

Brackishwater Aquaculture & Blue Revolution

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Disease Surveillance Programme: Way Forward

Perspectives on Indian Seafood Export Sector

E-Rupee: Salient Features & Advantages



From 15th - 17th February 2023 Biswa Bangla Mela Prangan | Kolkata, West Bengal



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On the Platter

Mr. Dodda Venkata Swamy Chairman

Dear Friends,

On February 1st, I was glued to the television and eagerly watching the Hon'ble Union Finance Minister's budget announcements for 2023-24. I was exhilarated when I found that MPEDA's proposal was recognized in the budget, and the import duty of feed ingredients like fish meal, krill meal, vitamin and mineral premixes, fish lipid oil and algal prime (flour) was reduced. A significant reduction in the import duty of these ingredients will support the aquaculture sector in bringing down the production cost.

I hope you all will have a memorable participation in the 23rd India International Seafood Show at Kolkata. MPEDA and the Seafood Exporters Association of India have made all efforts to make this event impactful in the seafood trade and allied sectors. As India adorns the chair of G-20, a special seminar session involving G-20 nations is aptly placed in the show for the benefit of delegates and invited guests, and has speakers from the USA, Japan, Canada and Saudi Arabia. We also have participation from Iceland and Argentina.

Another landmark event in the current seafood show time is the International Buyer Seller Meet. 32 buyers from 11 countries have confirmed their participation in the business match-making session. Technical sessions on topics involving national and international experts are kept from day 1 of the show. To make it unique, we also have an exclusive session by start-up firms arranged for the first time. Three start-up firms, shortlisted after a selection process, will present their innovation. I request the delegates to attend the sessions and make them meaningful with fruitful discussions.

MPEDA, along with the Export Inspection Council of India, has coordinated the audit by a 7-member team from Department for Environment, Food and Rural Affairs, UK, from 16th to 27th January 2022. The inspection team visited hatcheries, farms, processing units and feed mills in Andhra Pradesh and Gujarat. It is learnt that they will submit draft reports for our comments in two months. We are hopeful that the report will be favourable for India, so our units will get better access to the UK market.

MPEDA, in association with USFDA and JIFSAN, has organized 2 - days Sanitation training programme in Cochin. 20 Quality assurance personnel from the seafood industry and 15 MPEDA officials attended the programme. Due to sanitary failures, the industry personnel were selected from the respective companies based on the history of refusals in the US market.

I hope the technologists who got the training will go back and educate their colleagues to put into practice whatever sanitary measures they have learned. This will help the units to improve sanitary controls and avoid the risks of refusals.

Wishing all the delegates and exporters a successful seafood show once again, and thanking you all.

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Significance of brackishwater aquaculture in achieving blue revolution and mission of doubling the seafood export

Dr. K. P. Kumaraguru Vasagam Principal Scientist & Officer in-charge, PME, ICAR- Central Institute of Brackishwater Aquaculture, Chennai

Background

When predicted that the world will need to double the food production by the year 2050, and experts say that nutrient-rich foods from aquatic environments (fisheries and aquaculture) could play a significant role.

As the global demand for seafood increases every year, aquaculture is looked up to with a lot of hope and responsibilities, not only for increasing fish production and nourishing the growing population but also for fulfilling several other sustainable development goals. In addition to food production, aquaculture can generate employment opportunities, support the food processing industry, offer the chance to reduce carbon emission, and help conserve biodiversity in diversified fields across the nation.

In 2020, aquaculture contributed 57 percent to the total global aquatic food production of 214 million tons, comprising 178 million tons of aquatic animals and 36 million tons of algae. The aquaculture production statistics of India also stands on par with global standards with production peaking at 9 million tons of farmed aquatic animal food for human consumption making it the 2nd largest producer globally. Indian aquaculture production is mainly dominated by the freshwater aquaculture comprised of carps and is mainly utilized for domestic consumption. It is inspiring to witness the spectacular growth of this industry in India, spearheaded by shrimp farming which contributed with a seafood export of about 38,000 crore INR 2021-22, which was only a nascent industry during the early 1990s.

needs, providing over 20 percent of total animal protein intake to the Asian population. India is the second largest producer of farmed fish and offers a vast potential for aquaculture development. The aquaculture sector is also confronting severe challenges, such as the impact of climate change and variability, disease outbreaks, environmental degradation, increasing input costs, anthropogenic activities, and related social and economic changes, increasing intra-regional trade and public health concerns over food safety. Therefore, addressing these issues through research and development and policy formulation is of utmost necessity.

Aquaculture in brackishwater

Though aquaculture is possible in all types of water resources, realizing the full potential of the oceans and inland freshwaters requires a paradigm shift to embrace a new, responsible and sustainable approach to present it as more environmentally, socially, and economically effective. Brackishwaters, otherwise considered a zeroeconomic resource (not used in agriculture, drinking or construction), are ideal for aquaculture today and expansion in the future due to their biodiversity richness, high productivity, and negligible footprint on potable water and carbon emission.

As an added advantage, the high tolerance of brackishwater flora and fauna for water quality extremes makes them more appropriate for farming under controlled conditions. Therefore, in the future aquaculture development, the scope of expansion of brackishwater aquaculture is significant with the huge potential resources available for horizontal expansion in the country.

Aquaculture supplies over 60 percent of food fish

In India, brackishwater aquaculture is synonymous



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with shrimp farming, and estimates show that only 11-12% of the potential area is utilized for farming. It is inspiring to witness the spectacular growth of this industry in India, spearheaded by historical highest shrimp production of 8.44 lakh tons in 2021-22, which was only a nascent industry during the early 1990s.

Besides shrimp, brackishwater has a line-up of seafood choices in its farming basket, ranging from seaweed, clams, mussels, oysters, finfishes of different feeding nature, and gastronomic values, with ready demand in both domestic and export markets. At this juncture, brackishwater aquaculture comes with many scopes and hope due to several positivity's, catering to the country's societal and economic development.

Brackishwater resource potential

Out of a total of 3.9 million ha of the estuarine area estimated; 1.2 million hectares of coastal saline waters have been identified as potentially suitable for brackish water farming. Also, about 9 million hectares of saltaffected lands were assessed in the hot semi-arid and arid ecoregion of northern plains and central highlands in the states of Haryana, Rajasthan, Uttar Pradesh, Maharashtra and Gujarat with surface and sub-soil saline water.

In India, brackishwater aquaculture is synonymous with shrimp farming, and estimates show that only 11% of the potential area is utilized for farming, which offers tremendous scope for further expansion. To aid in national planning, management and policy decisions in brackishwater aquaculture, a precise data on potential brackishwater resource and its mapping is essential. CIBA is working to map the potential areas in the leading aquaculture states in a phased manner.

Science based support of ICAR-CIBA to Aquaculture

One of the National research institutes under the Indian Council of Agricultural Research (ICAR), New Delhi, ICAR-Central Institute of Brackishwater Aquaculture (CIBA), serves as the nodal agency for research and development brackishwater aquaculture in the country since the establishment in 1987.

As CIBA has marked thirty years of useful research and development in the brackishwater aquaculture sector, focusing on crucial questions to develop strategies and technologies for sustainable aquaculture, we are proud to steer the brackishwater aquaculture industry towards sustainability, as well as contributing towards food security and livelihood.

Currently, the brackishwater sector in this country is centered on the exotic vannamei shrimp, and CIBA realises the risk of complete dependence single species. CIBA continues to stress upon the diversification of brackishwater aquaculture with different candidate species of shellfish and finfish to judiciously and responsibly utilise the brackishwater resources sustainably with broad stakeholder participation.

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"Brackishwater Aquaculture for food, employment and prosperity"

VISION

CIBA envisions as one of the world's foremost scientific research institute in brackishwater aquaculture through the pursuit of excellence in research and innovation that contribute modernization and development of sustainable brackishwater aquaculture in the country.

MISSION

Our mission is basic and applied research, and providing technological backstopping suitable for the development of sustainable brackishwater aquaculture suitable for Indian conditions, which would ensure much-needed, nutritional security, employment, economic well-being and societal development.

In this direction, CIBA is supporting technology development in this sector by developing customized indigenous technologies in identified thematic areas of brackishwater aquaculture.

The progress is the outcome of the research in multidisciplinary areas of brackishwater farming covering captive seed production, feed development, farming system development, disease diagnostics and health management, genomics, genetics characterization and selection for improvement, climate-smart aquaculture, community engagements using social science tools and policy interventions through government agencies.

CIBA helps the govt agencies and policymakers get precise data on the potential resource, technological backstopping related to seed, feed, genetics, aquatic animal health, and societal linkage, which are crucial for national planning, management, and policy decisions on brackishwater aquaculture.

Cumulatively, these R&D interventions from CIBA have opened up new diversified farming initiatives and strategies to support the ongoing brackishwater farming.

Fisheries being a state subject, to take the sector forward, partnership with institutions such as CIBA, State govt, Central govt, and other state and central agencies are imperative to construct the country's emerging blue economy. Our ultimate goal is achieving sustainable brackishwater aquaculture for food, employment, and prosperity. It is encouraging to see the tremendous support from the farmers, industry people, and government agencies for our efforts. Still, there is a long way to achieve the committed goals and changing needs.

Some of the Important Technologies and achievements relevant to the sector:

• Captive breeding and hatchery technologies for diversified fish species such as seabass, milkfish, pearlspot, grey mullet, mangrove snapper, hilsa, silver moony, spotted scat, mystus catfish, mud crab, and five major shrimp species.

- Indigenous cost-effective, functional grow-out feeds for potential candidate fishes' different life stages.
- Farming technology for shellfish and finfishes in diversified rearing systems such as ponds, customized cages, RAS, IMTA and biofloc based intensive systems.
- Indigenous cost-effective kits for disease diagnosis (WSSV & EHP), water quality assessment and microbial products for aquatic health management.
- Whole genome sequencing of Indian White shrimp, White Spot Syndrome Virus, *Vibrio parahaemolyticus* and *Vibrio campbelli*.
- Frontline extension, livelihood development, the economic and social impact of aquaculture and IT applications for dual-channel knowledge dissemination.
- CIBA has trained thousands of technical and extension staff from the State Fisheries Departments, MPEDA, and academic institutions.

