There are many critical tracking events (CTEs) such as broodstock facility, hatchery, nursery, grow-out system, harvesting, processing, shipping, exporting, and retailing with respective key data elements (KDEs) which are interconnected in the entire shrimp supply chain that require close supervision and control to get the safe and certified produce with traceable value chain. Ensuring shrimp quality and safety at all stages has been a primary priority as regulatory demands for sustainability and transparency. Hence, we have developed and field tested an internet of things (IoT) with block chain-based traceability tool for each species of shrimp for improving their supply chain management. This tool is a robust, transparent, and technologically sophisticated comprehensive digital traceability

system, which can monitor and record critical data points throughout the production and distribution process.



# NEED FOR DIGITAL TRACEABILITY FOR INDIAN AQUATIC FOOD

**G. Jeyasekaran**
NABCONS Safe Fish & Traceability Program Coordinator, Ministry of Fisheries, Animal Husbandry & Dairying, New Delhi
jeyasekarang@gmail.com

Indian fisheries and aquaculture play a pivotal role in its socio-economic development, contributing significantly to food security, livelihoods, and exports. India is one of the top three aquatic food producing countries globally and a leading exporter of aquatic food. Indian fisheries value chains are extensive and diverse, encompassing all forms of capture fisheries, aquaculture systems, post-harvest handling, processing, marketing and export. Traceability is vital for aquatic food safety to prove legality and verify sustainability, as aquatic food is the most globally traded food commodity. Issues relating to illegal fishing and mislabeling are more prominent in recent years. Many opportunities exist for aquatic food fraud as and when new and poorly managed fisheries develop.

There is an urgent need for a unified digital traceability system that facilitates real-time tracking of aquatic food product movement and transactions throughout the value chain. The National Framework on Traceability in Fisheries and Aquaculture is envisioned as a transformative initiative to standardize and implement traceability across India's capture fisheries and aquaculture sectors. The National Traceability System will adopt a phased, inclusive, and technology-driven approach to ensure that both small-scale operators and large commercial enterprises can comply without disruption. The Framework envisages that at each Critical Tracking Event (CTE), the relevant Key Data Elements (KDEs) are digitally captured, time-stamped,

and linked to the product's unique identifier. The funds for the development of the Traceability System will be met by Central Government from the PM-MKSSY scheme. The project will create a centralized, secure and interoperable National Fisheries Digital Platform (NFDP) using standardized protocols, which enables customization at the state level while maintaining national-level consistency and data consolidation. The system will be hosted on a secure cloud infrastructure, ensuring scalability, cost-efficiency, and resilience against data loss. The Framework will adopt internationally recognized standards and guidelines for food traceability.

# CRISIS TO CONFIDENCE: PROVING TRACEABILITY AS A BIOSECURITY GAME-CHANGER

**Jane Gallagher**
CEO & Co Founder
Honey & Fox Pty Ltd, Australia
jayne@honeyandfox.com.au

The detection of White Spot Syndrome Virus (WSSV) in a major Australian prawn-growing region triggered strict restrictions on the movement of uncooked prawns, placing the viability of local fisheries at risk. In response, a collaborative project was initiated to design and trial a secure, real-time traceability platform capable of enabling trade while maintaining the highest biosecurity standards.

Led by Honey & Fox and Fish Beatty Consultancy, with funding from the Fisheries Research and Development Corporation and support from industry, government, and technology partners, the project engaged directly with fishers and supply chain stakeholders to co-design a system that was both practical and powerful. Using GS1 global standards, tamper-evident packaging, QR codes, and real-time trackers integrated through Trust Provenance software, the trials successfully demonstrated transparent, tamper-proof monitoring of mock prawn consignments from harvest through to chefs.

Critically, the trial design and protocols were reviewed with state and national authorities to ensure alignment with biosecurity import controls. Outcomes confirmed that the system could provide equivalent—or superior—assurance to existing regulatory frameworks, offering a pathway for secure domestic trade in high-risk environments.

The project's implications extend well beyond Australia. It demonstrates how digital traceability can

underpin regulatory compliance, reinforce consumer confidence in provenance, and contribute to global biosecurity preparedness. This approach provides a transferable model for other high-risk commodities and industries, showing how traceability systems can serve as both a safeguard and a market enabler.

At the World Seafood Congress, we will present project findings alongside a live demonstration of the technology in action, highlighting its potential to transform seafood supply chains and strengthen market access in biosecurity-sensitive environments worldwide.

# ADVANCING DIGITAL TRACEABILITY IN INDIA'S SEAFOOD SECTOR THROUGH GDST ADOPTION

**Kevin Edwards**[1] **Huw Thomas**[2]
[1] VP Global Market Development, GDST
[2]Executive Director GDST
Global Dialogue on Seafood Traceability (GDST)
Kevin.edwards@thegdst.org

Building on the GDST global context, we shall focuss on how GDST's interoperable digital traceability framework aligns with India's rapidly evolving seafood landscape. India—one of the world's leading producers and exporters of farmed shrimp—has entered a new phase of modernization with the Government of India's recent Digital Traceability Framework. This policy direction signals national recognition that future market access, regulatory compliance, and sustainability credibility depend on reliable, standardized digital data.

Indian seafood companies are already engaging with this transformation. Several GDST partners from India's shrimp sector, together with leading Indian traceability and software firms, are adopting GDST Standards to strengthen supply-chain transparency and meet the expectations of global buyers. These companies understand that providing trustworthy digital data to customers, regulators, and stakeholders is essential for demonstrating strong ESG performance and effectively addressing environmental risks, labor conditions, and product-quality concerns.

The momentum reflects a broader shift: global markets increasingly require interoperable digital traceability, and Indian exporters who implement GDST-aligned systems position themselves for competitive advantage in the US, EU, and other high-value markets. By harmonizing data capture

and exchange, Indian producers and processors can reduce administrative burdens, enhance credibility, and integrate seamlessly into international value chains that are progressively adopting GDST as a best-practice standard.

We will spotlight how India's industry leaders, government initiatives, and GDST's global framework are converging to support the long-term resilience, growth, and global competitiveness of India's seafood sector.

# THE GLOBAL DIALOGUE ON SEAFOOD TRACEABILITY (GDST) AND THE FUTURE OF INTEROPERABLE DIGITAL TRACEABILITY

**Huw Thomas[1], Kevin Edwards[2]**
Global Dialogue on Seafood Traceability
Kevin.edwards@thegdst.org
[1]Executive Director GDST
[2]VP Global Market Development, GDST

The Global Dialogue on Seafood Traceability (GDST) is a not-for-profit, public-benefit organization created to accelerate the global shift toward interoperable, digital seafood traceability. GDST convenes industry, civil society, and technology leaders to build and continuously evolve a common, practical, and globally applicable framework for capturing and exchanging key data across seafood supply chains. The GDST Standards—open, free, and vendor-neutral—enable interoperability across diverse digital systems, reduce the cost and complexity of compliance, and support responsible, transparent sourcing.

Today, GDST is supported by more than 120 partners worldwide, including global retailers, seafood brands, processors, logistics providers, technology companies, NGOs, and industry associations. These stakeholders recognize that standardized and verified data flows are essential to reducing fraud, enabling regulatory compliance, strengthening ESG reporting, and addressing environmental, labor, and quality risks across global seafood value chains.

Investors aligned with the FAIRR Initiative have also identified adoption and implementation of the GDST Standards as a critical indicator of responsible corporate practice, signalling growing financial-sector expectations for digital traceability. Governments and multilaterals have increasingly echoed this alignment: Indonesia's STELINA traceability platform integrates the GDST Standard, while the EU Fisheries

Control Regulation cites GDST as a best-practice model. The FAO and the UN Transparency Protocol further reinforce GDST's role in setting internationally recognized benchmarks for interoperable traceability.

We will explore how GDST's collaborative model, expanding community, and globally harmonized approach are reshaping the future of trustworthy seafood data exchange—and why interoperable digital traceability is becoming a cornerstone of responsible seafood production and trade.

# SESSION 11: WORKSHOP ON FOSTERING STEWARDSHIP FOR SUSTAINABLE INDIAN MARINE INGREDIENTS

**Supported by BoBP, CMFRI, NFDB and the Dakshin Foundation**
in technical cooperation with:

Food and Agriculture Organization of the United Nations

## Introduction

India is a major entity in the global seafood economy, supported by a dynamic aquaculture sector, strong export markets, and growing demand for marine ingredients such as aquafeeds. These sectors play an important role in supporting livelihoods, value addition, and food production systems both within India and internationally. As markets, regulatory expectations, and sustainability conversations evolve globally, FMFO and aquafeed businesses in India are increasingly navigating a complex operating environment. This includes balancing efficiency, competitiveness, traceability requirements, and long-term resource security, while responding to diverse domestic and international market signals. At the same time, there is growing recognition that closer dialogue across value chain actors can help identify shared interests, reduce fragmentation, and support more coordinated approaches to sectoral stewardship. While substantial evidence and experience exist across industry, government, and civil society, there are limited neutral platforms where these perspectives can be discussed collectively and constructively. This workshop responds to this opportunity by creating a focused, industry-facing space to exchange perspectives, surface practical insights, and explore pathways that align sustainability ambitions with business realities in India's marine ingredients sector.

**Workshop Purpose**

The workshop aims to convene key industry actors, regulators, and enabling organisations to:

- Initiate a structured dialogue on collective stewardship in the Indian FMFO and aquafeed sectors
- Strengthen alignment between sustainability expectations, traceability systems, and market access
- Discuss the possibilities of a longer-term multi-stakeholder coalition on marine ingredients stewardship in India.

**Workshop Objectives**

The workshop will aim to:

The workshop will:

1. Build shared understanding of sustainability risks, trade-offs, and opportunities within the Indian FMFO and aquafeed value chains.
2. Identify priority action areas where industry leadership can drive measurable improvements.
3. Explore the role of traceability and data systems in supporting sustainability, regulatory compliance, and market alignment.
4. Facilitate dialogue across value-chain segments, including producers, processors, feed manufacturers, exporters, and regulators.
5. Initiate a discussion on a multi-stakeholder coalition for continued engagement beyond the Congress

**Key Outputs**

By the end of the workshop, participants will co-develop:

- A shared framing of sustainability priorities for India's FMFO and aquafeed sectors.
- Practical recommendations on stewardship mechanisms, including traceability and data interoperability.
- Identified roles for industry, regulators, and enabling organisations in advancing collective action.
- Inputs towards a concept note for a multi-stakeholder marine ingredients coalition.

**Participants**

The workshop will bring together a curated group of stakeholders, including:

- Fishmeal and fish oil producers
- Aquafeed manufacturers and allied businesses
- Seafood exporters and industry associations
- Global and regional traceability initiatives
- National and international regulatory and intergovernmental organisations
- Sustainability standardisation bodies, technical partners, and civil society organisations

**For further information, please contact:**

**Dr. P Krishnan**
Director, Bay of Bengal Programme
Inter-Governmental Organisation
91, St. Mary's Road, Abhiramapuram,
Chennai, 600018
Mob: +91 9498050062
Email: krishnanars@bobpigo.org

**Dr. Naveen Namboothri**
Founder-Trustee, Dakshin Foundation
2203, 8th Main Rd, MCECHS Layout,
D Block, Sahakar Nagar, Bengaluru,
Karnataka 92
Mob: +91 70223 88061
Email: naveen.namboo@dakshin.org

| Activity | Details | Time |
|---|---|---|
| Welcome & Opening Remarks | Moderator: Dr. Naveen Namboothri, Founder-Trustee, Dakshin Foundation<br>Welcome and introduction to the workshop by BoBP-IGO and Department of Fisheries | 09:10 -0930 |
| Sector Realities & Shared Challenges | Chair: Dr. K.K. Lal, Director, ICAR-CIBA, Chennai<br>See below for details | 09.30-1015 |
| Reimagining Sustainability in Marine Ingredients Sector | Moderator: Ms. Angela Lentisco, Fishery and Aquaculture Officer, FAO-RAP | 10:15-1100 |

| Activity | Details | Time |
|---|---|---|
| | **Panellists:**<br>Dr. M.K. Ram Mohan, Director, MPEDA | |
| | Prof. G. Jeyasekaran, Safe Fish & Traceability Programme Coordinator, DoF, GoI | |
| | Mr. Santhana Krishnan, Chief Executive Officer, Marine Technologies, Chennai | |
| | Mr. Jogeir Toppe, Fishery Officer, Fisheries and Aquaculture Division, FAO | |
| Marine Ingredients Sector: Regional Perspectives | Moderator: Dr. P. Krishnan, Director, BOBP-IGO | 1100-1120 |
| | Current Status of Marine Ingredients in the Country: Opportunities for Regional Action - Senior Officials from Bangladesh, Maldives and Sri Lanka | |
| Wrap-Up & Next Steps | Priority Actions & Coalition Possibilities:<br>Dr. Naveen Namboothri<br>Founder-Trustee, Dakshin Foundation | 1120-1145 |

See below for more details

**Bay of Bengal Programme**
Inter-Governmental Organisation
91 St. Mary's Road, Chennai - 600 018, India. Tel: +91 44 42040024
Email: info@bobpigo.org | www.bobpigo.org

# POSTER PRESENTATIONS

WSC 2026 P 01

# AI-DRIVEN MICROBIOME INTELLIGENCE: TRANSFORMING SHRIMP PROBIOTIC DESIGN THROUGH OMNIBIOME AI AND NGS

**Aishwarya V.M, Rachelle M. Jensen, Federico M. Lauro**
Luminis Water Technologies, Ahmedabad, India
avm@luministech.com

Shrimp aquaculture faces escalating challenges due to persistent disease outbreaks, indiscriminate antibiotic usage, and the pressure to minimize production cost by achieving high feed conversion ratios. Although probiotics are widely adopted as an alternative intervention, most commercial products lack ecological specificity and therefore perform inconsistently under different physicochemical water conditions, regional environments, and farming methodologies.

To address these limitations, Luminis Water Technologies integrates next-generation sequencing (NGS) with OmniBiome AI, a proprietary microbiome-intelligence platform engineered to decode complex microbial ecosystems with high precision. NGS-based metagenomic profiling of pond water and shrimp gut microbiota across life stages enables comprehensive characterization of taxonomic and functional signatures. OmniBiome AI then processes these high-dimensional datasets to identify key taxa linked to immune modulation, digestive efficiency, pathogen exclusion, and environmental resilience.