• Provided policy support to national organizations like the Dept. of Fisheries, Govt. of India, MPEDA, Coastal Aquaculture Authority, and National Fisheries Development Board; International organizations like NACA, World Fish and FAO Department of fisheries on different issues of aquaculture production, certification, etc.

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Farmed Indian White shrimp



Silver moony, a brackish water ornamental fish



Hatchery produced grey mullet seeds

Road map for development of brackishwater Aquaculture

Sustainable improvements in technological aspects of aquaculture will not be achieved unless they are

accompanied by strong R&D, proper planning and appropriate policies that address the social and economic environment within which the aquaculture system is placed.

To assist in national planning, management and policy decisions in brackishwater aquaculture, precise data on the potential resource, technological backstopping and societal linkage are crucial. In the near future, the following key elements related to brackishwater sector may be focussed with adequate policy and funding supports to achieve the projected blue revolution mission.

• Promote species diversification to have more choices of finfish and shellfish in the Indian farming basket, and its genetic improvement with selected candidates for judicious utilization of resources.

• Promotion and demonstration of diversified farming systems such as cage culture, RAS, pond based farming, biofloc based farming, farming systems for inland saline soils, IMTA, poly farming etc. for better utilization of available natural water resources.

• Generation of adequate technologies for hatchery production of seeds and indigenous cost-effective feeds for diversified species and demonstrate the technologies with the active participation of the stakeholder.

• Create and strengthen the marketing channels with adequate infrastructure.

• Nationwide disease surveillance, aquatic animal health management, and disease control measures to control the spread of exotic disease and unexpected production losses.

 Promote cooperation of state departments, export promotion agencies, central departments & agencies, R&D institutions for joint action.

This all would lead to economically viable, environmentally sustainable, socially acceptable brackishwater farming and ultimately a significant increase in the total farmed seafood production.

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Conclusion

As part of the world population growth, the Indian population touched the 1.47 billion mark in 2022 and is on the rise, which increases the pressure on the agriculture sector to meet the responsibility of feeding the nation.

The country's agriculture sector has contributed to its maximum and further development in this sector is limited. Thus, the aquaculture sector is looked up with lot of responsibilities and expectations. Internationally aquaculture is considered as an adequate model for livelihood enhancement and quality food production. Aquaculture though a promising sector for food production in the country, has seen roadblocks in its development in the form of social conflicts, sustainability issues and a lack of infrastructure.

CIBA has achieved significant progress in developing customized indigenous technologies for seed production and farming of diversified species, giving the farmers and other stakeholder's confidence in this dynamic sector. It should progress with the same spirit, and we are close to the projected blue revolution mission.

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Perspectives on the Indian seafood export sector and future vision

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ndia has a long history of seafood exports, with the sector playing a significant role in the country's economy. Fish and fish products have traditionally been an important source of protein for the Indian population, and the country's vast coastline and abundance of water bodies make it well-suited for fishing and aquaculture. Over the years, the seafood export sector has faced a number of challenges and obstacles, but it has also made significant progress and achieved important milestones. In this article, we will examine the history, current state, and future vision of India's seafood export sector, as well as the opportunities and challenges it faces.

The Indian seafood industry employs a significant number of workers, including those involved in fishing, aquaculture, and seafood processing. According to the Marine Products Export Development Authority (MPEDA), the seafood industry in India directly employs around 4.3 million people, while an additional 8.3 million people are indirectly employed through related activities such as transportation, storage, and sales.

Fishing and aquaculture workers are typically responsible for harvesting and raising seafood, and may work on boats or in fish farms. Seafood processing workers are responsible for preparing and processing seafood products for export, which can include tasks such as cleaning, cutting, and packaging the seafood. The seafood industry in India employs a mix of skilled and unskilled workers, and many of the workers in the sector are from low-income or disadvantaged backgrounds. Working conditions in the Indian seafood industry vary, and there have been concerns about issues such as low wages, poor working conditions, and lack of job security for some workers in the sector. In recent years, there have been efforts to improve conditions for workers in the industry, including

initiatives to promote fair labour practices, improve health and safety, and provide training and education to workers.

India's seafood export sector has a long and storied history. The country has a diverse range of fish and shellfish species, and seafood has always been an important part of the Indian diet. In the early 20th century, India began exporting seafood to other countries, and the sector has grown significantly since then. However, the industry has not been without its challenges. In the past, it has faced issues related to quality control, food safety, and sustainability. However, in recent years, the sector has made significant progress in addressing these issues and improving its practices.

Today, India's seafood export sector is a major contributor to the country's economy. India's marine product exports record an all-time high in FY 2021-22; Grow by over 30% to Rs 57,586.48 crore (USD 7.76 billion). The major export markets for Indian seafood include the European Union, the United States, and Japan, and the top exported products are frozen shrimp, frozen fish, and processed fish products. The sector is dominated by a few large players, but there are also many small and medium-sized enterprises that play a significant role in the industry. The Indian seafood industry has achieved a number of significant milestones over the years. Some of the major achievements of the industry include:

• **Growth in exports:** India's marine product exports record an all-time high in FY 2021-22; Grow by over 30% to Rs 57,586.48 crore (USD 7.76 billion). This growth has been driven by increased demand from major export markets such as the European Union, the United States, and Japan.

• Diversification of export markets: In the past, the Indian seafood industry was heavily reliant on a

few major export markets, but in recent years it has diversified its export markets, expanding into new regions and countries such as Africa, the Middle East, and Southeast Asia.

• Improvement in quality and food safety: The Indian seafood industry has made significant progress in improving the quality and food safety of its products, implementing strict regulations and guidelines, and investing in advanced testing and inspection technologies. This has helped to improve the reputation of the industry and increase its competitiveness in the global market.

• **Growth in aquaculture:** In addition to traditional fishing, the Indian seafood industry has also seen significant growth in aquaculture, with fish farming becoming an increasingly important source of seafood production in the country.

• Sustainability and responsible practices: The Indian seafood industry has also made progress in adopting more sustainable and responsible practices, implementing best practices for fishing and aquaculture, and obtaining certifications such as the Marine Stewardship Council's certification for sustainable seafood. This has helped to address concerns about the environmental impact of the industry and meet the increasing demand for socially and environmentally responsible products from consumers and regulators.

Despite its successes, the Indian seafood export sector faces a number of challenges which are outlined below.

Challenges faced by the Indian seafood industry

• Competition from other countries: India faces strong competition from other countries, particularly those in Southeast Asia, which are also major seafood exporters. In order to compete more effectively, the Indian seafood export sector could focus on differentiating its products, improving the quality and sustainability of its practices, and expanding into new markets.

• Environmental and sustainability concerns: There are concerns about the environmental impact of fishing and aquaculture practices in India, as well as the sustainability of these practices. In order to address these issues, the sector could adopt more sustainable and responsible practices, such as implementing best practices for fishing and aquaculture, and obtaining certifications such as the Marine Stewardship Council's certification for sustainable seafood.

• Quality control and food safety issues: Ensuring the quality and safety of seafood products is crucial for the Indian export sector, as consumers in importing countries expect high standards in these areas. Improving quality control and food safety practices, such as implementing strict regulations and guidelines, and investing in advanced testing and inspection technologies, can help to address these issues.

• Impact of COVID-19 pandemic: The COVID-19 pandemic has had a significant impact on the Indian seafood export sector, with export demand dropping in some markets and supply chain disruptions. In order

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to address these challenges, the sector could focus on expanding into new markets, diversifying its product offerings, and investing in technology and infrastructure to improve efficiency and adaptability.

• Limited access to credit and financing: Small and medium-sized enterprises in the Indian seafood export sector may face challenges in accessing credit and financing, which can limit their ability to invest in technology, infrastructure, and other areas that could help to improve their competitiveness and profitability. The government and other financial institutions could help to address this issue by providing funding and support to these enterprises.

In short, the challenges are competition from other countries, particularly those in Southeast Asia, which are also major seafood exporters. In addition, there are concerns about the environmental impact of fishing and aquaculture practices, as well as the sustainability of these practices. Quality control and food safety are also important issues for the sector, as consumers in importing countries expect high standards in these areas. The COVID-19 pandemic has also had a significant impact on the sector, with export demand dropping in some markets and supply chain disruptions and another challenge is limited access to credit and financing.Despite these challenges, there are also many opportunities for growth in India's seafood export sector. One major opportunity is the untapped potential in emerging markets, particularly in Asia and Africa, which are expected to see increasing demand for seafood in the coming years.

Another opportunity is to focus on value-added products and processing, which can help to increase the sector's competitiveness and profitability. Investment in technology and infrastructure is also important, as it can help to improve efficiency and quality. Finally, diversification of export markets can help to mitigate the risks associated with relying on a small number of major markets.

Looking to the future, the Indian seafood export sector has the potential for significant growth and expansion. The government has implemented a number of initiatives and policies to support the sector, including the Blue Revolution Scheme and PMSSY which aims to modernize and expand the country's aquaculture industry. Technology and innovation will also play a key role in the sector's future, with the use of advanced techniques such as precision farming and biotechnology expected to increase. Sustainability and responsible fishing practices will also be important considerations, as consumers and regulators increasingly demand environmentally friendly and socially responsible products.

Some points to revolutionise the Indian seafood export sector are as follows:

• Investment in technology and infrastructure: Investment in technology and infrastructure can help to improve the efficiency, quality, and sustainability of seafood production and processing in India. This can include investments in advanced farming and processing techniques, as well as in cold chain logistics and other transportation infrastructure.

• Diversification of export markets: Diversifying the export markets for Indian seafood can help to reduce the sector's reliance on a small number of major markets and mitigate the risks associated with relying on a single market. This could include expanding into new regions or countries, or targeting niche markets with specialized products.

• Focus on value-added products: Instead of just exporting raw seafood, the Indian seafood export sector could focus on producing value-added products such as processed or prepared seafood dishes. This can help to increase the competitiveness and profitability of the sector.

• Sustainability and responsible fishing practices: Adopting more sustainable and responsible fishing practices can help to address concerns about the environmental impact of the sector, as well as meet the increasing demand for socially and environmentally responsible products from consumers and regulators. This could include implementing best practices for fishing and aquaculture, as well as obtaining certifications such as the Marine Stewardship Council's certification for sustainable seafood.

• Government initiatives and policies: The government can play a role in revolutionizing the Indian seafood export sector by implementing policies and initiatives that support the growth and development of the industry. This could include providing funding for



research and development, promoting investment in the sector, and implementing regulations that promote sustainability and responsible practices.

Future of Indian Sea food Industry

The future of the seafood industry in India looks promising, with the sector expected to continue growing and expanding in the coming years. India's marine product exports record an all-time high in FY 2021-22; Grow by over 30% to Rs 57,586.48 crore (USD 7.76 billion) and the sector is expected to continue growing in the coming years.

There are several factors that are expected to drive the growth of the seafood industry in India in the future, including:

• Increasing global demand for seafood: As the global population continues to grow, the demand for seafood is expected to increase, which could provide opportunities for the Indian seafood industry to expand its exports.

• Emerging markets: Emerging markets in Asia and Africa are expected to see increasing demand for seafood in the coming years, which could provide opportunities for the Indian seafood industry to expand its exports to these regions.

• Focus on value-added products: The Indian seafood industry could focus on producing valueadded products, such as processed or prepared seafood dishes, which could help to increase the competitiveness and profitability of the sector.

• Investment in technology and infrastructure: Investment in technology and infrastructure can help to improve the efficiency, quality, and sustainability of seafood production and processing in India. This could include investments in advanced farming and processing techniques, as well as in cold chain logistics and other transportation infrastructure.

• Government initiatives and policies: The government has implemented a number of initiatives and policies to support the growth and development of the seafood industry in India, such as the Blue Revolution Scheme and PMSSY which aims to modernize and expand the country's aquaculture

industry. Continued support from the government is expected to be important for the future growth of the industry.

Role of Fisheries institutes

Fisheries institutes in India have been playing a critical role in the development and growth of the seafood industry in the country. These institutes are responsible for conducting research and development activities related to fishing, aquaculture, and seafood processing, as well as providing education, training, and technical assistance to the industry.

Some of the specific roles of fisheries institutes in the Indian seafood industry include

• Conducting research on fishing and aquaculture practices: Fisheries institutes in India conduct research on topics such as fish and shellfish biology, aquaculture production systems, and fishing gear technology, in order to improve the efficiency and sustainability of these practices.

• **Providing education and training:** Fisheries institutes in India offer educational and training programs for individuals interested in working in the seafood industry, including programs in areas such as fish farming, seafood processing, and fisheries management.

• Providing technical assistance: Fisheries institutes in India provide technical assistance to the seafood industry, including assistance with topics such as fish farming, hatchery management, and seafood processing. This can help to improve the efficiency and profitability of these operations.

• Collaborating with industry: Fisheries institutes in India often collaborate with industry partners in order to conduct research, develop new technologies, and provide education and training. This helps to ensure that the research and development activities of the institutes are relevant and useful to the industry.

Overall, the role of fisheries institutes in the Indian seafood industry is critical for supporting the growth and development of the sector, and for ensuring that it is sustainable and responsible.

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National Institute of Fisheries Post Harvest Technology and Training – Fostering Indian seafood exports through knowledge & skill

Introduction

ndian fisheries and aquaculture are important sectors of food production, providing nutritional security, contributing to agricultural exports and providing livelihood opportunity for 2.8 crore fishers and fish farmers at primary level and several more along the value chain. The total marine fish landing of the country during 2019-20 was estimated to be 3.72 million tons and Inland fisheries sector contributed 10.43 million tons (Handbook on Fisheries Statistics, 2020). During 2021-22, India has exported 13,69,264 MT of seafood worth Rs 57,586.48 crore (USD 7.76 billion).

Stringent quality requirements and competition in international market has transformed the Indian export industry to an organized sector. However, lack of trained manpower especially in the supervisory / technologist level is a major impediment faced by the sector. It is also important that the country need to orient exports from conventional fishery products to value added products which can fetch more returns for the stakeholders. Post-harvest losses associated with insufficient infrastructure and lack of awareness among the stakeholders is another major hurdle to be tackled.

National Institute of Fisheries Post Harvest Technology and Training (NIFPHATT), ever since its inception as Indo-Norwegian Project (INP) has been striving for overall growth of the Indian Fisheries Sector. Current mission of NIFPHATT is to take up the new challenges and opportunities in the fisheries sector through post-harvest technology up-gradation and dissemination, human resource development, gender development, relief and rehabilitation programmes for the fishermen communities and consultancy in establishing infrastructure related to fisheries postharvest technology.



NIFPHATT Headquarters in Kochi



Vizag unit of NIFPHATT



Processing plant at NIFPHATT, Kochi



Quality Assurance Laboratory

Roles in human resource development, gender/rural empowerment, technology/infrastructure up-gradation and dissemination make the Institute an active partner in nation's fisheries development in general and export sector in particular. Keeping this mandate as the main objective, this Institute is ever committed towards skill up-gradation in the field of fisheries post-harvest technology.

NIFPHATT's activities in a nutshell

a. Capacity building programmes

The Institute's training programmes are aimed at University students, personals employed in fish processing industry and Fishermen/fisherwomen/ SHGs. NIFPHATT's pilot scale production units on freezing, canning, drying, value addition etc; provide a very unique opportunity for them to acquire experience of real time fishery products development. Thus, equip the future generation with know-how on Good Manufacturing Practices by providing hands-on training in all aspects post-harvest technology. On-job training and In-plant training for students pursuing specialized education in the field of fish/food processing is a flagship programme of the Institute. Processing plants and laboratory of the Institute serve as an apt venue for hands-on training in fish processing and quality assurance. Institute also offers specialized training programmes such as hygienic handling and high-end product development from seafood, on-board and onshore handling of sashimi tuna, microbiological analysis of seafood, VHSE apprenticeship training, HACCP concepts and canning technology.

1. On-Job Training to University students and VHSE students from fisher community

On-job training imparted by the Institute has received wide acceptance and appreciation from various schools, colleges and universities. The training provide handson training in different aspects of fisheries post-harvest technology viz., hygienic handling of fish, freezing, canning, smoking, refrigeration, quality control, product development etc. During the training, the trainees are given the opportunity to develop various value added products like dressed fish, fish fillet, fish cutlet, fish finger, fish pickle, fish ball etc. Students pursuing specialized education in Fisheries, Bio-technology, Food science, Food Engineering and professionals working in the fisheries sector across the country are beneficiaries of the programme.





2. Skill up-gradation programmes for fisher folks

Comprehending the pivotal role played by the fishermen community in the fisheries sector, this Institute has designed various training programmes to generate awareness and boost entrepreneurial skills of the community with more focus to fisherwomen in order to make them self-sustainable. These programmes are tailor made for each region/locality to suit to the species available, geographical considerations, local diet preferences etc.

Courses are conducted at the Institute and also onsite as per request. "Training on hygienic handling and high-end product development" is one of the flagship programme of NIFPHATT. Under this, trainees are instilled with the know-how for production of various frozen, dried, pickled and ready to cook/eat fishery



NIFPHATT

products. Primary thrust is given to hygienic handling of the commodity right from capture to consumption. The course is also intended at boosting entrepreneurship among the trainees to take up new ventures like seafood kitchens/catering centers etc.

Training on on-board handling of tuna for sashimi production is a course designed for traditional fishers. Through this training, fishermen are enlightened on the economic advantages, on-board handling and storage practices to be followed for landing fish in sashimi grade quality.





3. Training on microbiological analysis of seafood

Fish and seafood are a main source of animal protein in the diet. However, seafood is also one of the most perishable food items. Seafood-associated infections are caused by a variety of bacteria, viruses, and parasites; this diverse group of pathogens results in a wide variety of clinical syndromes, each with its own epidemiology. To guarantee consumer safety it is imperative to limit the microbial levels in food below desirable levels. This in turn requires a basic understanding about the etiologic agent, their source and enumeration methods. The training provides insight on the essential microbiological parameters to be analyzed in water, ice, fish and fishery products and methods for determining the same.

4. Training on HACCP concepts

Hazard Analysis and Critical Control Point (HACCP) is an internationally recognized system for reducing the risk of food safety hazards. Any company involved in the manufacturing, processing or handling of food products can implement HACCP to minimize or eliminate food safety hazards. Adherence to HACCP norms can guarantee the safety of fish products and help to enhance consumer confidence in such products.

The programme on "HACCP concepts" aims at familiarizing the trainees with the principles and steps involved in HACCP implementation. It also provides insight in to implementation and monitoring of HACCP system and finally the auditing of the system through different case studies.

5. Apprenticeship training programme

This is a one year programme exclusively designed for the passed out candidates from Vocational Higher Secondary Schools. The training is conducted in association with Regional Directorate of Skill Development & Entrepreneurship, Trivandrum, Under Ministry of Skill Development and Entrepreneurship, Government of India. Major objective of the programme is to create a cadre of fisheries experts with sound practical and theoretical knowledge. During the programme, trainees are given hands-on experience in all the processing activities, quality assurance, microbial analysis, hygienic handling of seafood. Students are also paid a monthly stipend.

b. Product development

Quite a few ready to serve, ready to cook, heat and eat products have been developed and popularized by NIFPHATT including new generation products such as canned products, frozen products, battered and breaded products, dried and smoked products, retortable pouch packed products etc.





c. Market research and sensitizing through test marketing

Popularization and test marketing of value added products from all fish varieties including low value, unconventional species and seasonally abundant fishes is being carried out by the marketing section. The normal skeptic attitude of customers towards preserved fishery products is being overcome by the promotional marketing of such products. The message of fish as a healthy food is being continuously propagated through participation in exhibitions and trade fairs.

d. R&D efforts

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Some of the recently developed, test marketed and popularized products include canned anchovies in ginger flavour, cold smoked farmed oyster canned in oil, canned squid with ink flavour, ready to serve oyster curry in pouches etc. Several value added like fish fillets, minced meat, coated products etc. were developed from unconventional and seasonally abundant fishes like Balistids. Flavour extract (taste maker) was developed from shell and head of fresh water prawn.

e.Popularizing and promoting fish as health food

The importance of fish as a health food both in terms of its protein and fatty acid content is being widely popularized and promoted among the various population of India. This is achieved mainly through making and presenting fish in more convenient and value added forms. Products are developed through a non-fish eater's perspective, trying to address all his apprehensions towards fish as a food item. Brochures and publications by the institute are widely circulated among the stakeholders.

f. Promoting novel and nascent entrepreneurship in value added fish export

The value realized from the export of fish in frozen form is almost on par with or slightly above the domestic rates. In order to shift the focus of our exporters from frozen to chilled form NIFPHATT has set up a chilled tuna processing facility (meant for other fishes also during lean seasons). This plant has a water front with landing/berthing facility facing the main channel. This plant is expected to act as groundswell for entrepreneurship by acting as incubation center.