Leveraging these insights, we have established a computational–experimental pipeline for rational design of customized probiotic consortia, optimized for specific cohorts, farm conditions, and production goals. Over 1,000 bioactive strains have been isolated and curated into our proprietary biological bank. Each candidate strain undergoes in-vitro validation for antimicrobial activity, enzyme secretion, and biofilm dynamics, followed by in-vivo performance benchmarking in multiple culture systems. Trials demonstrated significant improvements in growth rate, survival, immune responsiveness, and robustness under pathogen-challenge scenarios.

Our findings show that AI-guided, NGS-powered probiotic engineering represents a transformative advancement in sustainable aquaculture health management. OmniBiome AI enables precision biological formulations that reduce antibiotic dependency, strengthen farm resilience, and advance the global One-Health agenda by aligning environmental and animal health.

WSC 2026 P 02

# TRENDS IN INDIA'S SHRIMP PRODUCTION AND EXPORT GROWTH

**Arjunvishwak Prabhakarsriram, Sathaiah M, Jeyashree A, Anbarassan A, Muhammed Iqshanullah A and Kalai Chezhiyan K**

Department of Agricultural Economics, SRM College of Agricultural Sciences, SRM Institute of Science and Technology, Baburayanpettai, Chengalpattu-603201, Tamil Nadu, India.

arjunvishwak2003@gmail.com

Shrimp is India's top seafood export, contributing major share in export value and earnings.

- India's shrimp export quantity and trade value showed overall growth from 2000–01 to 2024–25.
- USA, Japan, and Belgium markets are stable, while China and Vietnam are more volatile.
- CDVI results show export instability, indicating the need for better market risk management.
- ARIMA forecasting suggests future growth potential in shrimp exports in upcoming years.

WSC 2026 P 03

# A STRATEGY FOR FOOD SAFETY COMMUNICATION AMONG GENERATIONAL COHORTS OF SEAFOOD CONSUMERS

**Arundhathi V[1], Mini Sekharan N[2]**

[1] Research Scholar, School of Industrial Fisheries, Foreshore Rd, Pallimukku, Ernakulam, Cochin University of Science and Technology, Kerala 682016, India

arundhathivnair@cusat.ac.in

[2] Associate professor, School of Industrial Fisheries, Foreshore Rd, Pallimukku, Ernakulam, Cochin University of Science and Technology, Kerala 682016, India minisekharan@yahoo.com

The effectiveness of global efforts toward a resilient seafood trade depends on consumer access to trusted and credible food safety information. This study investigates the perceived reliability of information sources and preferred communication channels among 2,079 seafood consumers across four generational cohorts in Kerala, India. Data were collected between March and December 2023 through an online survey distributed via social media platforms, using convenience and snowball sampling methods. The analysis revealed a significant communication deficit, with over 70% of Gen Z (18–26 years) and Millennials (27–42 years) rated their seafood safety knowledge as poor. Behavioural data indicated that Gen Z consumers seek minimal information related to food safety. Inferential analysis of trusted sources and preferred channels highlighted clear contrasts

among generations. Gen Z demonstrated significantly higher trust in social media and health professionals (doctors/ nutritionists), whereas Gen X (43–58 years) and Baby Boomers (59+) placed greater trust in online resources (websites/ blogs). Regarding preferred communication channels, Millennials showed a significant preference for product related information (QR codes/ labels/ certifications/ retail communication), identifying them as a key target for point-of-sale food safety interventions. In contrast, older groups retained a preference for print media. These findings underscore the limitations of a "one-size-fits-all" or single-channel communication approach. To enhance trust, optimize communication and encourage safer food handling practices to mitigate seafood-borne illnesses, stakeholders must adopt generation-specific strategies that prioritise digital and point-of-purchase communication channels. Such precision targeting is essential for building a resilient and inclusive seafood safety communication ecosystem.

*Keywords: Seafood safety, Consumer trust, Generational cohorts, Communication channels, Food safety education, Kerala.*

WSC 2026 P 04

# CHALLENGES IN ADVANCING CIRCULAR ECONOMY IN FISHERIES: INSIGHTS FROM FARMERS' ADOPTION OF ORGANIC FISH SILAGE FERTILIZER IN DIPOLOG CITY, PHILIPPINES

**Ms. Deserie Peralta, Rose Anne V. Lumapan, Dave A. Agcaoili, Ulysses M. Montojo**
National Fisheries Research and Development Institute – Fisheries Postharvest Research and Development Division, Quezon City, Philippines, 1128
fphrdd.fhps@nfrdi.da.gov.ph

High volume of sardine wastes including heads, bones, and entrails is generated each year from various sardine bottling processing plants in Dipolog City, Philippines. These wastes are just often discarded with no intended use. Fish silage production is a conventional approach of harnessing the nutrients from these wastes and can be used as fertilizer. Dipolog, as an agricultural city, has a great potential to benefit from this technology. It is therefore important to assess the insights of farmers to provide a basis for its further development, as well as to evaluate its market potential. Thus, survey interviews with 252 randomly selected rice farmers were conducted to identify the opportunities and challenges in the integration of fish silage fertilizer into agricultural farming practices in Dipolog City. Results of the study showed that all of the interviewed

farmers are using inorganic fertilizer such as urea and complete fertilizers. Only 22% of the farmers have tried fish silage as fertilizer, primarily for growing supplementary crops such as vegetables. One of the primary reasons is the skepticism of farmers toward the fish silage fertilizer effectiveness especially when compared to inorganic fertilizers. Also, little to none priority is given to the organic produce in the province. Other factors include the commercial unavailability of the product, and lack of awareness of fish silage and its method of production. To enhance adoption, farmers recommended product trials, government support to organic farming, and refinement of the fish silage production to enhance its effectiveness as a viable organic fertilizer.

**WSC 2026 P 05**

## STRENGTHENING FOOD SAFETY CULTURE IN SEAFOOD EXPORT FIRMS - MANAGEMENT PERCEPTIONS ON EMPLOYEE ENGAGEMENT

**Greena G G[1], Mini Sekharan N[2]**

[1] Research scholar,

[2] Director and Associate professor

School of Industrial Fisheries, Cochin University of Science and Technology, Lakeside Campus, Foreshore Road, Kochi-682 016.Kerala, India

greenatino@gmail.com

Food safety culture is a critical determinant of safe production practices within food and seafood organizations. Multiple dimensions—such as management and coworker support (leadership commitment), communication, self-commitment, and working environment—influence food safety culture. Among these, leadership commitment has emerged as a decisive factor in ensuring sustained compliance with safety requirements.

This study aimed to assess employee perceptions of leadership commitment to food safety in seafood manufacturing units, with particular emphasis on the role of supervisors and managers in promoting safe handling practices. The sample included food handlers from selected seafood organizations in South India. Data were collected through a structured questionnaire designed to capture employee views on management involvement, enforcement of food safety rules, and supervisory monitoring. The analysis focused on understanding how leadership actions influence employee behaviour and the overall food safety culture. Demonstrated through consistent actions, clear communication, and visible monitoring, leadership behaviours strongly shape employee attitudes and practices. Preliminary findings highlight that visible and consistent managerial involvement significantly strengthens compliance, builds mutual accountability, and reinforces collective responsibility for food safety. Conversely, gaps in enforcement, inconsistent monitoring, or lack of follow-up reduce employee trust in organizational commitment.

This research underscores the importance of leadership-driven initiatives in embedding food safety as a shared organizational value. The findings provide

actionable insights for managers and policymakers to design targeted strategies that foster strong food safety cultures, ensure sustained adherence to best practices, and safeguard consumer health.

WSC 2026 P 06

## CONSUMER ACCEPTANCE OF GREEN SEAWEED (*ULVA RETICULATA*): INSIGHTS FROM SENSORY PANEL AND E-NOSE ANALYSIS

**Karthika R[1], Dr. B. Kamalapreetha[2], Dr. R. Dakshayani[2], Dr. R. Mahendran[3] & Dr. R. Jagan Mohan[4]**

**[1] M. Tech Student,**

**[2] Research Fellow,**

**[3] Professor & HOD**

**[4] Professor and Dean Students Welfare**

Department of Food Process Technology, National Institute of Food Technology, Entrepreneurship and Management, Thanjavur

karthikar@iifpt.edu.in

jagan@iifpt.edu

Rapidly growing population across countries leads to alternative food sources to meet the increasing demand for nutrition. In this context, evolution in aquaculture industry plays a key role which enables seaweed as a sustainable and nutrient rich source. Around the world seaweed is widely consumed as a vegetable but consumption of seaweed is limited due to its lack of awareness and sensory characteristics in Indian cuisine. This present study investigates the sensory attributes and consumer acceptance of raw green seaweed (*Ulva reticulata*) through combined subjective and objective methods. Subjective method involves questionnaire where 25 semi-trained panelists evaluated the visual observation involving chromatic properties, olfactory, visual morphology, odor potency, and overall acceptability. Panellist exhibited mixed perception shows seaweed as algal, unappealing, strong, unpleasant fishy odors. Odor intensity was moderate to intense; this influences the unwillingness towards the consumption of seaweed. However, objective method of sensory profiling using E-nose (Electronic nose) identify volatile compounds such as ethanethiol,2-mercaptoethanol,1-propanol, thiophene,1butanamine,1-hyroxy-2-propanone and heptadecanal with its subsequent sensory descriptors as correlated with the fishy. pungent and strong odour. Combining both methods indicates that the characteristic of seaweed leads to reduced consumer acceptance in its raw or unprocessed form. Panellists have a favourable approach towards processed products such as incorporating seaweed as a functional food ingredient in food matrices like nutritional supplements, snacks, savory, bakery products, ready to eat products and beverages.

Keywords: Sensory, subjective, E-nose, consumer acceptance, functional ingredient

WSC 2026 P 07

# GENDER MAINSTREAMING UNDER UNIDO'S BLUE INDUSTRY FRAMEWORK: ADVANCING EQUITY IN SEAFOOD VALUE CHAIN

**Freya Gruenberg, Yasmin Langendoefer Atun**
United Nations Industrial Development Organization (UNIDO);
f.gruenberg@unido.org
y.langendoerferatun@unido.org

Achieving equitable and sustainable seafood value chains requires addressing structural gender barriers while supporting competitiveness and compliance in global trade. The Blue Industry Framework operationalises UNIDO's mandate on inclusive and sustainable industrial development by integrating gender mainstreaming throughout project cycles, complemented by targeted measures that strengthen women's access, skills and leadership in seafood systems.

This poster presents a twin track approach: (i) embedding gender considerations across diagnostics, policy, quality infrastructure and market linkage activities; and (ii) deploying targeted support to enhance women's participation in value chain upgrading. Operational entry points are illustrated across programmes, including SADC/PROFISHBLUE's quality infrastructure and One Stop Border Post facilitation; Indonesia's seaweed and shrimp–mangrove value chains where gender responsive

training supports processing quality and sustainability markets; Cambodia, where women-led fish processing groups benefit from food safety training, improved post harvest practices and strengthened testing and certification services; and GMAP Colombia's gender analysis, institutional capacity building and sex disaggregated monitoring in tilapia and shrimp value chains.

Across these cases, integrating gender into compliance processes, quality systems and trade facilitation enabled women producers and enterprises to formalise operations, meet SPS and quality requirements, and access higher value markets. By systematically combining gender analysis with targeted measures, this work demonstrates how gender mainstreaming enhances equity, decent work, productivity and seafood trade readiness. The poster offers actionable insights for policymakers and practitioners on embedding gender equity within seafood value chain development under the Blue Industry Framework.

WSC 2026 P 08

# PATTERNS OF LOCAL CONSUMPTION AND EXPORT OF PARROTFISHES (FAMILY: SCARIDAE) FROM THE COAST OF TAMIL NADU, INDIA - A PRELIMINARY MULTIMETHOD STUDY

**S. Narayani**
Ashoka University, Sonipat, Haryana, India
nans.mythila@gmail.com

Parrotfishes (Family: Scaridae) are key herbivorous species supporting tropical reef resilience. This multimethod qualitative study evaluates their fisheries, consumption patterns, and export dynamics across seven coastal and landlocked districts in Tamil Nadu, India. Data were gathered through harbour and market surveys, semi-structured interviews (n=75) with fisherfolk, vendors, exporters, auctioneers, and consumers, alongside digital ethnography from social media, export/vendor websites, and YouTube videos.

Surveys covered fishing villages, harbours, and markets, documenting catch methods (76% via nets and traps from small, motorized boats). Interviews explored preferences and trends; digital sources quantified exports and consumer sentiments. Thematic analysis with triangulation ensured methodological robustness.

Parrotfishes weighing 400–2000 g were selectively exported to Southeast Asia and the Middle East at

premium prices (3.68–7.35 USD/kg), approximately six times higher than local market rates, while smaller specimens supplied domestic demand. Local consumption predominantly featured scrambled fish or fried/roasted preparations; unexpectedly, landlocked district consumers exhibited stronger preferences than coastal residents, valuing the fish's low bone content despite its perceived blandness. Elder fisherfolk noted parrotfish exports were negligible two decades ago, indicating rapid market expansion. Functional analysis revealed 19 species grouped into 11 entities, with eight single-species entities showing high vulnerability to localized extinction—particularly concerning as these included the most heavily caught species. In conclusion, export pressures on this species surpass local consumption, thus threatening functional diversity and reef health. The results indicate a worrying trend, urging integrated management and quantitative monitoring.

WSC 2026 P 09

# SEAWEED INFUSED NUTRACEUTICAL FUNCTIONAL BEVERAGE FOR MICRONUTRIENT SUPPLEMENTATION

**Koushika Saravanan, L Stanley Abraham, Priya L 1, Steffy Joseph, R. Selvamani, R. Anish Kumar**

Centre for Ocean Research, National Facility for coastal and Marine Research, Sathyabama Institute of Science and Technology, Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai – 600119, India.

koushikasaravanan06@gmail.com

sabraham.cor@sathyabama.ac.in

Seaweeds are rich sources of nutraceutical compounds and possess significant potential as functional food ingredients beyond their conventional use as phycocolloids. Brown seaweeds such as Padina spp. and Turbinaria ornata have gained attention due to their nutritional richness and bioactive properties. This study focuses on the development and evaluation of a seaweed-based health drink formulated as a nutrient supplement using selected brown seaweeds. The seaweeds were assessed for their nutritional composition, antioxidant potential, and sensory acceptability of the formulated beverage.

Both Padina spp. and T. ornata are known to contain appreciable levels of macronutrients, dietary fibre, essential minerals, and natural antioxidants, which

contribute to their functional and health-promoting properties. Comparative observations indicate variation in nutrient composition and antioxidant potential between the two species, influencing their suitability for beverage formulation. Sensory evaluation demonstrated acceptable organoleptic characteristics, including colour, appearance, texture, flavour, and taste, highlighting the feasibility of incorporating seaweeds into palatable health drink formulations.

The findings emphasize the potential of edible seaweeds as sustainable and natural sources of macro- and micronutrients for functional beverage development. Seaweed-based health drinks represent a promising approach to nutritional supplementation and functional food innovation, supporting dietary balance and nutritional security.

Keywords: Seaweed-based health drink, Padina spp., Turbinaria ornata, nutrient supplements, antioxidants, functional beverages.

WSC 2026 P 10

# THE EFFECTS OF PESCATOURISM ON ENHANCING AQUATIC VAQLUE CHAIN IN PALANGAN FISH FARMS

**Lida Alikhani [1], Ahmed M. D. Elshafei [2]**

[1] Economist, Master, NSHR Roster - NFI, FAO

[2] Senior Researcher, Agriculture Research Center, Egypt

lida.alikhani69f@gmail.com

This research investigates the influence of pesca-tourism on the aquatic value chains in the scenic geographical region of fish farms in Palangan. By examining the interplay between eco-tourism activities and the local fish farming industry against the backdrop of rugged mountain landscapes and pristine waterways, this study investigates how pesca tourism practices shape the dynamic of fish production, processing and distribution in this area.

The study investigates the integration of pesca-tourism into the aquatic value chains of Palangan fish farms, highlighting its potential to enhance economic, environmental, and social sustainability. Through geospatial analysis, stakeholder interviews, and socio-economic surveys, findings reveal that farm engaging in pesca-tourism activities achieve higher revenues, larger scale, and improved market access by diversifying products and services, such as farm-to-table experiences and cultural tourism. marketing

upskilling correlates with increased farm size and production, emphasizing the importance of capacity building. Pesca tourism also fosters environmental stewardship by incentivizing sustainable aquaculture practices and raises public awareness of conservation. Socially, it supports cultural preservation and community empowerment, particularly benefiting women's economic participation.

The study recommends investing in infrastructure development, including visitor facilities and educational centers, enhancing capacity building focused on hospitality and sustainable tourism, and implementing targeted marketing strategies to promote pesca-tourism's unique value. Additionally, establishing a robust regulatory framework and fostering collaboration among government, private sectors, and local communities, are essential for sustainable growth. Ensuring community-based management and equitable benefits distribution is essential for the sustainable development of pesca tourism in Palangan.

Key words: Pesca-tourism, aquatic value chain, fish farms, Palangan

WSC 2026 P 11

# NUTRIENT COMPOSITION OF MARINE FISH SPECIES FROM THE EAST AFRICAN COAST: IMPLICATIONS FOR FOOD AND NUTRITION SECURITY.

**Mackrina Patrick Nombo[1], Betina Lukwambe[1], Maria Wik Markhus[2], Talhiya Maulid Ali[1], Edel O. Elvevoll[3], Quang Tri Ho[2], José Mateus Vilanculo[4], Marian Kjellevold[2]**

[1] School of Aquatic Sciences and Fisheries Technology, University of, Dar es salaam, Tanzania
[2] Institute of Marine Research, Norway
[3] Norwegian College of Fishery Science, UiT-The Arctic University of Norway
[4] Oceonographic Institute of Mozambique
nombomackrina9@gmail.com

Fish play a significant role in food and nutrition security along the coast of East Africa. However, there is a lack of comprehensive nutrient composition data. This study aimed to present the nutrient composition of the most commonly consumed marine fish species and assess their potential contribution to the recommended nutrient intakes (RNIs) of a healthy adult. In total, 24 commonly consumed fish species were sampled using pelagic and demersal trawls by R/V. Dr. Fridtjof Nansen during the ecosystem survey along the East African coast in 2018 and 2023. Species were categorized, according to length, into small (< 25 cm) or large (> 25 cm) fish and prepared

based on local consumption practices (whole, dressed, fillets, headed, and gutted). All samples were analyzed using accredited methods. The findings revealed that small fish species typically consumed whole with bones, heads and viscera, contain higher levels of micronutrients such as calcium (908 mg/100 g), iron (2.9 mg/100 g), iodine (140 µg/100 g), zinc (2.0 mg/100 g), vitamin A (205 µg/100 g), and the fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) (0.2 g/100 g and 0.6 g/100 g, respectively) when compared to larger species where only fillets are consumed. Several small fish species consumed whole were identified to contribute ⩾ 15% of the RNIs of healthy adults for several essential nutrients. The data presented in this study make a valuable addition to the Tanzanian and Mozambican food composition tables and enhance the understanding of fish as a significant source of micronutrients.

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# DIETARY ORGANIC ACID SALTS AS ANTIBIOTIC ALTERNATIVES FOR MITIGATING ANTIMICROBIAL RESISTANCE IN *PENAEUS VANNAMEI*

**Manisha Alex[1], Cheryl Antony[2], Ayappan Pillai Kumaresan[3], Arumugam Uma[4], Sethu Selvaraj[1], Elangovan Prabu[4]**

[1] Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Department of Aquaculture, Dr. M.G.R. Fisheries College and Research Institute, Ponneri, Tamil Nadu 601 204, India.

[2] Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Directorate of Sustainable Aquaculture, Nagapattinam, Tamil Nadu 611 002, India.

[3] Sheng Long Bio- Tech India Pvt.Ltd., Gummudipoondi Taluk, Thiruvallur.

[4] Tamil Nadu Dr. J. Jayalalithaa Fisheries University, Directorate of Incubation and Vocational Training in Aquaculture, Muttukadu, Kancheepuram, Tamil Nadu 603 112, India.

alexmanisha1320@gmail.com

The widespread use of antibiotics in shrimp aquaculture has accelerated antimicrobial resistance (AMR) and veterinary drug residue accumulation, threatening public health, international trade, and sector sustainability. Effective dietary alternatives to antibiotics are therefore essential for residue-free shrimp production. Although organic acids are recognized as functional feed additives, integrated

and dose-dependent evidence identifying the most effective organic acid salt and its optimal inclusion level as an antibiotic alternative in *Penaeus vannamei* remains limited. This study evaluated the efficacy of different organic acid salts (OAS) and doses in improving growth, immune competence, and disease resistance in *P. vannamei,* with implications for AMR mitigation. Juvenile shrimp (~1 g) were fed thirteen experimental diets comprising a control and diets supplemented with sodium butyrate (SB), sodium fumarate (SF), sodium succinate (SS), and sodium propionate (SP) at 0.5%, 1%, and 2% inclusion levels for 60 days (triplicate). Growth performance, digestive enzyme activities, apparent nutrient digestibility, intestinal histology, innate immune responses, immune- and growth-related gene expression, and resistance to *Vibrio parahaemolyticus* challenge were assessed. Shrimp fed OAS diets showed significantly improved growth performance and feed efficiency, with SP 1% producing the highest response ($p < 0.001$). SB 2% and SP 1% produced the greatest gains in digestion, hepatopancreas health, immunity, and post-challenge survival. Upregulation of IGF-1, IGF-II, TLR, and proPO further confirmed physiological benefits. Overall, sodium propionate (1%) and sodium butyrate (2%) emerged as effective non-antibiotic dietary strategies to enhance shrimp health and disease resistance, supporting AMR mitigation and residue-free, export-compliant shrimp aquaculture.

Keywords: Sodium propionate, Sodium butyrate, Antibiotic alternatives, Growth promotor, Disease resistance, antimicrobial resistance

WSC 2026 P 13

# DEVELOPMENT OF QUATERNISED MAGNETIC CHITOSAN BEADS FROM CRAB AND PRAWN SHELL WASTE FOR SUSTAINABLE DYE REMOVAL

**Nandika T**

Department of Biotechnology, Loyola College, Chennai

Seafood processing industries generate large volumes of crab and prawn shell waste which are often disposed, despite their high chitin content and potential as a bioadsorbent. Converting this waste into functional materials can address both environmental pollution and sustainability changes within the seafood value chain. Chitosan extracted from crab and prawn shells was functionalised into quaternised magnetic beads to check their efficiency as adsorbents for dye removal from aqueous systems.

Quaternisation was done to increase the surface charge of chitosan to improve its adsorption of anionic dye molecules, while magnetisation was done to enable separation of the adsorbent after dye removal. The beads were tested for the removal of representative dyes under laboratory conditions. Compared with unmodified chitosan, the modified chitosan showed enhanced dye removal, indicating the combined effect of chemical functionalisation and magnetisation. A main advantage of the developed bioadsorbent is the easier recovery using an external magnetic field, thereby reducing secondary waste generation and increasing

reusability. This is especially useful in wastewater treatment, where separation and simplicity are crucial.

The chitosan beads contribute to an environmentally responsible approach by converting seafood processing by-product waste into functional materials for environmental remediation. The developed quaternised magnetic chitosan beads show potential for application in industrial effluent treatment supporting sustainable water management and circular economy principles within global seafood sector

**WSC 2026 P 14**

## OCEAN TO DINE: A NOVEL SEAWEED-BASED INSTANT NUTRITIVE SOUP AS A NEXT-GENERATION MARINE SUPERFOOD

**Priya L, L Stanley Abraham, Ram Kumar M, Koushika S, R. Anish Kumar**

Centre for Ocean Research, National Facility for coastal and Marine Research,
Sathyabama Institute of Science and Technology,
Jeppiaar Nagar, Rajiv Gandhi Salai,
Chennai – 600119, India.

priyalpv8994@gmail.com

sabraham.cor@sathyabama.ac.in

Seaweeds are increasingly recognized as marine super foods due to their exceptional nutritional values and unique bioactive compounds not commonly

found in terrestrial plants. The present concept introduces a novel seaweed-based instant nutritive soup, developed as a functional and therapeutic food designed to support medical recovery, immunity, and tissue repair mechanism. This instant soup integrates selected green, red, and brown seaweeds rich in sulfated polysaccharides such as fucoidan, ulvan, and agar, along with essential minerals, antioxidants, and marine-derived micronutrients. Unlike conventional soups, this formulation is designed for rapid reconstitution, easy digestion, and enhanced bioavailability, making it suitable for individuals with compromised health. The seaweed instant soup is particularly intended for post-operative patients, individuals recovering from illness or fever, elderly populations with weak digestion, anaemic individuals, post-partum women, and children with poor immunity. After consumption, the natural seaweed polysaccharide forms a gentle protective layer gently in the walls of gastrointestinal tract aiding reduction in inflammation and help the tissues to repair damaged cells. At the same time, the rich mineral and antioxidant content improves immunity, energy levels, and nutrient absorption. Bioactive compounds such as fucoidan and phlorotannins exert anti-inflammatory, antioxidant, and immunomodulatory effects, thereby accelerating cellular repair and reducing recovery time. Its novelty lies in transforming seaweed into a clinically relevant, sustainable, and plant-based instant soup, rather than a pharmaceutical product offering a simple, natural, and biocompatible solution for recovery, wellness, and daily health support.

Keywords: Seaweeds, Super-food, Anti-inflammatory, Immunomodulatory and Sustainability

WSC 2026 P 15

# FROM CARBON IMBALANCE TO BLUE CARBON LEADERSHIP: HOW INDIA'S SHRIMP SECTOR IS RESTORING ECOSYSTEMS AND REIMAGINING GLOBAL TRADE

**Richa Gupta**
Aquabeats, New Delhi

The global shrimp industry faces an urgent climate challenge: for every kilogram of farmed shrimp produced, up to 13 kilograms of $CO_2$ are released, much of it due to the loss of mangroves—nature's most powerful blue carbon sinks. Over 250,000 hectares of mangroves have been lost worldwide to shrimp farming, driving ecosystem decline and increasing vulnerability to climate Change.

India's response is rapidly gaining momentum. Through the Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI), over 26,000 hectares of coastal buffer zones—including lands previously converted for shrimp ponds—are being restored. Projects such as Small-scale Aquaculture in Mangrove Ecosystems (SAIME) in West Bengal, and community-driven restoration and the MANGREEN initiative in Tamil Nadu, demonstrate that mangrove recovery and sustainable aquaculture can coexist, supporting both carbon sequestration and resilient coastal livelihoods.