Future perspectives

Spearheading along the path of skill development, the Institute also keep its other important mandates abreast. Production, Popularization and test marketing of nutritious seafood products and spreading the message of "seafood as a safe food for the future" are one of the key areas where NIFPHATT has established its reign. The Institute also offers consultancy services on establishment of fisheries infrastructure. NIFPHATT is also actively involved in standard fixing exercises by serving as an expert member in various national and international committees. Thus the Institute has a remarkable past studded with post-harvest activities and value based training programmes in fisheries sector.

Along with the regular training programmes, The Institute is presently intensifying its focus on skill upgradation of the fishermen/fisherwomen/fish farmersthe primary producers of the sector. The Institute is also planning to act as incubation centre in new areas for fostering entrepreneurship in fish processing and value added product development. As the capture fishery is nearing stagnation, efforts are also in place to analyze the issues in processing and marketing of cultured fish and recommend remedies to equip farmers and processors for domestic and international marketing of farmed fishes and products thereof. The Institute is also in the process of introducing a "National Capacity building Programme" in collaboration with processing units across the country for skill up-gradation of Graduate and Post-graduate students.

Consistent effort to maintain pace with dynamic changes in fisheries sector has helped NIFPHATT in establishing wide inter-institutional linkages with National and State establishments. Patronage from administrative Ministry and cooperation from Central/State Government Departments and Agencies, SHG's, NGO's University/ Colleges and VHSE Schools which enabled NIFPHATT to carve out its niche in fisheries post-harvest sector of the country is gratefully acknowledged.

India International Seafood Show 15-17 Feb, Kolkata, West Bengal

We are looking forward to our first India International Seafood Show where you will discover how our equipment, software and service can help your fish and seafood processing business become more efficient and profitable. Our processing experts will be available to discuss your business needs and help to determine solutions that will set you apart from the competition.

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TRANSFORMING FOOD PROCESSING

Monthly Outlook Forecast Report

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USDINR

SDINR started at 81.07 (01-Dec) and the rupee was under pressure over the last month of 2022. The dollar soared on the US Fed's hawkish monetary policy stance to manage inflation, making the Indian rupee the worst-performing Asian currency in 2022 with a drop of 11.3%, its largest annual decline since 2013. This week USDINR ended at 82.72.

The DXY was on track to post its highest annual surge since 2015, while the local unit ended the year at 82.72 to the dollar, down from 74.33 at the year's end of 2021. A surge in oil prices due to the crisis between Russia and Ukraine also dampened the local unit and resulted in India's current account deficit reaching an absolute record high in the 3rd quarter of that year.

Market observers expect that the rupee will trade with an appreciation bias in 2023 as a result of softening commodity prices and the expectation that FII's would continue to purchase Indian shares. In the month of Jan 2023, the rupee may recover as all the other major currencies gained significantly against the dollar. Market participants will closely watch the central bank's stance on the forex reserve position.

The annualized forward premium of USDINR came up during the week but settled at 2.02%. The benchmark 10-year bond yield up 2 bps at 7.32% vs the last close of 7.31%. The Sensex fell 0.48%, to 60,840.74, while the Nifty lost 0.57%, to 18,086.8. USDINR with the good

trading volume in the market USDINR may provide the direction for the upcoming month.

This was the last month of 2022 where our beloved Rupee registered a loss of 1.6% and ended the month and 2022 at 82.72 though dollar index weakened, market participation was very less in the second half of month and public sector banks also sold dollars in last two weeks near 82.85-90 but still local unit registered a loss amid RBI added nearly 40 billion dollars forex reserves since 28th oct 2022 and importers also bought dollars as premiums are very low.

In the daily candlestick chart, old price gaps continue to remain unfilled – observe the pink and blue horizontal lines. Interestingly, all price gaps towards rupee weakness have been filled up. The unfilled ones are towards rupee gains. On the daily time frame momentum indicator RSI trading at 55 which is considered to be a slight overbought zone while MACD giving mixed signals.

My sense is for a rupee recovery – towards first down gap 81.83 - 81.93 range in the short run and towards 81.00 - 81.20 in the long. The 81 mark will be an important long term dollar support. Current levels near 82.70 are good for exporters to increase their hedge ratios though USDINR forward premiums are very low i.e. 2.02% in annualized terms, Importers to target spot levels below 82.00 to hedge. Consider vanilla options along with forwards.



EURUSD

The EUR/USD advances modestly in the last trading day of 2022, during the North American session, though above its opening price by 0.13%. A light economic calendar keeps the EUR/USD pair within familiar ranges ahead of the week, month, quarter, and year-end. The European economic docket revealed that inflation in Spain dropped for the fifth consecutive month, to 5.6% YoY, below November's 6.7% reading.

However, due to thin liquidity trading conditions and 2023 around the corner, it failed to trigger any upside reaction that could break the EUR/USD 1.0600-90 trading range. Meanwhile, on geopolitics, Russia and China continue to deepen their ties, as Russian President Vladimir Putin and China's Xi Jinping video conference showed intentions for further cooperation between both countries on trade, energy, finance, and agriculture.

Furthermore, Russia's invasion of Ukraine continued during New Year's Eve, as the fourth wave of drones attacked civilian buildings, as reported by Ukrainian authorities. Shelling continued in Kiyv and Kharkiv, killing at least two people.

The EUR/USD is still upward biased. Nevertheless, the inability to decisively crack the 1.0700 mark would expose the pair to selling pressure. Oscillators like the

Relative Strength Index and the Rate of Change favour EUR/USD upside, but low volumes keep traders at bay.However, the EUR/USD key resistance levels lie at 1.0700, followed by the December 15 daily high of 1.0736 and 1.0800. On the other hand, if the EUR/USD drops below 1.0638, a test of 1.0600 is on the cards, followed by the 20-day Exponential Moving Average at 1.0575.

Support: 1.0638, 1.0600, 1.0575.

Resistance: 1.0700, 1.0736, 1.0800.

GBPUSD

GBPUSD cable pair entered the last month of 2022 by opening at 1.2054 As a result of the Bank of England's decision to slow the rate of rate hikes following its December meeting, the pair started to lose momentum. Two of the nine members of the committee voted to keep the rates steady, while the bank increased them by 50 basis points.

In the exact middle of the month, on 15th Dec the volatility turned out to be the largest where it touched 1.2431 on the higher side and 1.2153 on the lower side, after which the pair started its downward trajectory for rest of the month. The BoE's decision has prompted speculation about a more relaxed tightening of the monetary policy in 2023 and enhances the possibility that interest rates





may rise at a lower level than previously thought. Some market sources predict that the Bank Rate will peak at 4% rather than the previously predicted 6% next year. A week after Christmas, the forex markets remained largely flat, but stock markets were slightly up due to China's authorities announcing the lifting of travel restrictions, which is anticipated to spark a rapid economic recovery in the Asian nation.

On the UK front, the Bank of England will be actively resolving the inflation problem next year as CY2023 ends with a higher inflation rate driven by increased energy prices. Andrew Bailey, governor of the BOE, may rely on further rate hikes to ease inflationary pressures.

Despite falling in the initial weeks of the month pair managed to end the month on a positive side and ended this year very close to 1.21. It seems pair managed to shake off the selling pressure in last trading session of 2022. Bulls could show more interest if pair sustains above 1.21 for a longer period.

On the daily time frame pair is hovering near 200 days SMA (1.2045) which should play a role of major support as that is a long-term indicator and lot of people pay close attention towards this.

Breaking of 200 days SMA could push pair towards psychological level 1.20 then 1.1750 which is a longterm support while on the upper side 1.23 would play a role of resistance. Momentum indicators RSI and MACD giving mixed signals.

USDJPY

The USDJPY pair started the month at 138.118 levels and depreciated 5.08% and closed at 131.101 levels compared to the previous month's close. Early in the month, Japan continued to manipulate the yield curve, thus the majority of what the market saw here was a reaction to the international bond markets. Several solutions emerged following the Federal Reserve's monthly meetings. The US dollar fluctuated in the middle of the month as it seemed that efforts to build a foundation for a recovery were ongoing. Numerous times, the 135 level was critical, so it wasn't shocking to see a slight bounce from there. Early attempts by the US dollar to gain ground against the Japanese yen were unsuccessful as the Bank of Japan startled the market in the second previous week. They stated that a threshold of 50 basis points, which was much higher than the previous 25 basis points, would be allowed for the 10-year rate.

As a result, the pressure on the Japanese yen from the market, which forced the Bank of Japan to print endless yen to keep yields down, was significantly lessened. As the Bank of Japan continued to follow its ultra-loose policy, which caused the yen to suffer for the most of the year, the bank raised the federal funds rate by 425 basis points. But in the previous quarter, the BoJ relaxed some of its long-term yield curve control, which sparked rumours about a change in monetary policy in the months to come and led to a 13% recovery in the value of the Japanese Yen in the final three months of the year.



The USDJPY opened at 138.118 and fell for a consecutive month and closed at the level of 131.101 (-5.08%) level compared to the previous month's close. The pair also touched the low of 130.566 level. If the pair moves upward it could reach the top at the 50-day Moving Average of 138.10 levels.

The first support and second support level must be at 130.39 and 126.359 levels respectively in case the pair further depreciates and the resistance remains at 134.50 if the pair rebounds. The MACD line is moving below and parallel to the signal line. It may further move in the same trend and create a divergence.

The pair ended the month at a lower level compared to the previous month's close and the price behaviour steered to weaken further. The Relative Strength Index continued to fall below its 14-day RSI's simple moving average in a weekly chart which also indicates further weakness to the pair.



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Central Bank Digital Currency (CBDC) – E Rupee

Anil Kumar Bhansali, Head of Treasury -Finrex Treasury Advisors

What is E-Rupee?

-Rupee is a digital currency in the same denomination as physical notes, the difference being physical notes are in your wallet while E-Rupee is in e-wallet. As RBI issues physical currency, it issues digital currency that can be stored in one's mobile phone wallet. It is a legal tender and all rules governing printing of currency will be applicable to E-Rupee too.

How does it work?

One needs to have some money in the Bank account, an android mobile phone and a digital rupee wallet app provided by the Bank (in which you have the account). E-Rupee app does not support iPhone at present.

E Rupee-W

The RBI has operationalised two types of pilot projects of CBDC - First pilot in Digital rupee is the Wholesale Segment (e rupee-W) operationalised from 1st January 2022. The use of this pilot is settlement of secondary market transaction in Government Securities. It would be used to make inter-bank money market more efficient. Settlement in Central Bank money would reduce transaction costs by pre-empting the need for settlement guarantee infrastructure or for collateral to mitigate settlement risk. Going forward, other wholesale transactions and cross-border payments will be the focus of future pilots, based on learning's from this pilot. 9 Banks have been identified for participation in the pilot.

E Rupee-R

RBI launched the pilot project of retail digital rupee (E Rupee-R) on 1st December 2022 comprising of select banks at select locations and select closed group of participating customers and merchants. The pilot covered 4 cities viz. Mumbai, Delhi, Bengaluru and Bhubaneswar to be later extended to Ahmadabad, Gangtok, Guwahati, Hyderabad, Indore, Kochi, Lucknow, Patna and Shimla. Four banks viz. SBI, ICICI, Yes and IDFC First Banks will initially participate in the pilot project to be later extended to Bank of Baroda, Union Bank of India, HDFC Bank, Kotak Mahindra Bank. The scope of the project may later be extended to include more users, banks and locations.

Features of E Rupee-R

1. Legal tender in the form of digital token.

2. Same denominations as physical/paper currency.

3. Distributed through financial intermediaries - i.e. Banks.

4. Users can participate through the digital wallet offered by the participating banks and stored on mobile phone devices.

5. Transactions can be both person to person (P2P) or person to merchant (P2M).

6. Payment to merchant locations can be made using the QR codes displayed at merchant locations.

7. Trust, safety and settlement finality from RBI.

8. No interest once the money is converted to E Rupee from the Bank account.

9. It can also be converted to other forms of money, like deposits with Banks.

10. The pilot project will test the robustness of the entire process of digital distribution and retail usage in real time.

How does the E Rupee-W wallet work?

If one is a customer of the four banks at the four cities and you want to try out the E Rupee you can reach



out to your Branch Manager and make a request for an e-mail which would allow you to download the app. This would be at the discretion of the bank. One the app is downloaded and the KYC process is done one can transfer money from the linked (presently not linked) Bank account to the digital wallet. Amount of any value can be transferred and you have the liberty to choose the denominations. For eg. if you want to transfer Rs. 5500 it could be split into one Rs. 2000, two Rs. 500/-, five Rs. 200/-, 10 Rs. 100/- and 10 Rs. 50/- or one can transfer all 110 as Rs. 50/-.

All denominations are available on the app. Payments to persons or individuals will happen from one app to another app while that to merchants will happen as QR-enabled. The payments process is similar to that of UPI. The app user may not necessarily be tech savvy. The transfer is instant and will be reflected in the E Rupee wallet. At present the wallet can be refilled from any Bank account as it is not linked to any particular Bank account but money will only be remitted to the Bank account whose E Rupee app you are using.

Advantages of E Rupee-W Wallet

1. It is secure from counterfeit notes and theft. No trip to ATM to withdraw cash.

2. Even if mobile is lost the amount in the digital wallet can be accessed and transferred to a new mobile number.

3. UPI may have the risk of the Bank account being compromised but the risk is not there with E- Rupee.

4. As in case of physical rupee there is no trail of the payment made to which account and it is just like physical cash being given. In case of UPI since it is Bank to Bank transfer there is a trail.

5. Every transaction is tokenised and hence it is unique and secure. A problem in internet connectivity will not allow token to be generated. Thus internet connectivity will be the only risk for E Rupee.



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Fig. 1: Catch composition of marine landings recorded in

December 2022

Data was obtained from 92 selected landing sites and the total marine landings recorded in December was 96,939.29 tons. The total catch was comprised of 58,112.33 tons of Pelagic finfish resources, 22,747.82 tons of Demersal finfishes, 7,111.78 tons of Crustaceans and 8,967.37 tons of Molluscs (Fig.1).

December 2022. I.Observations on fish catch landings

of India, so as to support traceability and the catch

certification system of MPEDA. Details of fishing

vessels arriving at the landing sites and the species-

wise catch quantity landed by these vessels are recorded and uploaded into the MPEDA website on a day-to-day basis by the Harbour Data Collectors. This report gives a summary on the species-wise, harbourwise and state-wise trends in marine landings during

MPEDA-NETFISH eal-time data on fish landings and boat arrivals is collected by NETFISH on a daily basis from around 100 fishing harbours/landing centres

Out of the 267 species of marine finfishes and shellfishes reported during the month, the major five contributors were Sardinella longiceps, Rastrelliger kanagurta, Lepturacanthus savala, Nemipterus japonicus and Otolithes spp. (Table 1).

Table 1: Major fish species landed during December 2022

SI. No.	Common name	Scientific name	Qty. in tons
1	Indian oil sardine	Sardinella longiceps	20592.12
2	Indian mackerel	Rastrelliger kanagurta	9054.60
3	Ribbon fish	Lepturacanthus savala	6762.20
4	Japanese thread fin bream	Nemipterus japonicus	4324.97
5	Croaker	Otolithes spp.	2532.27

Considering the group-wise landing, Sardines. Mackerels, Ribbon fishes, Threadfin breams and Tunas were observed as the major items recorded during the month. Half of the total catch was composed of these five fishery items (Fig 2).

FOCUS AREA

Marine landing report December 2022

Dr. Afsal V. V. & Dr. Joice V. Thomas



Fig. 2: Major fishery items landed during December 2022

Among Pelagic finfishes, the landing of Sardines was exceptionally high during the month. Another major pelagic item reported was the Mackerel. Among Demersal finfishes the Threadfin breams and Croakers were the most landed items. In the case of Crustaceans, more than 58 % catch was comprised of different species of Coastal shrimps, in which the *Karikkadi* shrimp was the dominant species with a total landing of 1260 tons. Among the Molluscan resources, Squid and Cuttlefish were the major items landed.

State-wise landings: Almost 25% of the total catch reported during the month was from the Karnataka state. The states of Gujarat and Kerala followed in the line with a share of 19% and 18% respectively (Fig. 3). The landings from West coast states had together formed 83% of the total catch. The least marine landing was reported from Odisha.



Fig.3: Comparison of state - wise fish landings (in tons) during December 2021 & December 2022

Harbour-wise landings: In December, the Mangalore and Malpe harbours in Karnataka had recorded the maximum fish landings, which was to the tune of 6,211.15 tons and 5722.56 tons respectively. Jagathapatnam landing centre in Tamil Nadu had recorded the lowest landing during the period.

II.Observations on boat arrivals

The total number of fishing vessel arrivals reported from 92 fish landing sites during the month was 39,817. From the state-wise figure (Fig. 4) it can observed that the highest number of boat arrivals had occurred in Gujarat and then in Kerala. The state which reported least number of boat arrivals was Odisha.

Mangrol (1,881) and Veraval (1,703) harbours in Gujarat had topped the list in terms of highest number of boat arrivals. The last one in the list was Jagathapatnam landing centre.



Fig. 4: Comparison of state- wise boat arrivals (nos.) during December 2021 & December 2022

Summary: A total of 96,939.29 tons of marine landings and 39,817 nos. of boat arrivals were reported during December 2022 from 92 major fishing harbour/landing centres in India. From November 2022, the total catch was in a declining trend and the trend continued in December as well, registering a decrease by 11,625 tons when compared to that of previous month. Whereas the number of boat arrivals has decreased by 2,484 nos. than that of the previous month.

Pelagic finfish resources continued as the major contributor to the total catch and the Indian Oil Sardine attained the first position in terms of the most landed species of the month. Karnataka retained the first place among the states in terms of total catch landed whereas Gujarat attained the first place in terms of the highest number of boat arrivals.

Among the various landing sites, the Mangalore harbour in Karnataka attained the first position in terms of total catch landed and the Mangrol harbour in Gujarat retained the first place in terms of highest number of boat arrivals.

RAINBOW IN A BOWL

Freshwater Sting Ray

RAINBOW IN A BOW



V. K. Dev

V. K. Dey has over three decades of experience in diverse sectors of seafood industry in Asia-Pacific region. He was the Deputy Director of MPEDA and then associated with INFOFISH, Malaysia. As part of INFOFISH, he was involved in several studies related to seafood industry in the Asia-Pacific region and beyond, including setting up of Aqua-technology Park for ornamental fish. MPEDA has published Living Jewels, a collection of his articles on ornamental fish.

iver sting rays, belonging to the family Potamotrygonidae, are hardy, active, beautiful and easy to keep in the right aquarium conditions. They are distributed in the river systems of South America particularly Uruguay, Paraguay and the Amazon River basins. They are of minor commercial importance and are widely used in public aquariums and to a certain extent in the hobby sector. They demand the best water conditions and this is considered to be the key factor in raising this fish. They have a flattened circular body like a large suction cup with the long, slender tail sticking out behind. Although they have a poisonous sting on their tails, this fish is very peaceful. It is a bottom dweller and does best in a community tank with enough bottom area for swimming around. The ideal water conditions are medium-hard, neutral pH with temperature ranging between 26 and 27°C.