Call to Action: To catalyse a fair, sustainable, and

resilient shrimp supply chain, Indian industry leaders must:

- Invest in landscape-level aquaculture improvement projects and cross-sector restoration partnerships
- Fund and participate in community-managed mangrove nurseries and restoration initiatives, with an emphasis on empowering women and local families
- Adopt and promote full-chain traceability and global ESG certifications such as ASC and Shaphari, leveraging digital platforms like Aqua Trace for transparency and buyer confidence
- Collaborate with government, NGOs, and supply chain partners to scale holistic solutions—moving beyond farm-level fixes to ecosystem-wide impact.
- Publicly report restoration metrics, community impacts, and progress toward SDG 13 (Climate Action) and SDG 14 (Life Below Water), reinforcing leadership and trust in global markets

India's shrimp sector now has the chance to move from a legacy of blue carbon loss to global leadership in blue carbon restoration and sustainable seafood

WSC 2026 P 16

# PERFORMANCE TRADE-OFFS OF PENAEUS MONODON ACROSS STOCKING DENSITIES IN A NATURAL FLOC-BASED PRECISION INTENSIVE SHRIMP FARMING SYSTEM

**Srikarnashekar Elango, Akshaya Panigrahi, K. Ambasankar, Syama Dyal, Kumararaja P, N. Lalitha, Partha Sarathy, Manimaran, B. Dishen Kumar, Mohan Hariharan, Prasanna K Sudharson, K.P. Kumaraguru Vasagam**
ICAR-CIBA, Chennai, India

The resurgence of Penaeus *monodon*, once the cornerstone of shrimp aquaculture before the dominance of *P. vannamei* has now renewed its commercial value by improved technologies and growing market demand for large sized premium shrimp. A 142-day study evaluated the effects of three stocking densities high (HSD, 100/$m^3$), medium (MSD, 60/$m^3$), and low (LSD, 30/$m^3$) on growth, survival, feed efficiency, and water quality in six HDPE grow-out tanks (12 m diameter; 150-ton capacity). Post-larvae with an initial average body weight (ABW) of 0.012 g were stocked under semi
floc conditions. Results showed that LSD produced the highest final ABW (38.4 g), followed by MSD (37 g) and HSD (28.5 g). Survival was also greatest in LSD (98%), compared to HSD (92%) and MSD (82%). Biomass yield was highest in HSD (788.9 kg), with lower outputs from MSD (539.7 kg) and LSD (350.3 kg). FCR for shrimps reared in LSD was 1.58 which is the lowest, whereas for shrimps reared in MSD is 1.66 and 1.77 resulted

in HSD. Greenhouse gas ($CO_2$, $CH_2$, $N_2O$) emissions remained within acceptable limits, and water quality parameters (DO, pH, salinity, temperature) were stable throughout the trial. TVC and TBC in both water and shrimp gut samples were low across all treatments. Overall, the study demonstrates that while higher stocking densities yield greater biomass, lower densities significantly enhance growth, survival, and feed efficiency, emphasizing the importance of optimizing stocking strategies for sustainable shrimp production.

Keywords: Intensive, Biomass yield, Survival, FCR, Greenhouse gas emissions.

**WSC 2026 P 17**

## ASSESSING SEAFOOD SAFETY THROUGH HEAVY METAL PROFILING IN FARMED SHRIMP (*LITOPENAEUS VANNAMEI*)

**Tausif Haseeb Khan[1]*, Deepti Deshpande, Deepali V. Bhadvankar, Dr. Surekha Manoj Gupta**

Department of Zoology, Guru Nanak Khalsa College, Nathalal Parekh Marg, Matunga (East), Mumbai 4000 19, M.S, India

khanhtausif@gmail.com

Seafood safety is a critical concern for public health, global food security, and the sustainability of aquaculture systems. Farmed shrimp, particularly *Litopenaeus vannamei,* constitutes a major component of international seafood trade and human diets,

making the assessment of contaminant levels in edible tissues essential. Building on earlier findings of heavy metal enrichment in shrimp pond environments, the present study examines the implications of such contamination for seafood safety through analysis of shrimp muscle tissue. Shrimp muscle samples were subjected to standardized acid digestion followed by elemental analysis using Atomic Absorption Spectroscopy (AAS) to quantify essential and toxic metals. The analysis revealed that essential elements were largely present within expected physiological ranges, indicating acceptable nutritional quality of the shrimp muscle. Several toxic metals, including cadmium, chromium, nickel, and cobalt, were below detection limits, suggesting limited exposure to these contaminants. However, lead was detected in shrimp muscle at a concentration that exceeds the European Union maximum permissible limit for crustaceans (0.30 mg/kg), although it remains below the Codex Alimentarius maximum limit of 0.50 mg/kg. Given that shrimp muscle represents the primary route of dietary exposure, the presence of lead raises concerns regarding potential long-term health risks due to its cumulative toxicity and the absence of a safe exposure threshold. These findings highlight shrimp muscle as a critical matrix for evaluating seafood safety and regulatory compliance. The study emphasizes the importance of routine monitoring of edible shrimp tissues to minimize dietary exposure to toxic metals, ensure adherence to international food safety standards, and support sustainable aquaculture practices that protect consumer health and maintain market confidence.

Keywords: Seafood safety; heavy metals; shrimp muscle; *Litopenaeus vannamei*; lead contamination; atomic absorption spectroscopy; food safety standards; aquaculture sustainability

WSC 2026 P 18

# PROMOTING VALUE ADDITION AND EXPORT OF TUNA VALUE CHAIN IN IRAN THROUGH INTRODUCING A SPECIAL ICE MACHINE

**Tomoyoshi Koume**
Industrial Development Officer, UNIDO

This UNIDO project, funded by the Government of Japan, aims to promote inclusive and sustainable development of the yellowfin tuna value chain in Chabahar, Iran. Building on UNIDO's previous interventions, it addresses challenges such as inadequate post-harvest handling, limited product diversification, weak export capacity, and risks of overfishing. The initiative targets MSMEs, local institutions, and fishermen, while fostering collaboration with Japanese partners to support technology transfer and expand high-value export opportunities.

The project is structured around three pillars: improving quality management systems, promoting market access, and building a sustainable ecosystem. Key interventions include training on proper handling techniques, upgrading cold-chain and logistics infrastructure, enhancing quality assurance capacities, and introducing new technologies. A pilot export of fresh tuna to Japan through introducing a special ice machine will demonstrate opportunities for higher value addition. The special ice produced by the machine allows fishermen in Iran to improve

quality of tuna and thereby help export tuna to foreign market.

To ensure sustainability, the project includes stock assessments, awareness-raising activities on sustainable fishing practices, and the establishment of mechanisms to monitor and manage yellowfin tuna resources. Capacity building for local institutions will strengthen long-term monitoring and regulatory capabilities.

Expected outcomes include improved competitiveness, reduced post-harvest losses, broader adoption of sustainable fishing methods, and increased access to high-value markets.

# ALPHABETICAL LISTING OF EXHIBITORS

| Exhibitor | Stall No. |
|---|---|
| Agilent Technologies India Private Limited | A110 |
| Amar Seterilised Fish Meal (A unit of Vistar Amar Limited) | Fish Meal Pavilion |
| Aqua Genki Private Limited | B213 |
| Biomérieux | C314 |
| Biosystems Diagnostics Private Limited | A118 |
| Bismi Aquatic Products | Fish Meal Pavilion |
| Bitzer India Private Limited | A101 |
| Blue Cold Refrigeration Private Limited | B203 |
| City Union Bank | C302 |
| CLFMA of India | Fish Meal Pavilion |
| Cortland International | B210 |
| DhruvX Solutions Private Limited | D401 |
| DSS Imagetech Private Limited | B220 |
| Duke Thomson's India Private Limited | A108 |
| Epack Prefab Technologies Limited | A106 |
| Esquire Multiplast Private Limited | B221 |
| Fisheries & ARD Department, Government of Odisha | A114 |
| Fisheries Survey of India | A115 |
| Fishery.News | A126 |
| F-Max Systems India Private Limited | A113 |
| Foundation For Aquaculture Innovations and Technology Transfer (FAITT) | C321 |
| Fresh 'N' Frozen Magazines | C318 |

# ALPHABETICAL LISTING OF EXHIBITORS

| Exhibitor | Stall No. |
|---|---|
| GFFCO Global Private Limited (Kovai BSF) | A104 |
| Global Marine Exports | Fish Meal Pavilion |
| Hameed Marine Private Limited | Fish Meal Pavilion |
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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**AGILENT TECHNOLOGIES INDIA PVT LTD** — **A110**

Ground Floor, Abw Elegance Tower
Plot No. 8, Jasola District Center Jasola,
New Delhi, Delhi – 110025,
New Delhi – 110025, India.
Tel: +91 8587046326
Email: diya.sengupta@non.agilent.com
Website: www.agilent.com

**Company Profile**

Agilent Technologies Inc. (NYSE: A) is world's premier measurement company and a technology leader in Life sciences and Chemical analysis. Agilent has developed innovative analytical solutions for laboratory-dependent organizations in form of UHPLC's, HPLC's, GC's, Columns and Chemistry products, Mass spectrometry (GCMS, LCMS, CEMS), Lab Automation Solutions, Dissolution testing, PCR/qPCR, Microarrays, Molecular Spectroscopy (FTIR, UV-VIS/NIR, Fluorescence Spectrophotometers), Atomic Spectroscopy (AAS/GFAAS, MP-AES, ICPOES/ICPMS) Laboratory informatics solutions, and comprehensive service programs to enable scientists, manufacturers, researchers and regulatory agencies in Pharmaceutical, Chemical, Food Testing, Environmental, Forensics, Genomics, Clinical and Contract Research & Academia.

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**AMAR SETERILISED FISH MEAL (A UNIT OF VISTAR AMAR LIMITED)** — **FISH MEAL PAVILION**

Jawar Naka, Subhashnagar,
Porbandar, Gujarat – 360575, India
Tel: +91 9825409169
Email: vistaramarltd@gmail.com
Website: www.vistaramar.com | www.hiravati.com

**Company Profile**

At the forefront of sustainability in the seafood industry, our Fish Meal Division is vital to reducing waste and maximising resource utilisation. Operated across three state-of-the-art plants in Porbandar, Mangrol and Veraval, this division processes waste from Surimi and whole-round fish.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

The waste from Surimi and other processing plants, once considered byproducts, finds new life as valuable fish meal. Beyond waste reduction, our Fish Meal Division is pivotal in supporting the aquaculture and animal feed industries, providing essential nutrition to various species. At Hiravati Group, sustainability isn't just a buzzword—it's a guiding principle that influences everything we do.

**Product Description**
Fish Meal Powder is a premium, steam-dried protein supplement widely used in aquaculture, poultry, animal, pet, and dairy feeds. Made primarily from Surimi Waste and Whole fish, it offers high-quality protein, healthy fats, and omega-3 fatty acids (EPA & DHA) for optimal growth and nutrition. Manufactured at our modern mechanised plants across India. Our fish meal ensures consistent quality, freshness, and superior nutritional value for feed applications.

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**AQUA GENKI PRIVATE LIMITED** **B213**
Room 1, 610, Sector 10A, Gurgaon,
Gurgaon – 122001, India.
Tel: +91 9990930033
Email: aquagenkipl@gmail.com
Website:

**Company Profile**
Provider of Cutting Edge Japanese Patented Technology to Increase Dissolved Oxygen level in all types of Fish Farms.

**Product Description**
Made In Japan Super Saturated Bubbles Machines which Increase Dissolved Oxygen level in all types of Fish Farms.
Cutting Edge Japanese Patented Technology.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**BIOMÉRIEUX** **C314**

43A, Okhla Industrial Estate- Phase-Iii,
Modi Mill Compound, New Delhi,
Delhi – 110020, India.
Tel: +911142098800
Email: rammohan.mutharasu1@biomerieux.com
Website: https://www.biomerieux.com

**Company Profile**

A world leader in the field of industrial microbiological control, bioMérieux provides diagnostic solutions (systems, reagents, software, and services) that detect pathogens and identify microorganisms responsible for contamination at all steps of the manufacturing process as well as within the manufacturing environment. The solutions offered by bioMérieux are globally approved by AFNOR, AOAC OMA, and MicroVal and are also validated & approved by FSSAI.

**Product Description**

bioMérieux provides full microbiology laboratory automation (FMLA) solutions starting from automated media preparation & media dispensing systems, Sample preparation systems (such as the dilution & homogenizer system with capacity to process up to 375 g samples), Pathogen detection system (such as VIDAS & GENE-UP), Quality & hygiene indicators enumeration testing system (TEMPO), and confirmatory tests (such as API & VITEK). The solutions are validated and approved by AFNOR, AOAC, MicroVal, Health Canada, Australia, FSSAI, etc

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**BIOSYSTEMS DIAGNOSTICS PVT. LTD.** **A118**

Plot No. A4, Sipcot, Industrial Park
Irungattukottai Tamil Nadu - 602105,
Sriperumbhudur – 602105, India.
Tel: +91 07539906962
Email: food.beverages@biosystems.in
Website: www.biosystems.global

**Company Profile**

BioSystems Diagnostics Pvt. Ltd., a joint venture company marketing product of BioSystems S.A, Spain, a multinational company operating in 107 countries globally, developing and manufacturing Clinical chemistry, Food and Beverages, Instruments & Reagents for more than 30 years.

We provide a fast, high- sensitive, cost-effective and user friendly analytical systems of key substances in fish and seafood products.

With more than 10,000 satisfied users, our product quality and exceptional after-sales support Have earned widespread trust and credibility.

**Product Description**

BioSystems Diagnostics Pvt. Ltd. offers reliable testing solutions for the determination of Histamine, Sulfite, Ascorbic Acid, and Phosphate in food and beverage samples. These products are designed to support food safety, quality control, and regulatory compliance across various food matrices.

Manufactured under stringent quality standards, the assays provide accurate, precise, and reproducible results with user-friendly procedures, making them suitable for routine use in quality control, research, and regulatory laboratories.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**BISMI AQUATIC PRODUCTS** — **FISH MEAL PAVILION**

50/1, paandukudi road, Machur village,
Vattanam post, Thiruvadanai taluk ,
THONDI, TAMILNADU – 623409, INDIA
Tel: +91 7353365763
Email: bapdesk@gmail.com
Website: www.bismiaquaticproducts.com

**Company Profile**

Bismi Aquatic Products, established in 2009, is one of India's leading manufacturers of premium fish-based products for the aqua and animal feed industry. Located in Thondi, Ramanathapuram(Dt), our state-of-the-art integrated plant specializes in producing Steam Dried Fish Meal, Crude Fish Oil and Fish Soluble Paste for National and International markets.

Our mission is to provide high-quality, sustainable products that enhance nutrition in aquaculture and animal feed, while promoting responsible fishing practices and supporting local communities.

**Product Description**

Fish Meal: Fish meal is a coarse powder obtained from raw fish by cooking, pressing, drying the press cake and grinding. It is a concentrated source of protein, rich in the amino acid lysine and it is used as an ingredient in aquaculture, poultry and animal feed industries.

Crude Fish oil: Fish Oil is a light brown colored, viscous liquid, commonly used in various processes in chemical industries and for aqua-culture and animal feeds.