They prefer shrimp and worms and fish pieces. They can grow up to a disc diameter of 35 cm. Sexes are separate; the males have claspers while the females do not and even in young ones claspers are easily distinguishable.

They are live bearers and reach maturity at around 30 cm size disc diameter or at the age of four years with males maturing at a somewhat smaller size than females. Although more than twenty species are recorded, only a few species are of interest in the hobby market. Among them, *Potamotrygon castexi, P.brachyura, P.henlei, P.histrix, P.leopodi, P.menchacai, P.motoro, P. reticulatus* and *P.schroderi* are important.

Potamotrygon castexiare commonly known as Otorongo or Pintard sting ray or star stingray. They are very easy to keep in aquarium conditions. The body is marked with a dark brown disc and many small yellow spots which make this fish very beautiful. The maximum attainable size is 60 cm or more.

P. brachyuraare known as ahaia grandyand are considered to be the largest among the stingrays with a body of over 2m diameter. Their eyes are small while the tail is short. Although keeping this fish in an aquarium is easy, they are considered to be the most

expensive sting rays. This species is commonly used in public aquaria.

P. henleiis aspopular as the black ray in the aquarium trade. They are considered to be the easiest fish to keep in an aquarium. The maximum size reported is 70 cm diameter of the body.

P. histrixis commonly known in the trade as histrix stingray or Porcupine River stingray. This fish is also one of the easy fish to keep in the aquarium conditions and is the smallest among all the freshwater rays. They are non-aggressive, having a sandpaper like disc, and are from the Paraguay River basin.

P. leopodiis commonly known as the white spotted freshwater stingray or white blotched river sting ray, originating from South America. It is also known as the Polkadot stingray. This fish is considered to be the easiest fish to keep in the aquarium .and is the most beautiful among all stingrays. The maximum size is reported to be 60 cm.

P. menchacaiis popularly known as the tiger ray because of the tiger-like marking on the body. It is considered to be a difficult fish to keep in aquarium conditions and needs a tank with a larger area because of its long tail.

P. motoro, better known as motoro or orange spot stingray or golden spot sting ray, is also known as the ocellate river ray. It is very hardy and is considered to be a good candidate species for beginners as is easy to keep in the aquarium. It is very sensitive during the acclimatisation period and to polluted and unclean water. It prefers water with pH 5-6 and temperature between 24-26°C. Sexing is easy. The maximum size reported is 30 cm. It is a native of Brazil, Paraguay, Argentina and Uruguay. The optimum water temperature is between 24 - 28°C with pH ranging between 6.5 and 7.0. They prefer meaty food such as earthworms and chopped fish.

P. schroderi, commonly known as flower ray, is a very rare, hardy and beautiful fish. It usually turns completely black with bright flowers on it if kept in dark coloured gravel. Preferred water temperature is around 25 - 26°C with pH 6.0. It will eat any kind of food that will fit into its mouth. It has close similarity to *P motoro.*











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Disease surveillance programme: Way Forward

Dr. P. Ram Mohan Rao, Dy. Director of Fisheries (Rtd), Kakinada, A.P., 98851-44557 rammohanraokkd@gmail.com

The so-called 'Blue Revolution' in India has resulted in phenomenal increase in the production of fish/ shrimp and brought a metamorphosis in the coastal communities. It has not only improved their socio-economic conditions but also resulted in selfemployment. In spite of vast increase in production, aquatic animal diseases pose a major risk and a primary constraint to the growth of the aquaculture sector in India.

The outbreak of white spot syndrome virus (WSSV) in shrimps in mid 1990s has a devastating impact on brackish water aquaculture systems. Fish diseases like Argulosis, Columnaris, Gill flukes, Red disease, EUS etc. are also common. To control the prevalent diseases and emerging ones, several government organizations/ institutes have framed Good Management Practices (GMPs) so as to manage all potential risks at different stages of the crop.

Aquaculture in Asia, including India has shown a growth of over 7% during the last two decades and this is one of the fastest growing food sectors. The trans boundary movement of aquatic animals has significantly contributed to the growth; however, it has also increased the risk of spread of new and emerging diseases to new regions. (Neeraj Sood *et.al.*, 2021).

With the introduction of new exotic species like *Litopenaeus vanammei* in brackish water aquaculture and, Nile Tilapia *(Oreochromis niloticus)* and *Panagasius* in freshwater aquaculture, the onus is on the R&D wing of ICAR to look into critical biosecurity measures that will pave way for significant progress of aquaculture in our country.

There is an urgent need for reducing the risks of aquatic animal disease impacting on livelihoods of aqua farmers and on aqua trade. Developing a strategic plan and preparation of guidelines for dealing with aquatic animal health management is a must. Surveillance on aquatic animal diseases is an important strategy that provides proper technical guidance and advice to aqua farmers by developing disease management strategies.

Disease surveillance is a more intense form of monitoring consisting of collection, collation and interpretation of data along with targeted action (Thrusfield, 2005). A comprehensive disease surveillance system provides a reliable picture of the health status of aquatic animal populations on an on-going basis. It also provides the tracking/traceability information for rapid and effective response to the emergence of an aquatic animal disease emergency (Arthur *et. al.*, 2005).

Government of India has taken a right step towards this and established a National Surveillance Programme for Aquatic Animal Diseases (NSPAAD), funded by National Fisheries Development Board (NFDB), Hyderabad under the aegis of National Bureau of Fish Genetic Resources (NBFGR), Lucknow with a view to safeguard the aqua farmers and streamlining the aquaculture sector.

The main objectives of this programme are to identify important aquatic animal diseases, monitoring, collection, compilation and analysis of trends in diseases, and training of technical personnel/lab personnel on various aspects of disease surveillance and conducting awareness programmes to aqua farmers in different states of India. There are indeed certain key areas in coastal aquaculture which can be regarded as 'hot spots' for several viral pathogens. Therefore, proper disease monitoring and reporting is a continuous effort to assess the health and disease status of aquatic population in a given area.

Prevention and control of viral disease outbreaks requires a coordinated approach from all stakeholders. No doubt Fisheries departments in various states and central government institutes are putting great effort

towards surveillance programmes. For example, in the state of Andhra Pradesh which is the 'aqua hub of India', several measures have been taken by establishing disease diagnostic labs, organizing capacity building programmes for agua farmers, training departmental officers on several aspects aquatic animal diseases, gathering and compiling disease status information for Quarterly Aquatic Animal Disease Report to be prepared by Government of India, setting up of Andhra Pradesh State Aquaculture Development Authority to streamline aqua sector through aquaculture seed act (quality control), feed act (quality control) etc. The National Surveillance Programme for Aquatic Animal Diseases (NSPAAD) has also been implemented in this state and collecting data through active and passive surveillance.

Way Forward:

Effective health management strategies are the need of the hour. Planning, funding, implementing these strategies are arduous and if not done in a meticulous way will remain infeasible. The present aquatic animal disease surveillance programme in our country need to be strengthened and institutes like NFDB,NBFGR,MPEDA,CIBA,CIFA,CIFE and the like need to work out simple, implementable strategies that will address the disease mitigation.

Certain actions need to be taken by the Government of India to further refine the disease surveillance programme in a fool proof manner viz.,:

- To identify gaps in the existing disease surveillance programme.
- To sanction proper funds for thorough implementation of disease surveillance.
- To provide necessary infrastructure support to nodal centers liberally.
- To arrange focused and need based training to field level officers.
- To establish more surveillance labs.
- To analyze the trends in diseases and provide the database to all aqua labs by networking them.
- To review the work done on disease surveillance

quarterly in respective states through online and suggest the ways and means for further follow up studies.

• To encourage corporate sector/ Multi-national Companies into the disease surveillance programme as part of Corporate Social Responsibility (CSR).

- To increase the number of surveillance teams depending on the aquaculture area.
- To identify and rope in reliable private labs/ institutes having adequate facilities towards Disease Surveillance Programme.
- To develop Standard Operating Procedures (SOPs) for proper implementation.
- To properly harmonise testing protocols/ methods.
- To constitute task force team for disease surveillance in respective states by inclusion of stakeholders.
- To develop advisories to all aqua farmers on the disease outbreaks and how to prevent or control them (in vernacular language).
- To organize farmer-scientist meets in all nodal centres and create heightened awareness.
- To strengthen research-extension linkage on disease surveillance and to disseminate the information to the end users.

Conclusion:

Disease outbreaks in aquaculture pose tremendous pressure on aqua farmers. It may hamper the growth of aquaculture in India. With the galloping growth of aquaculture, diseases continue to emerge. Therefore rapid detection and preventive measures are a must.

Needless to say that epidemiological study of risk factors for diseases in aquaculture will go a long way to plan measures for prevention and control of major diseases successfully and in an environmental-friendly manner.

Disease reporting and information sharing will aid in minimizing the impact of serious aquatic animal

health issues if pragmatic plans are implemented in a coordinated approach with all stakeholders.

Apart from this, aqua farmers need to be continuously provided with quality service and sound advice to overcome the disease problems. Hence disease surveillance programmes become a critical component of aquatic animal health care. Mere collection and analysis of data will not serve the purpose.

With the available database, farmers need to be educated on the impending dangers of disease menace. Exchange of information between farmers and other stakeholders and government institutes on disease management aspects is imperative.

Time has come to properly review the on-going disease surveillance programme and further refining is necessary for effective implementation. A serious look should be given to disease surveillance programme

in our country as the aqua sector is beset with severe known and unknown disease threats. Any prevention of disease outbreak in aquaculture will result in a huge profitability.

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Details of the SPF L. vannamei brooders imported & quarantined at AQF during December 2022

SI. No	Name of the stakeholders	State	Country of origin/ supplier	Date of re- ceipt of the lot at AQF	Broodstock imported		ed (nos)
			Supplier	arrival	Male	Female	Total
1	Sheng Long Bio-Tech (India) Pvt. Ltd	Tamil Nadu	SIS; Florida	01.12.22	350	350	700
2	Sri Mahalakshmi Hatcheries - Vizag	Andhra Pradesh	SIS; Florida	02.12.22	600	600	1200
3	Sun Hatcheries	Andhra Pradesh	Syaqua Americas inc; Florida	05.12.22	200	200	400
4	Aqua Prime International (India) Ltd	Andhra Pradesh	Syaqua Americas inc; Florida	05.12.22	200	200	400
5	Blue Star Marines	Andhra Pradesh	Syaqua Americas inc; Florida	05.12.22	200	200	400
6	Samudra Hatcheries Pvt. Ltd	Andhra Pradesh	SIS; Florida	07.12.22	240	240	480
7	Lotus Sea Farms	Tamil Nadu	SIS; Florida	08.12.22	300	300	600
8	Shilpa Hatcheries LLP	Andhra Pradesh	SIS; Florida	08.12.22	300	300	600
9	Devi Seafoods Ltd	Andhra Pradesh	Kona Bay; Hawaii	09.12.22	330	330	660
10	Shilpa Hatcheries LLP	Andhra Pradesh	Kona Bay; Hawaii	09.12.22	330	330	660
11	East Coast Hatcheries	Tamil Nadu	Kona Bay; Hawaii	09.12.22	275	275	550
12	Blue Bay Culture	Tamil Nadu	Kona Bay; Hawaii	09.12.22	220	220	440
13	CPF (I) Pvt. Ltd	Tamil Nadu	American Pe- naeid; Florida	13.12.22	300	300	600
14	Blue Park Aquatics Pvt. Ltd	Andhra Pradesh	SIS; Florida	14.12.22	100	100	200
15	Meenakshi Hatcheries Pvt. Ltd	Andhra Pradesh	SIS; Florida	15.12.22	375	375	750
16	Meenakshi Hatcheries Pvt. Ltd - Vizag	Andhra Pradesh	SIS; Florida	15.12.22	200	200	400
17	KKR Aquatics	Odisha	Kona Bay; Hawaii	16.12.22	660	660	1320

30	Apex Frozen Foods Ltd	Andhra Pradesh	Syaqua Americas inc; Florida	24.12.22	300	300	600
29	BMR Industries Pvt. Ltd	Tamil Nadu	SIS; Florida	23.12.22	400	400	800
28	Empire Marine Harvest	Tamil Nadu	SIS; Florida	23.12.22	200	200	400
27	Sripa Aqua Marine Pvt. Ltd	Andhra Pradesh	Syaqua Americas inc; Florida	22.12.22	200	200	400
26	Sree Gayathri Hatchery	Andhra Pradesh	Syaqua Americas inc; Florida	22.12.22	200	200	400
25	Saran Saai Hatcheries	Andhra Pradesh	SIS; Florida	22.12.22	300	300	600
24	SVR Hatcheries	Andhra Pradesh	Syaqua Americas inc; Florida	22.12.22	250	250	500
23	AR Shrimp Hatchery	Tamil Nadu	SIS; Florida	22.12.22	250	250	500
22	Jay Jay Marine	Andhra Pradesh	SIS; Florida	21.12.22	200	200	400
21	CP Aquaculture (India) Pvt. Ltd - Mukkam	Andhra Pradesh	American Pe- naeid; Florida	21.12.22	300	300	600
20	Gaayathri Bio Marine	Andhra Pradesh	SIS; Florida	17.12.22	300	300	600
19	Shree Kanak Matsya Hatcheries	Odisha	Kona Bay; Hawaii	16.12.22	330	330	660
18	CP Aquacultue (I) Pvt. Ltd - Nellore	Andhra Pradesh	Kona Bay; Hawaii	16.12.22	330	330	660

Ornamental fish in the Global trade

Neenu Peter, Deputy Director, MPEDA, Kochi -36.

rnamental fish keeping is one of the oldest and popular hobbies of the global population. Globally, live ornamental fish worth USD 397.4 Million were traded in 2021 under HS Codes 030119 – Live Ornamental fish (excluding freshwater) and 030111 – Live ornamental freshwater fish.

Japan was the top exporting nation of ornamental fishes which exported USD 55.1 Million and USA was the leading importer with imports worth USD 94.6 Million in 2021. Other major exporting countries are Singapore, Spain, Netherlands and Indonesia.

The leading importers of ornamental fishes after USA are UK and Germany. Figures 1 & 2 are the representation of countries which import ornamental fishes under two relevant HS codes, with the legend indicating the range value of products imported. India can explore the potential markets for expanding the trade of ornamental fishes.

Indian conditions are favourable for growth, maturation and breeding of many exotic as well as indigenous ornamental fishes. Indian ornamental fish trade is presently dominated by wild caught species which are primarily sourced from Western Ghats & North-Eastern Region of India.

During 2021-22, India exported ornamental fishes to 29 countries worth USD 4.54 Million. The top buyers of ornamental fishes from India are Indonesia, China, Malaysia & Singapore. The major ports of export for this category are Kolkata, Chennai, Hyderabad, Mumbai and Kochi.

In India, MPEDA and Export Inspection Council are the competent authorities for pre-shipment inspection and health certification of ornamental fishes for export. However, for exports to China and Hong Kong, MPEDA is the competent authority for health certification of ornamental fishes.



Fig. 1: Importing countries of live ornamental freshwater fish



Fig. 2: Importing countries of live ornamental fish (excluding freshwater)

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1

Diversified aquaculture demonstrations in West Bengal

A. Mud crab culture

PEDA Regional Division, Kolkata organized the first harvest of mud crab culture demonstration programme in the farm of Mr. Abul Hossain Sardar, at Dakhina Chandpur village, Hasanabad Block, North 24 Parganas district of West Bengal. The demonstration programme was conducted to popularize the Mud crab culture in the state as a part of diversification of export-oriented aquaculture species.

Dr. S. Kandan, Director, RGCA inaugurated the harvest programme. 44 kg of live crab was harvested, which had an average weight of 330 g. Mr. Darshan Lal Dhondiyal, Assistant Director, Mr. L. K. Pattanayak, Junior Technical Officer, other MPEDA officials and farmers were present for the programme. The farm of 0.51 Ha area was stocked with 5000 match box size crabs from RGCA-MPEDA on 28th April 2022. The total production expected is 850-1000 Kg.



Harvested crabs



Dr. S. Kandan, Director, MPEDA - RGCA, inaugurates the harvest and hands the catch to Mr. Abul Hossain Sardar

B. Scampi farming

Partial harvest of the first scampi culture demonstration organized by MPEDA Regional Division, Kolkata in the farm of Mr. Gahar Sardar, at Dakhina Chandpur village, Hasanabad Block, North 24 Parganas district





Mr. Archiman Lahiri, Deputy Director, MPEDA, Regional Division, Kolkata and other with partially harvested scampi crop

of West Bengal was done. This was organized to popularize the scampi culture and a step towards diversification of export oriented aquaculture species.

The inaugural harvest of scampi farming in the farm belonging to Mr. Layek Ali Sardar, at Ramchandrapur village, Basirhat -II Block, North 24 Parganas district was conducted on 22nd November 2022 in the presence of Mr. Archiman Lahiri, Deputy Director, MPEDA, Kolkata along with other progressive farmers.

Mr. Layek Ali is a beneficiary under the aquaculture scheme for promotion of diversification of aquaculture species by MPEDA.

A visit was arranged for trainees who have undergone MPEDA training programme at Kanmari village to witness of scampi monoculture farming.







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Training on "Health certification of ornamental fish exports from India"



Dr. M. Karthikeyan, Director, MPEDA addressing the trainees

PEDA in association with the National Centre for Aquatic Animal Health (NCAAH), Cochin University of Science and Technology organized five-day training programme on "Health certification of ornamental fish exports from India" during 9th - 13th January 2023. The training was attended by 20 officials of MPEDA, Network for Fish Quality Management and Sustainable Fishing (NETFISH) and National Centre for Sustainable Aquaculture (NaCSA).

The classes were led by Prof. I.S. Bright Singh, Dr. Valsamma Joseph, Dr. T. V. Anna Mercy, Professor (Retd.), KUFOS, Dept. of Aquaculture, Sacred Heart College, Cochin, Dr. G. Gopakumar, Former Head, Mariculture division, CMFRI, Mr. Anil Kumar P., Joint Director (Marketing), MPEDA and Dr. Rajeev Raghavan, Assistant Professor, KUFOS.



Dr. Valsamma Joseph, Director, NCAAH distributes the training certificate



Training session



Trainees with faculty



Training programmes by MPEDA

West Bengal

PEDA Regional Division, Kolkata organized a three-day training programme on "Soft shell mud crab farming" at Dakhin Balarampur, Ramnagarand Shankarpur Fisheries Project, East Midnapur District under SFDC (The State Fisheries Development Corporation Ltd, Shankarpur, Ramnagar block, East Medinipur District) from 14th-16th December 2022 and 19th – 21st December 2022. The objective was to provide the technical knowledge on soft-shell mud crab farming for promotion of the diversified aquaculture species. The training programme was attended by 43 farmers of Shankarpur area.



Mr. Archiman Lahiri, Deputy Director, MPEDA, Kolkata distributes training certificate



Trainees with MPEDA officials



Field visit for the trainees



Mr. Darshanlal Dhondiyal, Assistant Director, MPEDA, Kolkata distributes training certificate



Field visit for the trainees at Tajpur village of East Medinipur district

Andhra Pradesh

Capacity building programme to the officers of District industry centres on District export hub and export promotion

A capacity building programme for the officers of District industries centres of Guntur zone covering the districts of Eluru, NTR, Krishna, Palnadu, Guntur, Bapatla, Prakasam, and SPSR Nellore was conducted at Mangalagiri, Guntur district, Andhra Pradesh on 16th December 2022. 35 participants attended the programme.

The topics covered were functions of MPEDA and its societies, capture fisheries, culture fisheries, value addition, quality control, processing infrastructure, market promotion and R&D activitiesOngoing Projects under RGCA and its achievements, Registration of exporters, trade barriers etc.