Fish Soluble Paste: Fish Soluble Paste is a pulpy, light brown / brown and semi viscous liquid.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**BITZER INDIA PVT LTD** **A101**

Office No – 604 & 605, 6Th Floor,
B – Wing, Powai Plaza Building,
Hiranandani Garden, Powai,
Mumbai – 400 076., Mumbai – 400076, India.
Tel: +91 09500005985
Email: karthik.m@bitzer.in
Website: www.bitzer.de

**Company Profile**

YOU CAN'T SEE OUR PRODUCTS ANYWHERE. BUT YOU CAN FEEL THEM EVERYWHERE.
Refrigeration and air conditioning technologies are key elements of our world. The BITZER Group has been making a contribution with innovative products and services for 90 years. Our products maintain the optimum temperatures on buses, trains and in buildings and ensure food stays fresh at all times on its way to you. Perfection and precision shape our operations – and efficiency and sustainability our way of thinking. With specialist skills and lots of passion, we promote development in compressor technology and, in this way, fulfil our responsibility as a market leader.

**Product Description**

AMMONIA COMPRESSOR PACKS:-
Developed especially for the refrigerant $NH_2$ screw compressor packs are tailored to the requirements of the industrial and commercial market. They are available with numerous options and accessories to meet the rising demand for highly efficient solutions with natural refrigerants.
Reliable refrigeration is a top priority in many industries. The flexible combination of compressor units in our Ammonia Compressor Packs (ACPs) supports redundant system concepts – for a reliable cooling supply and a significant reduction in downtime.
Whether for medium or low temperature applications, air conditioning or booster applications, BITZER Ammonia Compressor Packs (ACPs) are just as flexible as the requirements in industrial refrigeration.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**BLUE COLD REFRIGERATION PVT. LTD.** **B203**

C-37, 1St Main, 3Rd Cross,
Bommasandra Industrial Area,
Hosur Main Road,
Bangalore – 560099, India.
Tel: +919341980404
Email: sales@bluecoldref.com
Website: www.bluecoldref.com

**Company Profile**

Blue Cold Refrigeration is a trusted manufacturer of advanced refrigeration systems and heat exchangers, offering complete solutions for cold rooms, cold storage, blast freezers, blast chillers, and CA Chambers applications. We focus on delivering high-performance, energy-efficient, and long-lasting cooling systems.

We are dedicated to preserving freshness and ensuring quality across industries such as food processing, dairy, seafood, fruits, vegetables, and frozen foods. Every system is engineered to perform reliably, even under the toughest climatic conditions.

**Product Description**

Our product portfolio includes air-cooled and water-cooled condensing units, along with Ammonia and Freon-based heat exchangers for cold room and blast freezers. Each unit is precisely designed using advanced technology to achieve high thermal efficiency and durability.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**CITY UNION BANK LTD** **C302**

'Narayana', Administrative Office,
No. 24-B, Gandhi Nagar, Kumbakonam,
Kumbakonam, TAMIL NADU – India
Tel: +91 435 - 2402322
Email: customercare@cityunionbank.in
Website: www.cityunionbank.com

**Company Profile**

City Union Bank, the oldest private sector bank in India, was founded in 1904 and is headquartered in Kumbakonam, Tamil Nadu. With 828 branches and ~1697 ATMs, it has served the nation for over 120 years. CUB is known for its technology innovations such as Tap, pay & go payments, voice-based authentication, multilingual chatbots, and end-to-end digital loan processing, catering to both personal and business banking customers.

**Product Description**

City Union Bank offers a variety of products including Savings Accounts, Current Accounts, Deposits, NRI Services, Debit/Credit Cards, Home Loans, MSME Loans, Gold Loans, and Insurance, with tailor-made solutions to meet diverse customer needs.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**CLFMA OF INDIA** — **FISH MEAL PAVILION**

111, Mittal chambers,
Nariman point, Mumbai,
Maharashtra – 400021, India
Tel: +91 7304500176
Email: Ed@clfma.org
Website:

**Company Profile**

CLFMA was formed in June 1967 as The Compound Feed Manufacturers Association, CLFMA now has around 230+ members, including all sectors of the livestock industry.
CLFMA of India is the apex organization and the voice of the country's dynamic livestock sector. It currently has over 230 members representing diverse sub-sectors of animal protein value chain including feed manufacturing, poultry, dairy and aquaculture business, animal nutrition and health, veterinary services, machinery and equipment, processing, distribution and retailing of meat, and ancillary services such as banking.

**Product Description**

Livestock Association

---

**CORTLAND INTERNATIONAL** — **B210**

Technocraft House, 1St Floor
Plot No A-25, Road No 3,
Midc Industrial Estate,
Andheri East, Mumbai 400093,
Mumbai – 400093, India.
Tel: +91 9790202522
Email: spanicker@cortlandinternational.com
Website: www.cortlandinternational.com

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**
Cortland International (Tufropes) is a leading manufacturer and supplier of netting, ropes, twines, and customized solutions catering to Fishing, Aquaculture, Shipping, Sports, Agriculture, and heavy-lifting applications for Defense and Wind Energy. With over 30 years of experience in delivering tailored solutions, we serve a diverse customer base.

**Product Description**
Netting, Ropes & Twines for the Fishing sector and customized Cages for Marine & Freshwater Aquaculture, made from HDPE, HMPE & Nylon.

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**DHRUVX SOLUTIONS PVT LTD** **D401**

101, Vinayak House, Plot:2A,
Sector:19C, Vashi, Navi Mumbai,
Navi Mumbai – 400705, India.
Tel: +91 022 40138254
Email: director@dhruvxsolutions.com
Website: www.dhruvxsolutions.com

**Company Profile**
DhruvX Solutions is an Indian Private Limited company headquartered in Mumbai, founded in 2025. DhruvX Solutions specializes in providing turnkey solutions to customers, tailor made to meet the demanding needs of Customers. The company is committed to innovation and excellence. With a strong presence in the technology sector, DhruvX Solutions prides itself on its customer-centric approach and cutting-edge solutions.

Founders with a combined 80 Years of Industry experience are well positioned with a commitment to provide World class Customer experience.

DhruvX specialize in Data Loggers, Trackers, Online monitoring of Temperature & Humidity, full range of Dixell and Cooper Atkins products.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Product Description**
Data Loggers record the Intransit temp. of any export and domestic shipments and it is also used to record the temp. and humidity of cold storage as per the customer requirement. Where as Trackers gives the Real time visibility of data like location, temp, humidity.

Cooper-Atkins Range of products used to measure the measure the core temp. of frozen/cooked products. It has wide range of high accuracy thermometers. We have also have complete Lab Instruments for Seafoods Industries.

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**DUKE THOMSON'S INDIA PVT LTD** **A108**

Plot No: 403, Scheme No:78, Part - 1, Phase - 2,
Industrial Area, Mr-11, Dewas Naka-Niranjanpur,
Indore, M. P. 452010, Indore – 452010, India.
Tel: +91 7024219423
Email: info@duketoms.com
Website: www.duketoms.com

**Company Profile**
One stop Solution Centre for Food Processing Industries
With an experience of 20+ years, we take immense pride in being a one-stop solution for the food industry. Our mission is to bring cutting-edge technology to India and engage in innovation through partnerships with industry leaders. As a trusted supplier and technical service provider, we are here to bridge the divide between visionaries and end-users. We stand firmly as an ally on the path to achieve exceptional standards in food safety
and quality

**Product Description**
Rapid Food Diagnostic Kits, Hygiene Monitoring System, Speciality Ingredients, Professional food grade Cleaning Tools and Enzymatic Cleaning Solution.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**EPACK PREFAB TECHNOLOGIES LTD** **A106**

B 13&14. Ecotech 1St Extension,
Greater Noida – 201306, India.
Tel: +91 8800393918
Email: zeeshan.faizi@epack.in
Website: www.epack.in

**Company Profile**

EPACK Prefab Technologies Limited is India's leading manufacturer of Pre-Engineered Buildings (PEBs) and Insulated Sandwich Panels, with over 25 years of expertise in delivering cutting-edge prefabricated construction solutions.

Established in 1999 and ISO 9001:2015 and ISO 14001:2015 certified, we operate state-of-the-art manufacturing facilities across Andhra Pradesh, Uttar Pradesh and Rajasthan.

With a strong presence in Chennai and successful project deliveries across all 28 Indian states, we specialize in turnkey infrastructure solutions that combine speed, precision, and sustainability.

EPACK's energy-efficient building systems support seafood businesses in achieving their ESG objectives while reducing carbon footprints by up to 30% compared to conventional construction.

**Product Description**

EPACK delivers end-to-end cold storage and processing infrastructure engineered for the seafood industry's most demanding requirements. Our pre-engineered buildings offer robust, large-span layouts ideal for processing plants, blast freezers, and frozen warehouses, enabling up to 60% faster construction and quicker ROI. Temperature-controlled systems maintain stable conditions from –15°C to –40°C, ensuring export-grade preservation with minimal energy loss through high-performance insulation ($_2$ as low as 0.023 W/mK). Advanced insulated sandwich panels, including double-groove wall panels in 60–150 mm thicknesses with PIR, PUR, or Rockwool cores, deliver superior hygiene, airtightness, fire safety, and full FSSAI compliance.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**ESQUIRE MULTIPLAST PVT LTD** **B221**

Esquire Multiplast Pvt Ltd
Plot No. 63 Major Industrial Estate
South Kalamassery, Ernakulam,
Kerala, Ernakulam – 683104, India.
Tel: +91 09345014265
Email: sales@esquireplastics.com
Website: www.esquireworld.com

**Company Profile**

We are pleased to introduce ourselves as one of the major manufacturers of Plastic Molded CRATES, STACKING BINS & ROTO MOLDED PALLETS under the brand name of 'ESQUIRE'.

As far as Crates are concerned, we are directly supplying to Marine Products Exporters, Sea Food industries, Various Fish transporters, Hatcheries & processing industries, Milk Dairies Ice Cream Industries, Grocery suppliers, Fruit market agents, Various component manufacturing industries, Gherkin Exporters etc. We are having specialized crates for various packing & logistic purposes. We have started Manufacturing ROTO products also like PALLETS & Insulated ICE BOXES in the same perundurai facility,

**Product Description**

Quality of the products are given top priority and to ensure this we are using premium UV stabilized food grade raw material which can withstand both extreme climatic conditions along with long durability in rough handling situations also. Because we are using the right Raw Material combination the crate is also very good and all our customers are satisfied with the quality, Service & best price. Also, pl note ours is an ISO 9001.2015 company. We are having a plastic fabrication unit at Chennai /Perundurai

Our food industry customers are : Modern Foods, Chennai Foods, Wow memos, Sri Krishna Sweets, BG Naidu Sweets, Gupta Sweets, Elite Group, Britannia , Nanda Foods, Galla Foods, KR Bakers etc.

Our Pharma customers: Uniqu Biotech, CHEM INDIA, JODAS EXOIM, ALPHAMED, Bharat coats, Auro Lab.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**FISHERIES & ARD DEPARTMENT, GOVERNMENT OF ODISHA** **A114**

Magalabag, Cuttack,
Odisha – 753001, India
Tel: +91 8328926760, +91 9438412375
Email: ddfbwodisha@gmail.com,
director.odifish@gmail.com
Website: https://fisheries.odisha.gov.in/,
https://fard.odisha.gov.in

**Company Profile**

We are from Department of Fisheries & ARD Department, Government of Odisha eager to establish one stall for showcasing Departmental activities for promotion of Fisheries and Export from the State as well as attracting new entrepreneurs to invest in Odisha.

**Product Description**

We are dealing with service and Schemes for Fishers.

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**FISHERY SURVEY OF INDIA, CHENNAI** **A115**

Fishing Harbour Complex,
Royapuram, Chennai – 600013, India.
Tel: +91 04425976053
Email: matsyasagar@yahoo.co.in
Website: https://fsi.gov.in/

**Company Profile**

In the year 1946 Government of India established a pilot project known as Deep Sea Fishing Station with the objective of augmenting food supply trough development of deep-sea fishing. The project graduated to the status of a survey institute in the year 1974 and was named the Exploratory Fisheries Project. The Base Offices is located in al the maritime states. Exploratory fishing, charting of fishing grounds, training of fishing operatives and testing commercial

# EXHIBITORS' PROFILES

**Company** **Stall No.**

possibilities of deep-sea fishing were the programmes assigned to it. With the declaration of the Exclusive Economic Zone (EEZ) and consequent changes in priorities in marine fisheries development, It was reorganised and upgraded as a National Institute and rechristened as Fishery Survey of India (FSI).

---

**FISHERY NEWS** **A126**

4D, Myrah Avenue, Ayyappa Society,
Siddhi Vinayak Nagar, Madhapur.,
Hyderabad – 500081, India.
Tel: +91 7075527682
Email: info@fishery.news
Website: www.fishery.news

**Company Profile**

FisheryNews is a dedicated media and information platform serving India's fisheries and aquaculture sector. We deliver timely news, industry insights, policy updates, and ground-level stories that matter to fishers, farmers, entrepreneurs, and stakeholders across the value chain. Through digital media, regional language content, and industry engagement, FisheryNews aims to strengthen awareness, sustainability, and growth in India's blue economy.

**Product Description**

FisheryNews is a specialized digital media platform for aquaculture. We Provide news video reports, interviews, market trends and policy updates for fishers, farmers, seafood businesses and startups through multilingual content, strong social media reach, and sector-focused storytelling, FisheryNews helps brands, institutions, and industry players connect with a targeted fisheries audience while promoting awareness, sustainability, and innovation in the blue economy. Alongside our media platform, AquaNE Expo is FisheryNews flagship industry exhibition, bringing together farmers, fishers, technology providers, input suppliers, startups, and policymakers to enable networking product showcasing and Business collaborations for Sustainable Sector Growth.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**F-MAX SYSTEMS INDIA PRIVATE LIMITED** **A113**

D No 4/594 - 1 ,Onnipalayam Road,
Coimbatore – 641019, India.
Tel: +91 94437 03731 , 94896 08020
Email: ak@fmax.in , av@fmax.in , cr@fmax.in
Website: www.fmax.in

**Company Profile**

A giant in the commercial refrigeration sector, delivering innovative and customized refrigeration solutions designed to meet your exact needs. With over 25 years of excellence, we specialize in low-temperature applications such as Cold Storage, Blast Freezers, and Industrial Chillers. We also offer in-house manufactured PUF insulated panels, ensuring superior thermal efficiency, quality control, and seamless system integration. Our solutions cater to Fruits & Vegetables, Poultry, Meat & Seafood, Dairy, Ice Cream, Pharmaceuticals, and Chemicals, delivering reliable, energy-efficient, and sustainable cold chain solutions.

**Product Description**

Our refrigeration products are engineered for high performance, durability, and energy efficiency in demanding low-temperature applications. The range includes Cold Storage systems, Blast Freezers, Industrial Chillers, and customized process cooling solutions, complemented by in-house manufactured PUF insulated panels for walls, ceilings, and doors. Designed with advanced heat transfer technology, intelligent controls, and Eco-friendly refrigerants, our systems ensure uniform cooling, precise temperature control, reduced operating costs, and compliance with food, pharma, and industrial standards.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**FOUNDATION FOR AQUACULTURE INNOVATIONS AND TECHNOLOGY TRANSFER (FAITT)** **C321**

Flat No. G1, Ground Floor, P.No. 3,
Kumaran Kudil 4th Cross Street,
Okkiyam Thoraipakkam,
Chennai, Tamil Nadu – 600097, India
Tel: +91 7502717975
Email: gopimicro2010@gmail.com
Website: https://faitt.org/

**Company Profile**

Foundation for Aquaculture Innovations and Technology Transfer (FAITT) is a non-profit private Research and Development (R&D) Centre established in 2020. The purpose of the FAITT is to facilitate research and development and education and training across scientific disciplines, aqua farmers, technicians, stake holders and entrepreneurs.

**Product Description**

Technology Transfer and AquaFocus Magazine.

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**FRESH 'N' FROZEN MAGAZINE** **C318**

12, Rajiv Nagar, P.h.road,
Maduravoyal, Chennai – 600095, India.
Tel: +91-7010-9898-61/62/65
Email: info@freshnfrozen.info
Website: http://www.freshnfrozen.info

**Company Profile**

Published by BrandsMart Packaging Group, FreshnFrozen Magazine reaches a substantial readers of professionals within fresh & frozen food industries, including Seafood manufacturers, Veggie exporters, Bakery & Confectionery Producers, Processing Machinery, Equipment & Raw Materials Manufacturers, Dealers, Traders, and Service providers, across India.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

Our e-magazines and print editions are disseminated both domestically and internationally, offering industry participants current information on the latest advancements, trends, and innovations in these fields. The objective of this Bi-Monthly FreshnFrozen Magazine is to provide update for the whole frozen food and seafood sectors worldwide.

**Product Description**
Industry Magazine.

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**GFFCO GLOBAL PRIVATE LIMITED** **A104**

Sf No 40/1B, Lmw Annur Road,
Pothiyampalayam,
Coimbatore – 641407, India.
Tel: +91-9360467202
Email: anupa@gffcoglobal.com
Website: www.kovaibsf.com

**Company Profile**
KovaiBSF is a leading Indian producer of Black Soldier Fly Larvae (BSFL), specializing in BSFL based products for aquafeed and pet feeds.

**Product Description**
BSFL Meal: Defatted powder with 50-54% protein for aqua, poultry, and pet feed formulations; 10% supplement or 10-40% protein source; 45kg packs.

BSFL Oil: High-energy oil extracted for feed enhancement; 1-2% supplement based on formulation; 35kg barrels and 200kg barrels.

Bio Fertilizer - Insect Frass based bio-fertilizer.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**GLOBAL MARINE EXPORTS** — **FISH MEAL PAVILION**

G-2, TALOJA MIDC IND AREA,
PANVEL, RAIGAD,
MAHARASHTRA – 410208, India
Tel: +91 9820092113
Email: mailglobalmarine@gmail.com
Website: https://globalmarineexports.com

**Company Profile**

Global Marine Exports is a trusted name in the export of high-quality marine products. Established in 2014, the company has built a strong reputation for reliability, consistency, and excellence in serving international markets. Based in Taloja, Maharashtra, India, we specialize in delivering premium marine goods that meet global standards.

**Product Description**

Global Marine Exports specializes in the export of premium marine and seafood products e.g. Fish Meal & Fish Oil Manufactured & Sourced from trusted suppliers and processed under strict quality standards. Our products are carefully handled to preserve freshness, taste, and nutritional value, meeting international food safety regulations.

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**HAMEED MARINE PRIVATE LIMITED** — **FISH MEAL PAVILION**

Door No:27/1, Razak road,
Edalakudy, Kottar,
Nagercoil, Kanya kumari District,
Tamil Nadu – 629002, India
Tel: +91 9080824906
Email: officehameedmarine@gmail.com
Website: www.hameedmarine.com

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**

Hameed Marine Pvt Ltd, Fish meal and Fish Oil Company founded by Haji.M.Shahul Hameed M.Com with 40 years of experience, immense knowledge & expertise in fish meal, fish oil and fish soluble. We produce steam sterilized fish meal, fish oil and fish soluble from our modern and fully mechanized plant situated in Radhapuram, Tamilnadu.

We are committed to quality and our experts ensure the quality and reliability of our products. The manufacturing is done under extremely hygienic conditions and the supervision of thoroughly trained Quality Management team and all our products are scientifically tested and manufactured. The company's mission is to transform the success on large scale and touch base across the globe.

**Product Description**

FISH MEAL

We have earned a huge reputation as Steam Dried Fish Meal Manufacturers. Due to its high protein content and superior quality, our Steam dried fish meal is widely accepted by large numberof clients. We have in store for our clients an extensive assortment of quality fish meal that are hygienically processed and packed.

FISH OIL

Fish oil is oil derived from the tissues of oily fish.. It serves as natural remedy for health problems and needless to say it has an important application in the animal feed industry (mainly aquaculture and poultry), where it is known to enhance growth, feed conversion rate. (FCR).

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**ICAR-CENTRAL INSTITUTE OF FISHERIES TECHNOLOGY, KOCHI** **A120**

Wellington island, Matsyapuri P.O,
Kochi 682 029, Kochi,
Kerala – 682 029, India
Tel: +91 0484-2412300
Email: procift@gmail.com
Website: www.cift.res.in

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**

The ICAR–Central Institute of Fisheries Technology (ICAR-CIFT), Kochi, is a premier research institute under the Indian Council of Agricultural Research (ICAR), Government of India. Established in 1957, ICAR-CIFT focuses on the development of innovative technologies for harvest and post-harvest fisheries, fish processing, value addition, quality assurance, packaging, and waste utilization. The institute plays a vital role in enhancing fishers income, reducing post-harvest losses, promoting food safety, and supporting sustainable fisheries. Through research, training, and technology transfer, ICAR-CIFT significantly contributes to entrepreneurship development, livelihood security, and the growth of India's fisheries and allied sectors.

**Product Description**

ICAR-CIFT has developed a wide range of products and technologies for fisheries value addition and sustainability. Key products include fish cutlets, fingers, burgers, sausages, balls, wafers, pickles, prawn chutney, butterfly shrimp, and extruded snacks (Fish Kure), which enhance market value and consumer acceptance. Processing technologies include solar and hybrid fish dryers, solar tunnel dryers, descaling machines, insulated fish boxes, refrigerated fish vending kiosks, and cold chain solutions. The institute also promotes by-products such as fish silage, protein hydrolysates, chitin, chitosan, fish calcium, collagen, gelatin, and organic manure from fish waste, supporting circular economy and entrepreneurship.

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**ICAR-CENTRAL MARINE FISHERIES RESEARCH INSTITUTE** **C308**

ICAR-CMFRI Madras Regional Station,
75 Santhome high road, R A Puram,
Chennai, Tamil Nadu – 600028, India
Tel: +91 9446804213
Email: director.cmfri@icar.org.in
Website: www.cmfri.org.in

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**
The ICAR-Central Marine Fisheries Research Institute was established by Government of India on February 3rd 1947 under the Ministry of Agriculture and Farmers Welfare and later it joined the ICAR family in 1967. During the course of over 78 years the Institute has emerged as a leading tropical marine fisheries research institute in the world.

**Product Description**
Technology related to Sustainable fisheries, Mariculture, Consultancy services, Marine fisheries policy guidelines

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**I-TECH MEDIA PVT.LTD (THERMAL CONTROL BUSINESS UPDATE)** **C316**
Surya House, 410, Road Nos -7,
Near Railway Station, Vidyavihar East,
Mumbai, Maharashtra- 400077,
Mumbai – 400077, India.
Tel: +91 09326507269
Email: itmbarter@gmail.com
Website: www.i-techmedia.com

**Company Profile**
Thermal Control Update is a specialized media platform and blogzine serving the HVAC&R industry. It provides authoritative coverage of emerging trends, advanced technologies, and market developments across heating, ventilation, air-conditioning, and refrigeration. The platform is a trusted information source for MEP contractors, HVAC professionals, engineers, manufacturers, EPC companies, architects, and government bodies. With strong print circulation and extensive digital outreach through newsletters, e-broadcasts, mobile apps, Magzter, and social media, Thermal Control Update ensures wide industry engagement and global recognition.

**Product Description**
Thermal Control Update offers comprehensive industry intelligence for the HVAC&R sector through high-quality print and digital media solutions. Its products include a monthly magazine, digital

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

editions, newsletters, e-broadcasts, mobile app access, and curated online content. Designed to inform, educate, and connect industry stakeholders, the platform highlights innovative technologies, product launches, policy updates, and market trends. Thermal Control Update enables brands to effectively reach MEP consultants, engineers, contractors, manufacturers, and decision-makers, making it a trusted communication and marketing platform for the global HVAC&R community.

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**ICEBATTERY PVT LTD** **B215**

C-214, Urbtech Trade Center,
Sector 132, Noida – 201301, India.
Tel: +91 9167392148
Email: kspraveen@icebattery.jp
Website: https://icebattery.jp/

**Company Profile**

IceBattery Pvt Ltd represents Innovation Thru Energy, a Japan-based company offering patented technology that maintains significantly extended constant temperature durations without the use of dry ice or active power. This technology is particularly crucial for food, agri, fisheries and pharma industries, where strict temperature management is essential. The IceBattery is reusable, non-toxic, and adaptable across transport, storage, and retail sectors. Our focus areas include:
-Green cold chain logistics for pharmaceuticals and vaccines (GDP/GMP
compliant)
-Sustainable food supply and preservation for agriculture and fisheries
-Energy-efficient transport and storage for rural and emerging markets

**Product Description**

The IceBattery Hybrid Truck is a green energy cold chain logistics solution featuring patented technology that operates in Hybrid, Active, and IceBattery modes. This product offers several benefits, including:
Saving diesel and operational costs, Preventing compressor failures
Eliminating hot air emissions from the compressor

# EXHIBITORS' PROFILES

**Company** **Stall No.**

As a result, it provides a truly green cold chain solution, reducing CO2 emissions by 50-70%. The Icebattery hybrid mode can function anywhere between 48-72 hours without active use of compressors and maintains the quality all throughout its journey. the duration can be further increased by intermittent charging whenever the drivers are resting during the transit.

**INDIAN MARINE INGREDIENTS ASSOCIATION** **B209**

207 2Nd Floor
Royal Corner Bulding Mission Road,
Bangalore – 560027, India.
Tel: +919341228350
Email: president@imia.co.in
Website: imia.co.in

**Company Profile**

IMIA

IMIA originated from the collective efforts of Indian fishmeal producers coming together to establish an association. We firmly believe in the power of collaboration as a cornerstone of success. Thus, we unite stakeholders from various segments of the fisheries sector, including fishers, feed producers, seafood processors, researchers, fisheries institutes, scientists, and policymakers, onto a single platform. Our primary objective is to address the existing gaps in our national fisheries policy while also championing the significant advantages offered by the fishmeal industry. This industry has often faced misconceptions and unwarranted interference from other sectors, and our aim is to rectify this situation. We are committed to creating a level playing field for all participants,

**Product Description**

Fisheries Improvement Program
Responsible sourcing
Waste To Wealth (Inland Fisheries waste management.
Fair Trade Practices,
Traceability

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

Fish Meal / Fish Oil
value addition

**INFOFISH** **B219**

1St Floor, Wisma Lkim, Jalan Desaria,
Pulau Meranti, 47120 Puchong, Puchong,
Selangor, Malaysia, Puchong – 47120,
Malaysia.
Tel: (603) 80668112
Email: info@infofish.org
Website: https://v4.infofish.org/

**Company Profile**

INFOFISH is an intergovernmental organization established by FAO in 1981, Headquartered in Kuala Lumpur, Malaysia, and hosted by the Government of Malaysia since its inception. Serving nine (9) Member States across the Asia-Pacific region, INFOFISH works with governments, industry, and partners to strengthen fisheries and aquaculture value chains, enhance market access, promote responsible practices, and build institutional and industry capacity. Operating at the intersection of markets, policy, And industry practice, INFOFISH adopts an integrated approach combining market intelligence, technical advisory services, publications, training, and industry platforms to strengthen export performance, resilient value chains, and inclusive blue economy development.

**Product Description**

INFOFISH provides integrated services that support fisheries and aquaculture development across the Asia-Pacific region. Its core services include market and trade intelligence, export and market access support, technical advisory services for value chain strengthening, food safety and trade compliance, and policy and regulatory readiness. INFOFISH also promotes sustainability, traceability, and responsible practices; delivers capacity building through training and knowledge exchange; produces trusted publications; and organises industry platforms and trade conferences to connect governments, industry, and global stakeholders.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**INITIATIVE ENGINEERING** **A112**

Sr. No. 273, Near Vitthal Mandir,
Bhatewara Nagar, Hinjawadi, Pune,
Pimpri-Chinchwad, Maharashtra 411057,
India, Pune – 411057, India.
Tel: +91 788 788 9448
Email: pernesh@initiativeengineering.com
Website:

**Company Profile**

Since 1990, Initiative Engineering has been a leader in water treatment solutions, proudly serving the Indian market with innovative, high-quality products. Starting as a humble business in a Pune residential neighborhood, we've grown into a trusted name in the water treatment industry.

We have earned the trust of the water treatment industry through our unwavering focus on quality and prompt service. Our extensive dealer network across the country ensures customers receive excellent support, no matter their location.

Our commitment extends beyond manufacturing. We continuously innovate and implement improvement programs, prioritizing customer satisfaction. Each product undergoes 100% inspection to guarantee optimal performance, ease of installation, and extended service life.