Technical session

Karnataka

MPEDA, RD, Mangalore organized a 3 day training programme on 'Better Management Practices for Sustainable Aquaculture at Yadgiri in Yadgiri district from 20th - 22nd December 2022 for the benefit of local aqua farmers as well as new entrepreneurs in the area. A total of 24 participants attended the programme.



Inaugural session



Mr. Premdev K.V., Deputy Director, MPEDA, Mangalore distributes training certificates

Tamil Nadu

MPEDA organized a general farmers training programme on diversified aquaculture at Venusupatti of Tirupur district on 29th to 31st December 2022, which was attended by farmers. The location Venusupatti has been selected due to the potential of many marginal inland fish farmers who are mainly farming IMC. The sessions was handled by Mr. S. Pandiarajan, Assistant Director, MPEDA, Nagapattinam. The training concluded with distribution of certificates to the trainees.



Aview of participants during training programme



Mr. Venakateswara, Assistant Director of Fisheries, Yadgiri interacting with the trainees



Field visit for participants to the tilapia fish farm at Dindigul district



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MPEDA Seafood HACCP Training Programme at Bhubaneswar

HACCP (Basic) for the benefit of technical personal working in the seafood processing establishments in Odisha was organized by MPEDA, Regional Division, Bhubaneswar from 7th to 10th November 2022. Total 27 candidates participated in the training programme.

The programme was inaugurated by Mr. Aditya Dash, Managing Director, M/s. Rams Assorted Cold Storages Pvt. Ltd. Dr. Bharat Majhi, Deputy Director; EIA, Bhubaneswar was present in the inauguration function. Mr. Rajakumar Naik, Deputy Director, MPEDA Bhubaneswar welcomed the dignitaries and participants.

The training programme of four days had theory and practical classes on SEAFOOD HACCP based on USFDA's HACCP standard curriculum. Mr. Kishore Kumar Vaniya, Mr. Subray Pawar and Mr. Rajakumar Naik were the faculty members. Dr. Bharat Majhi has briefed the participants about the regulations



Inaugural ceremony

in different markets including EU, USA and Japan, compliance measures.

Certificates were distributed to all the participants who have completed the training programme. The training programme was concluded by vote of thanks by Mr. S. K. Mohapatra, State Coordnator, NETFISH.



Technical session



MPEDA, USFDA & JIFSAN jointly organize Sanitation training programme

PEDA in association with US FDA and Joint Institute of Food Safety and Nutrition (JIFSAN) has organized a 2 -days Sanitation training programme during 19th-20th January 2023 at MPEDA Head Quarters in Kochi. The trainees included 20 quality assurance personnel from seafood industry and 15 MPEDA officers.

The faculty members from JIFSAN were Mr. Brett Koonse, Dr. Jason Bolton, Dr. Christina DeWitt, and Dr. Michael Ciaramelle. FDA India was represented by Dr. Pankaja Panda, Food Safety Coordinator.

Training certificates were distributed by Mr. D. V. Swamy, Chairman, MPEDA who presided over the valedictory function. Chairman, MPEDA urged the seafood sector to follow the principles of *Swachh Bharat* campaign to improve the quality of seafood offered to both overseas and domestic customers. He has encouraged the sector to bring up "Sanitary Warriors" for the associated societies so that the goals envisaged under the national level Swachh Bharat mission can be fulfilled.

The valedictory function was attended by Dr. Ram Mohan M. K., Joint Director (QC), and Mr. Anil Kumar P.,

Joint Director (Marketing), MPEDA. The programme was coordinated by Mr. V. Vinod, Deputy Director (QC) and Dr. Biji K. B., Junior Technical Officer (QC), MPEDA.



Opening ceremony





Mr. D. V. Swamy, Chairman, MPEDA distributes certificate to the trainees

QUALITY FRONT

MPEDA Seafood HACCP Basic training programme at Kolkata

PEDA Regional Division, Kolkata organized four days Seafood HACCP basic training programme during 9th-12th of January 2023 at Kolkata. The main objective of this training programme was to empower the technologists of seafood processing plants registered under Regional Division, Kolkata with Seafood HACCP and related regulations. 25 Technologists working in different seafood processing establishments took part in the training programme.

The training programme was inaugurated by Mr. Rajarshi Banerji, President of the Seafood Exporters Association, West Bengal region. In his inaugural address Mr. Banerji emphasized the importance of the safety of seafood exported from the country and urged the participants to gain good knowledge to maintain quality and to avoid rejections.

Mr. Archiman Lahiri, Deputy Director, MPEDA, Kolkata welcomed the dignitaries and participants. Mr. Vaniya Kishore Kumar, Assistant Director & faculty of MPEDA HACCP cell delivered a special address on USFDA based HACCP training programme. Mr. Darshan Lal Dhondiyal, Assistant Director, MPEDA Kolkata proposed the Vote of Thanks.

The training sessions were handled by Mrs. Anju, Deputy Director, Mr. Subray Pavar and Mr. Kishore Kumar Vaniya, Assistant Directors of MPEDA.

The training programme was concluded with a valedictory function chaired by Mr. Anil Kumar P., Joint Director (Mktg.), MPEDA. Dr. T.R. Gibinkumar, Deputy Director (MP & Statistics), Mr. Premdev K.V., Deputy Director, MPEDA Mangalore and Mr. Archiman Lahiri, Deputy Director, MPEDA Kolkata also were present. Training Certificates was distributed to the participants in the valedictory function.



Mr. Rajarshi Banerji, President, SEAI West Bengal inaugurates the training; flanked by Mr. Archiman Lahiri, Mrs. Anju, Mr. Darshan Lal and Mr. Subray Pawar



Certificate distribution by Mr. Anil Kumar P., Joint Director (Mktg.), MPEDA



Group photo of participants, dignitaries and faculty members

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NEWS SPECTRUM

Underdeveloped seafood cold chains threaten livelihoods, food security and climate

ne of the most critical components of food and agriculture infrastructure is the availability of cold storage at every stop along the supply chain. What use is a trawler full of haddock if it rots before it gets from ship to shore, or processing facility to market? Food is wasted, income is lost, the potential to nourish a growing global population drops. Add emissions-producing refrigeration to the equation and at least four of the United Nations' 17 sustainable development goals (SDGs) are threatened.

A recent report released jointly by the UN's Food and Agriculture Organization and its Environment Program determined that insufficient refrigeration was directly implicated in the loss of 526 million metric tons of food, or 12 percent of the global total, in 2017, which released 1 gigaton of carbon dioxide into the atmosphere. As a result, it concluded that building up sustainable food cold chains worldwide was "fundamental" to protecting livelihoods, preserving the quality and safety of food and boosting climate resilience.

When it comes to seafood in particular, FAO estimates that "wastage between landing and consumption accounts for about 27 percent of the landed fish and within this, cold chain is a major percentage," said Toby Peters, director of the Centre for Sustainable Cooling at the University of Birmingham and one of the report's lead authors. In South and South East Asia, for example, 8.2 percent of seafood waste and loss comes from fish discarded due to lack of refrigeration, a number Peters calls "significant."

He says the entire cold chain — from point of harvest to point of sale, including production, transportation, handling and storage — has to work seamlessly in order to protect seafood quality.

"For me, the critical point of the chain is that first stage, because if you don't get the product to the right temperature and protect the quality once it's harvested,



then everything down the chain is going to fall over," he told the Advocate. "Once you've embedded loss of quality you can't recapture it."

If freshly harvested fish can be kept at 16 degrees-C (60.8 degrees-F), "You've probably got a day" before it goes bad, added Peters' co-author Leyla Sayin, a senior research fellow at the Centre for Sustainable Cooling. "If you can get it down to 5 degrees-C (51 degrees-F), you've probably got three days, and if you can get it down to zero, then you can get it to 10 days."

This is especially difficult for small fishers in low-income countries and communities in particular, Sayin added. Some producers "don't have any cold storage or any processing facility at the point where they caught it," she said, pointing out that in these instances when cold storage is available, it's usually in the form of ice. "So, they can't really transport [seafood] and sell it to urban markets, and export is not even a question, either."

Even for those who do have access to refrigeration to cool seafood, sustainability can remain elusive: "The challenge is that to produce cooling you have to use energy, which is inherently from diesel gensets, and you also use refrigerants, which have high global warming potential. Refrigerants can be many thousands of times more polluting than CO2," Peters said.

NEWS SPECTRUM

The trick is finding renewable energy solutions that can be used in tandem with natural refrigerants. The capital cost to build this capability is steep, though, and likely well beyond the reach of small producers. Training is also a challenge – not just on how to install, but also maintain equipment.

"I'm aware of ice cold stores for fisheries, which have been installed and everybody's rubbed their hands with glee," said Peters. "But they've broken down and then they've discovered the nearest engineer's three weeks away."

The FAO report details several solar-powered solutions for seafood cold chains, including chest freezers for women's fishing groups in the Solomon Islands, which can store 1,000 kilograms of fish; a freezer lease-toown scheme for women in the fisheries supply chain in Nigeria, which came with 3 years' worth of technical support and insurance; and a cold chain hub in Kenya that includes, among other important amenities, an ice flake machine for chilling fish before processing and during transport, and a cold room in which to store fish before bringing it to market. In the latter instance, write the report's authors, "The fishing community can increase its income by selling the fish fresh rather than dried (which results in losing over half the value of the fish and incurs the extra cost of salting and drying it for preservation)."

Still, challenges remain. When you're using renewables, "The sun doesn't always shine, the wind's not blowing, and therefore you have to have energy storage, so you have to have a system which has resilience in-built to provide cooling when you want it. And you have to develop the business model so that fishers can afford it," said Peters.

In developed countries, "The main problem is the cold chain is very private-sector dominated, [and] private sector invests in areas where they can make money," said Sayin. "So actually, what needs to happen is that government needs to invest in cold chain as part of critical infrastructure and become a partner in cold chain development."

Do this, she maintains, and the action will ripple out to "underpin food security, nutritional security and all the SDGs that we are talking about. Without treating cold chain as part of critical infrastructure, you won't address malnutrition, GDP growth – anything."

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