**Product Description**

Dosamatic - India's first non-electric proportional doser, utilizing water pressure for accurate chemical dosing.
Manual Multiport Valves - Replacing multiple steel valves with single efficient units for filters, softeners, and demineralizers.
Dazzle- Nicheless underwater lights for pool and water applications
Edose Range - Our highly popular metering pumps, known for reliability and precision.
Customised Dosing Systems - Including Edose Neutra, Edose Chloro, Chill series for cooling tower chemical dosing systems, and Optitherm boiler dosing systems. Pooldose.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**JENEFA INDIA** — **FISH MEAL PAVILION**

SY.NO.764/1,2,3,
VADAKKU KARACHERI VILLAGE,
SRIVAIKUNDAM, TUTICORIN,
TAMIL NADU – 628601, INDIA
Tel: +91 9384012036
Email: admin@jenefaindia.com
Website: www.jenefaindia.com

**Company Profile**

M/s JENEFA INDIA, established in 2018, is engaged in the manufacture and marketing of steam-dried fish meal and fish oil for domestic and international markets. The company is a proprietorship led by Mr. R. Venkatesh and operates a state-of-the-art manufacturing facility at Thoothukudi. Equipped with modern technology, the plant complies with stringent quality standards set by regulatory authorities and buyers. Renowned for consistent product quality and timely fulfillment of commitments, JENEFA INDIA has earned a strong reputation in the industry. The company aims to become a leading producer and supplier of premium-quality fish meal & fish oil in India.

**Product Description**

Steam dried fish meal & Fish oil is for Animal Feed, Pet food, Aqua culture feed industry. Steam dried fish meal contains High quality Proteins & Fish oil contains Good quantity of Omega3 fatty acids.

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**JITAL SOLUTION PVT LTD** — **A124**

75/2 Happy villa colony Dhar, Indore,
Madhya Pradesh – 454001, India
Tel: +91 8860579605
Email: Sales@jitalsolution.com
Website: www. jitalsolution.com

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**

At JITAL SOLUTION, We Harness The Power Of Black Soldier Fly Larvae (BSFL) Technology To Tackle Two Of The World's Most Pressing Challenges: Food Waste And Protein Shortages. Our Innovative Approach Transforms Organic Waste Into High-Quality, Protein-Rich Animal Feed And Organic Fertilizer Paving The Way For A Circular Economy That Is Sustainable, Profitable, And Future-Ready.

**Product Description**

"BSFL-based Insect Protein / Feed / Fertilizer (e.g. "BSFL Meal / Oil / Frass")
Category: Alternative Protein Feed & Organic Fertilizer — Insect-Protein / Waste-to-Value / Circular-Economy Agricultural Inputs
Target Market: Poultry farms, aquaculture (fish/shrimp) farms, livestock/pig farms, pet-food manufacturers, organic agriculture (fertilizer users), waste-management agencies / organic-waste generators.

Primary Use Cases:

- Replacement/substitute for conventional protein feed (fishmeal, soybean meal) in poultry, aquaculture, livestock, pet food.
- Organic fertilizer / soil amendment using frass (larvae excreta / residual waste) for crop or horticulture use.
- Waste-management: converting organic waste (food waste,) into valuable protein."

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**KTI PLERSCH INDIA PVT LTD** **A102**

No. 46, Wilson Garden.
Bangalore South,
Bangalore – 560027, India.
Tel: +91 9900080579
Email: prasad@kti-india.com
Website: www.kti-plersch.com

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**

**KTI-Plersch India Pvt Ltd** is a leading provider of advanced cooling and refrigeration solutions for industrial applications. Specializing in ice-making systems such as Plate Ice Machines, KTI ensures reliable cold chain support for seafood, aquaculture, and food processing industries. With German engineering excellence and a strong presence in India, KTI delivers energy-efficient, high-performance systems tailored to customer needs. Our commitment to innovation and quality makes us a trusted partner for sustainable cold chain technology.

**Product Description**

KTI-Plersch offers advanced ice-making and refrigeration systems designed for industrial applications. Our flagship Plate Ice Machines produce high-quality, flat ice ideal for seafood processing, aquaculture, and cold chain operations. Built with German engineering precision, KTI products ensure energy efficiency, durability, and consistent performance in demanding environments. From ice plants to complete cooling solutions, we deliver technology that supports freshness, safety, and sustainability across the food and marine industries.

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**MARINE PRODUCTS EXPORT DEVELOPMENT AUTHORITY (MPEDA)** **A123**

167, Eco Park, Chetpet, Poonamallee High Rd,
Kilpauk, Chennai, Tamil Nadu - 600010, India
Tel: +91 9500449179
Email: ro.che@mpeda.gov.in
Website: https://mpeda.gov.in/

**Company Profile**

The Marine Products Export Development Authority (MPEDA) was set up by an act of Parliament during 1972. The erstwhile Marine Products Export Promotion Council established by the Government of India in September 1961 was converged in to MPEDA on 24th August 1972. MPEDA is given the mandate to promote the marine products industry with special reference to exports from the country. It is envisaged that this organization would take all actions to develop and augment the resources required for promoting the exports of "all varieties of fishery products known commercially as shrimp, prawn, lobster, crab, fish, shell-fish, other aquatic animals or plants or part thereof and any

# EXHIBITORS' PROFILES

**Company** **Stall No.**

other products which the authority may, by notification in the Gazette of India.

**Product Description**
Chilled, Frozen and Value added seafood Products

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**METTLER-TOLEDO INDIA PVT. LTD** **B204**
1, Amar Hill, Saki Vihar Road, Powai,
Mumbai Suburban, Maharashtra,
Mumbai – 400072, India.
Tel: +91 07506744792
Email: tejasvi.sawant@mt.com
Website: www.mt.com

**Company Profile**
METTLER TOLEDO is a leading global supplier of precision instruments and services. We have strong leadership positions in all of our businesses and believe we hold global number-one market positions in most of them.

We are recognized as an innovation leader and our solutions are critical in key R&D, quality control, and manufacturing processes for customers in a wide range of industries including life sciences, food, and chemicals.

**Product Description**
Proven product inspection solutions from METTLER TOLEDO help you inspect every product with confidence to support manufacturing quality across food, pharmaceutical, and other industries. Our advanced inline inspection systems help you meet safety and quality standards, so you can protect your brand, profits, and productivity, and comply easily with industry requirements. Our extensive portfolio includes checkweighers, metal detection, x-ray inspection, vision inspection, and combination systems, complemented by our quality inspection and monitoring software which collects data for productivity and efficiency gains analysis.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
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**MULTIVAC LARAON INDIA** **C311**

Sp5 245 , Riico Industrial Area,
Ghiloth – 301706, India.
Tel: +91 09873577300
Email: ruchi.juneja@multivac.co.in
Website: https://multivac.com/in/en

**Company Profile**

MULTIVAC is a solution provider and technology partner. We support customers around the world with our comprehensive range of products and services. From smaller-scale, artisan producers to large global corporations. In virtually all sectors of activity. From food to medical and pharmaceutical products and all the way through to consumer and industrial goods of all types.
The very diverse range of products offered by the globally-operating MULTIVAC Group encompasses an extensive range of packaging technologies, handling and automation solutions, labelling and marking equipment, inspection systems and quality control systems, as well as, of course, packaging materials. Our vast product portfolio is ideally complemented by needs-based solutions, which meet the widest range of processing and

**Product Description**

From food to medical and pharmaceutical products and all the way through to all types of consumer and industrial goods, the MULTIVAC Group offers complete solutions for the packaging and processing. Multivac will be displaying and showcasing Express machine for the same. It supports various packaging modes, including top seal, Modified Atmosphere Packaging (MAP), and Skin technology (vacuum skin packaging). Ideal for packing fresh meat, deli items, cheese, pasta, fruits, vegetables, and ready meals. Known for its small footprint, high-performance vacuum circuit, and ability to handle quick product/format changes.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**NANDINI GEARS** **B207**
1A,Mahalakshmi Nagar,
Neelikonampalayam,
Coimbatore – 641033, India.
Tel: +91 9842243447
Email: info@nandinigears.com
Website: www.nandinigears.com

**Company Profile**
We would like to introduce ourselves as one of the Leading Manufactures of Aerators, Aerator Parts such as Floats, Paddle Fans, Aquaculture Equipment.

Nandini Gears is a well Known Brand names in Aquaculture & Domestic Market.

We are in Standard Gearbox manufacture from Coimbatore. We are in this field for nearly Two Decades. We Design, manufacture and sell advanced Engineering solutions for Aquaculture market Power transmissions.

We are committed to Provide Premium Quality products at affordable price, our significant factor is perseverance by our R&D Team on the continuous development according the market requirements. We looking forward to work with you to offer the world Quality Gear boxes at very competitive Prices.

**Product Description**
PADDLE WHEEL AERATOR

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**NATIONAL COOPERATIVE EXPORTS LIMITED** **C322**
New Delhi, India, Delhi – 110029, India.
Tel: +91 7428537548
Email: nodal@ncel.coop
Website: ncel.coop

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**
National Cooperative Exports Limited (NCEL) – India's apex cooperative export body, established with the support of the Government of India and jointly promoted by leading institutions such as AMUL, IFFCO, KRIBHCO, NAFED, and NCDC. NCEL operates under the Ministry of Cooperation, Government of India, reflecting our mission to strengthen the cooperative movement and enhance India's export capabilities.

**Product Description**
Shrimp:
Vannamei
Black Tiger

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**NATIONAL FISHERIES DEVELOPMENT BOARD (NFDB)** **B212**

NFDB, Fish Building, Pillar No. 235,
PVNR Expressway, SVPNPA Post,
Rajendranagar, Hyderabad,
Telangana – 500052, India
Tel: +91 6305687947
Email: cenfdb@gmail.com
Website:

**Company Profile**
The National Fisheries Development Board (NFDB) was established in 2006 at Hyderabad as an autonomous organization and works under the aegis of Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India. The Board focus on the holistic development of the fisheries sector through professional management of fisheries and aquaculture activities, sustainable conservation of aquatic resources, development of post-harvest infrastructure thus ascertaining nutritional security.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

NFDB implements major fisheries schemes that include PMMSY, FIDF, PM-MKSSY, NSPAAD, GAIS, Aqua Crop Insurance, Cooperatives, CRCFV, Entrepreneur Development, Certification and Traceability, Training, Awareness, Exposure and Capacity Building, Outreach and Publicity Campaigns

**Product Description**
Government Organization.

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**OCEAN COLD TECHNOLOGIES** **A122**

No.64 B,Kuberan Nagar Extension,
3 Rd Street,Madipakkam.
Chennai – 600091, India.
Tel: +91 9445148686
Email: siva@oceancoldtech.com
Website: www.oceancoldtech.com

**Company Profile**
Established in 2011, Ocean Cold Technologies is a premier manufacturer and service provider specializing in advanced refrigeration solutions. Under the leadership of Mr. Siva Settu, we deliver high-quality cold storage rooms, ice machines, and commercial cooling systems.
Driven by a client-centric philosophy, we prioritize quality and affordability, ensuring our durable products meet rigorous industry standards. Our success stems from a sophisticated infrastructure and a dedicated team of experts committed to timely delivery. We pride ourselves on building lasting relationships by consistently exceeding customer expectations with efficient, technology-driven cooling solutions and reliable professional support.

**Product Description**
Cold Storage,Refrigeration Unit,Blast Freezer,Blast Chiller,PUF/PIR Panel and Door,Ripening Chamber,Saffron Cultivation Room,Block Ice Machine,Flake Ice Machine,Plate Ice Machine,Industrial Process Chiller,Slurry Ice Machine and Tube Ice Machine.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**RESEARCH AND EDUCATION FOR ENVIRONMENTAL FOUNDATION(REEF)** **C304**

Mcc Mrf Innovation Park,
Madras Christian College,
Chennai – 600059, India.
Tel: +91 6383033935
Email: reefedu2024@gmail.com
Website: www.reefeducation.org

**Company Profile**

Research and Education for Environmental Foundation (REEF) is a non-profit organization promoting marine, coastal, and environmental sustainability through research, education, and community engagement. REEF works with fishers, students, scientists, and institutions to support responsible fisheries, biodiversity conservation, climate resilience, and blue economy initiatives. Its activities include field-based research, skill-development internships, conservation training, policy outreach, and public awareness across coastal ecosystems such as Pulicat and India's southeast coast. At the World Sea Food Congress, REEF highlights community-linked science and sustainable seafood practices that connect traditional knowledge with modern marine research for a resilient ocean future.

**Product Description**

REEF Traditional Seafood Products – Pulicat Exclusive
REEF offers traditional seafood products exclusively sourced from Pulicat and produced by women entrepreneurs of the REEF Self Help Group. Responsibly harvested and carefully processed, these products reflect authentic coastal flavors, high nutritional value, and ethical sourcing. Women-led processing follows hygienic practices and quality standards while preserving traditional knowledge. This initiative empowers coastal women, supports sustainable livelihoods, and promotes responsible seafood systems, delivering trusted, community-made seafood products that respect both people and the marine environment.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**SEQLO BY DSS IMAGETECH** **B220**

A5, Mohan Cooperative Industrial Estate,
Mathura Road, New Delhi – 110044, India.
Tel: +91 8448081331
Email: rajesh.bhoge@dssimage.com
Website: www.seqlo.com

**Company Profile**

Seqlo is a distinguished provider of real-time PCR-based solutions, trusted across diverse industries including food and beverage manufacturing, dairy production, cosmetics, seafood export, and other sectors requiring precise, reliable molecular diagnostics.. Our offerings encompass testing kits designed for species identification, pathogen detection, food allergen detection, and GMO identification to ensure food safety and quality. We prioritize trust, accuracy, reliability, and safety in our products, ultimately contributing to the promotion of high-quality food and the well-being of consumers. In addressing the imperative need for contamination assessment in food and GMO identification, we offer cost-effective and time-efficient solutions suitable for rapid analysis in the Indian an

**Product Description**

Food allergies are a growing public health concern. These trigger severe adverse allergic reactions ranging from mild to severe and may pose serious risks to particularly children and adults with allergies. Allergen detection refers to the process of identifying and measuring the presence of allergenic substances in food or other samples. Most common food allergens include gluten, peanuts, tree nuts, milk, eggs, soya, seafood etc. Accurate detection of allergens is essential for ensuring food safety and quality control before distribution & packaging. Food industries must have reliable and sensitive methods to detect and quantify allergens in food products as this allows proper labeling, ensures that consumers with food allergies can make informed choices, and avoids potential health risk.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**SGS INDIA PRIVATE LIMITED** **A103**

28B/1, 28B/2, 2Nd Main Road,
Ambattur Industrial Estate,
Chennai – 600058, India.
Tel: +91 044 6608 1600
Email: rajagopalen.cr@sgs.com
Website: www.sgs.com/en-in

**Company Profile**

SGS is the world's leading Testing, Inspection and Certification company. We operate a network of over 2,500 laboratories and business facilities across 115 countries, supported by a team of 99,500 dedicated professionals. With over 145 years of service excellence, we combine the precision and accuracy that define Swiss companies to help organizations achieve the highest standards of quality, compliance and sustainability.

Our brand promise – when you need to be sure – underscores our commitment to trust, integrity and reliability, enabling businesses to thrive with confidence. We deliver independent results tailored to the precise needs of each industry or sector.

**Product Description**

We deliver advanced analytical testing solutions to validate the safety, quality and authenticity of seafood, including microbiological testing for pathogens and indicators, nutritional and compositional analysis, contaminant and allergen testing, integrity and authenticity verification and testing against third-party standards. Our global inspection network conducts organoleptic and physical assessments, production audits, container inspections and fishing vessel catch verifications. We also provide comprehensive certification and assurance services across the seafood supply chain, from HACCP and GFSI-recognized schemes to industry benchmarking programs such as GSA Best Aquaculture Practices, MSC Chain of Custody, ASC and GLOBALG.A.P. Aquaculture.

# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**SHIVA ANALYTICALS (INDIA) PRIVATE LIMITED** **A116**

Plot No: 24D(P) & 34D,
Kiadb Industrial Area,
Hoskote, Bangalore – 562114, India.
Tel: +91 9980097322
Email: rajnish.s@shivaanalyticals.com
Website: www.shivaanalyticals.com

**Company Profile**

Founded in 1997, Shiva Analyticals is one of the foremost analytical testing labs in India, providing solutions across diverse industries, such as Pharmaceuticals, Food & Agri, Ores & Minerals, Petroleum, Environmental and Material testing.

**Product Description**

Our Range of Testing Includes and are not limited to:
Antibiotic Residues
Chloramphenicol
Florfenicol
Nitrofuran Metabolites
Antibacterial Contaminants
Fluoroquinolones / Quinolones
Tetracyclines
Sulfonamides
Dyes (Triphenylmethane Dyes)
Crystal Violet
Leuco Cyrstal Violet
Leucomalachite Green
Malachite Green
Mycotoxins
Aflatoxins (B1,B2,G1 & G2)
Aflatoxin M1
Ochratoxin A
Biological Contaminants

# EXHIBITORS' PROFILES

| Company | Stall No. |
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Total Bacterial count(TBC),
Yeast & Moulds, Total Coliform count.
Escherichia coli, Thermotolerant coliforms or faecal coliforms
Staphylococcus aureus, Salmonella,
Listeria Monocytogenes,
Enterobacteriaceae, Vibrio cholera,
Vibrio parahaemolyticus,
Vibrio vulnificus
Other Services
Tests for Shelf-Life Studies
Tests for Nutritional Labelling
Ice and Water testing for Chemical and Biological

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**SK AQUA & AGRICULTURE** — **S3**

St Antonys School, No 2/43,
Periyapalli St, Trustpakkam,
Mandaveli, Chennai,
Tamil Nadu – 600028, India
Tel: +91 9940252803
Email: planktonplustk@gmail.com

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**SM FISHMEAL AND OIL CO.,** — **FISH MEAL PAVILION**

No. 207 2nd Floor
Royal Corner Building Mission Road,
Bangalore, Karnataka – 560025, India
Tel: +91 9341228350
Email: Sait.md@smgroupind.com
Website: www.smgroupind.com

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**
Founded in 2005 by promoters with over 40 years of experience in the fish industry
- Manufacturers and exporters of steam sterilized fish meal, fish oil, frozen fish and marine products
- Production capacity: 1000MTS per day from stagically locate processing of Sardin Fish
- ISO 9001:2008, EIA, MPEDA, HACCP, GMP+

**Product Description**
Main Products:
1. Fish Meal (Steam sterilized)
2. Fish Oil (Crude and refined)
3. Fish Solubles
4. Tiny Shrimp/Jawala Fish Meal
5. Fish Soluble Paste
6. Frozen Fish
7. Additional products: Fish fertilizer, Fish emulsion, Cod liver oil, Shark liver oil

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**SOUTHERN REFRIGERATION SYSTEMS PVT LTD** **A121**
Plot No: 78, 1St Floor, V.v Koil Street,
Thiruvalleswarar Nagar, Anna Nagar West,
Chennai, Chennai – 600040, India.
Tel: +91 9280093732
Email: engineers@southernrefrigeration.co.in
Website: www.southernrefrigeration.co.in

**Company Profile**
Southern Refrigeration Systems Pvt. Ltd. has 16+ years of proven experience and expertise in delivering complete turnkey refrigeration solutions for Seafood Processing Plants.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Product Description**
Our solutions are designed to meet stringent seafood quality standards, ensuring product freshness, hygiene, energy efficiency, and operational reliability. We provide end-to-end services covering design, engineering, supply, installation, commissioning, and after-sales support.

**Our Product Range Includes:**
Frozen Storage Rooms (–18°C to –25°C)
Blast Freezers
IQF Systems
Plate Freezers
Ice Machines (Flake / Tube / Block)
Chilled & Process Water Chillers
Ammonia & Freon-based Refrigeration Systems
Pre-Fabricated PUF Insulated Panels
Insulated Doors
**Key Features:**
Customized design as per plant capacity and process flow
Reliable performance with low operating cost
Energy-optimized system configuration
Compliance with seafood export and food safety standards
Single-point responsibility.

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**SUNBEAM GENERATORS PVT LTD** **A111**
R.s.no. 139/1,2,3 & 142/2,
Sedarpet Main Road,
Ramanathapuram Village,
Villianur Commune,
Puducherry – 605502, India.
Tel: +91 9344914213
Email: john@sunbeampower.com
Website: www.sunbeampower.com

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Company Profile**

SUNBEAM GENERATORS PRIVATE LIMITED, a manufacturing organisation certifi ed to ISO 9001:2015, ISO 14001 and OHSAS 45001, was established in the year 2002. Apart from being a market leader in the design, manufacture and supply of class-leading Diesel Gensets, Sunbeam is also into the infrastructure business, specializing in the manufacture, supply and servicing of Concrete Mixers, Batching Plants, Concrete Pumps, and other products like Isothermal Containers, along with its one-stop manufacturing solutions (METAL 1).

**Product Description**

At Sunbeam, we manufacture Isothermal light weight containers with GRP & XPS sandwich panelsvwith world class process machinery and production techniques. In collaboration with European market leader Frigos Europe, an Italian firm having over 3 decades of expertise in manufacturing Insulated containers. Salient features are European Technology, Branded materials, Light in Weight, Special Grade XPS material, Jointless Panels, Rust free proven and reliable brand.

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**TAMIL NADU FISHERIES DEVELOPMENT CORPORATION LTD (TNFDC)** **C323**

4th Floor, Integrated Animal Husbandry and Fisheries Building,
Nandanam, Chennai, Tamil Nadu – 600035, India
Tel: 044-24364901
Email: tnfdcho@gmail.com
Website: www.tnfdc.in

**Company Profile**

Established in 1974, Tamil Nadu Fisheries Development Corporation Limited (TNFDC) is a state owned Public Sector undertaking with an authorized share capital of Rs 5 crore and paid up share capital of Rs. 4.45 crore. The annual turnover of the corporation is more than Rs 450 Crores The corporation is continuously earning profit from the year 2005-06 onwards through its business activities such as reservoir fisheries management, marketing of fish and fishery products, fish processing, supply of diesel/kerosene to fishermen and ornamental fish culture activities. The Corporation is continuously paying dividend to the state government from the year 2012-13 and has paid Rs.2.50 crore as

# EXHIBITORS' PROFILES

**Company** **Stall No.**

dividend for 2023-24 to the state govt. during 2023-24, TNFDC has earned a net profit of Rs.12.86 crores. TNFDC also owns Chetpet Ecopark at the heart of the Chennai city. It attracts tourists for Boating. It has state of the art Augmented Reality/Virtual Reality rooms where visitors can view and enjoy AR/VR multimedia works. The corporation has well established network in Marketing of Fish and Fishery products. There is a vast scope for Private investment in the Fisheries sector. Private companies & TNFDC can sign Joint ventures in the field of Fish Processing and Aquaculture.

**Product Description**
Fish Marketing - Fish Stalls, online Sales and Mobile restaurants
Reservoir Fisheries Management
Fish Seed Production
Centralized Kitchen
Chetpet Eco Park
Supply of Subsidised Diesel / Kerosene to Fishermen
Production and Marketing of Ornamental Fishes
Achampatti Feed Mill

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**TECUMSEH PRODUCTS INDIA PVT. LTD** **A109**
38 K M Stone , Delhi Mathura Road,
Ballabgarh – 121004, India.
Tel: +91 8130894442
Email: somesh.kumar@tecumseh.com
Website: www.tecumseh.com

**Company Profile**
Tecumseh is a global leader in commercial refrigeration solutions with over 90 years of expertise. In India, Tecumseh offers a comprehensive range of energy-efficient, reliable, and sustainable refrigeration products, including condensing units, compressors, and refrigeration systems designed for demanding applications.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

At the World Seafood Expo, Tecumseh showcases solutions engineered for seafood processing, freezing, cold storage, and retail display, ensuring optimal temperature control, product freshness, and operational reliability. With a strong focus on natural refrigerants (R290) and low-GWP technologies, Tecumseh supports the seafood industry in meeting both performance and environmental goals.

**Product Description**

Tecumseh offers a complete range of commercial refrigeration solutions designed for seafood processing, freezing, cold storage, and retail applications. Our high-efficiency compressors and condensing units ensure fast pull-down, precise temperature control, and consistent performance, helping maintain freshness, quality, and food safety.

Engineered for reliability in demanding environments, Tecumseh solutions support natural refrigerants (R290) and low-GWP options, delivering energy efficiency, sustainability, and long service life for seafood industry applications.

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**THE GREENBOX HVACR PVT LTD** **B208**

Punjakutta officers colony,
PUNJAGUTTA, Hydrabad ,
TELANGANA – 500082, India
Tel: +91 9787738009
Email: Southsales.thegreenbox@rockwell.co.in
Website:

**Company Profile**

"The Green Box" is an extension of Rockwell Industries Ltd through which we offer a range of dependable, energy efficient, smart IoT enabled walk-in cold rooms that help us support and service industries such as pharma, ice-creams, dairy, seeds, frozen foods, poultry, confectionery, horticulture, floriculture, drone manufacturing, automotive, defense and many more. The Green Box range of products have been designed from the ground up to be Simply efficient and smart.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Product Description**
Cold Rooms
Cold Storage
Innovative Test Chambers
Blast Freezers / Coolers
Spiral Freezer
IQF
Bulk Milk Chillers
Ripening Chambers
Proofing Chambers
Stability Chambers
Large Chest Freezers
Transport truck refrigeration

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**VAMIQA LABORATORIES PVT LTD** **S6**
B-16/1, Ida, Moula-Ali,
Hyderabad, Hyderabad – 500040, India.
Tel: +91 98663 74155
Email: satyamurthy@vamiqalabs.com
Website: https://vamiqalabs.com/

**Company Profile**
Vamiqa Laboratories Pvt. Ltd., a strategic ally of the Qualitek Group, specializes in food testing and regulatory advisory services. It carries deep expertise across the seafood, spices, and extracts industry value chain. Backed by over 25 years of collective industry experience, Vamiqa operates from a state-of-the-art 9,000 sq. ft. laboratory in Hyderabad and specializes in contaminants testing and risk-based regulatory solutions aligned with global food safety standards.

Qualitek has also established an exclusive seafood laboratory at Nellore, dedicated to antibiotic residue testing, enabling the Test & Buy model.

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# EXHIBITORS' PROFILES

| Company | Stall No. |
|---|---|

**VIR FISHMEAL AND OIL** — **FISH MEAL PAVILION**

Narvai mata mandir,Gosa, Poebander,
Gujarat – 360576, INDIA
Tel: +91 98252 30293
Email: Virfishmealandoil@gmail.com
Website:

**Company Profile**

Owner of Old Aksha fishmeal & oil (porbander) and Sea star frozen foods.This is new Factory Vir fishmeal and oil

**Product Description**

Fish Meal, Fish Oil, Surimi, Fish Processing, and IQF Products

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**XTREME AQUATECH** — **S1**

West Rangamatia,
Rupnarayanpur Bazar,
Hindustan Cables Town – 713335, India.
Tel: +91 9474817672
Email: Info@xtreamaquatech.com
Website: www.xtreamaquatech.com

**Company Profile**

XTREME AQUATECH is a brand engaged in the development of high-quality fishing baits and natural fish attractants for freshwater fishing. Developed in India, the brand focuses on practical, performance-oriented formulations designed for carp fishing environments. XTREME AQUATECH emphasizes consistent quality, ease of use, and field-tested effectiveness in ponds, rivers, and reservoirs. The company is open to B2B collaborations, distribution partnerships, and market expansion opportunities, aiming to deliver reliable and adaptable bait solutions for anglers and fishing communities.

# EXHIBITORS' PROFILES

**Company** **Stall No.**

**Product Description**

XTREME CATCH is the core product range of XTREME AQUATECH, including Rohu Chara, Katla Special Chara, Katla Special Touch, and Liquid Fish Attractant. These products are formulated using natural aroma-based components to improve attraction, feeding response, and bite consistency in freshwater fishing. Designed mainly for carp species, they perform effectively in ponds, rivers, and reservoirs and are easy to mix or apply with local bait materials.

Upcoming Product: Master Bait is under development as a versatile solution suitable for all carp fish species, aimed at simplifying bait selection while maintaining strong attraction and consistent performance.

# NOTES

# NOTES

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