



**GOVERNMENT OF KERALA
KERALA STATE PLANNING BOARD**

**FOURTEENTH FIVE-YEAR PLAN
(2022-2027)**

**WORKING GROUP ON
FISH PROCESSING SECTOR IN KERALA – CONSTRAINTS
TO GROWTH AND SUGGESTIONS FOR REFORM**

REPORT

**Agriculture Division
March 2022**

FOREWORD

Kerala is the only State in India to formulate and implement Five-Year Plans. The Government of Kerala believes that the planning process is important for promoting economic growth and ensuring social justice in the State. A significant feature of the process of formulation of Plans in the State is its participatory and inclusive nature.

In September 2021, the State Planning Board initiated a programme of consultation and discussion for the formulation of the 14th Five-Year Plan. The State Planning Board constituted 44 Working Groups, with more than 1200 members in order to gain expert opinion on a range of socio-economic issues pertinent to this Plan. The members of the Working Groups represented a wide spectrum of society and include scholars, administrators, social and political activists and other experts. Members of the Working Groups contributed their specialised knowledge in different sectors, best practices in the field, issues of concern, and future strategies required in these sectors. The Report of each Working Group reflects the collective views of the members of the Group and the content of each Report will contribute to the formulation of the 14th Five-Year Plan. The Report has been finalised after several rounds of discussions and consultations held between September to December 2021.

This document is the Report of the Working Group on “Fish processing sector in Kerala – Constraints to growth and suggestions for reform.” The Co-Chairperson of Working Group was Dr.C.N.Ravishankar. Dr.R.Ramakumar, Member of the State Planning Board co-ordinated the activities of the Working Group. Sri.S.S.Nagesh, Chief, Agriculture Division was the Convenor of the Working Group and Smt.Vidhya K, Assistant Director, Agriculture Division was Co-Convenor. The terms of reference of the Working Group and its members are in Appendix 1 of the Report.

Member Secretary

PREFACE

As part of formulation of the 14th Five Year Plan, the Kerala State Planning Board had constituted working groups of experts in all the major sectors. In Agriculture and Allied Sectors, 6 working groups were constituted viz. Agriculture and Cooperation, Animal Husbandry and Dairy, Inland and Marine Fisheries, Forest and Environment, Water Resources and Regional Packages. To discuss and frame policies in each of these sectors, the working groups were further divided into 28 Expert Sub-Groups (ESG) with specific mandates.

Each Expert Subgroup held at least three meetings beside one focused group meeting before finalising the report. I, the Co-Chair, place my deep appreciation and gratitude to all the esteemed members of the ESG for their valuable contributions in preparing the report. I am extremely grateful to Dr. V. K. Ramachandran, the Honourable Vice-Chairperson, Kerala State Planning Board, Dr. R. Ramakumar, Member, Kerala State Planning Board and Sri. S. S. Nagesh, Chief, Agriculture Division for their consistent guidance and suggestions in preparing the report. The drafting team put in commendable work in bringing together all the views and opinions of the members. I sincerely hope the recommendations in the report can lead to important changes in the public policy on the development of fish processing sector in the State.

Dr.C.N.Ravishankar
Official co-chairperson

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HIGHLIGHTS

- Fish processing and export is a sunrise sector for Kerala.
- Effective value addition and innovative products in the way forward for the sector



FISH PROCESSING SECTOR IN KERALA –CONSTRAINTS TO GROWTH AND SUGGESTIONS FOR REFORM

Executive Summary

Introduction: Kerala, located on the south-west coast of India has a coastal stretch of 590 kms and an exclusive economic zone (EEZ) of 0.218 million km². Apart from the immense potential for capture fisheries, the possibilities for exploring the inland aquatic resources are also considerable. Seafood has an established market on account of its availability, accessibility, nutritional value, as well as quality and safety aspects. These also offer immense potential for product diversification. However, seafood is highly perishable and requires proper processing and preservation. This is critical to maintain the inherent quality characteristics and extended stability for better returns, to abate post-harvest losses, and to ensure consumer safety and satisfaction.

Challenges in the fish processing sector: these include inconsistency in raw material supply, constricted value addition, lack of focus on domestic markets, insufficient supply of quality water and ice, scarcity of pre-processing facilities, shortage of amenities in fishing harbours, shortage of skilled manpower, unfair trade practices, lack of upgradation in fishing techniques, and controversies in the implementation of projects. Another issue is the deficiency of inclusive growth in the industry.

Recommendations: Several recommendations and action points have been proposed to overcome these limitations. These are listed in the table below

Recommendations	Immediate Action points*	Long-term Action points*
Conservation of Fishery Resources for Boosting Primary Production	Measures to ensure responsible harvesting practices in the vessel. Implementation of sea ranching programmes. Issues affecting the seafood trade such as US ban on export of wild caught shrimp from India.	A comprehensive revival policy for aquatic ecosystems. Implementation of various scientific technologies like remote sensing.
Upgradation of Fishing Methods	Compliance to requirements of design and construction of fishing vessels with reference to post-harvest handling and storage.	Periodic training programmes to the personnel involved in fishing activities.

Adoption of Scientific Farming Practices

Upgradation of gear and craft in fishing.

Implementation of a cage-culture project along the entire length of the Kerala coast.

Seaweed may be adopted for its possible culture, harvest and post-harvest utilization.

An intense survey to estimate the un-barren paddy fields and traditional prawn filtration fields in the state and a comprehensive plan to be prepared.

Ranching programme should be strengthened to boost the aquatic productivity.

Focus on Domestic Trade

Introducing the value addition options of emerging candidate species like tilapia in the domestic sector.

Hubs for seafood value addition with a networking system

Market promotion schemes for promoting value added fish products in the domestic sector.

Entrepreneurship development programs especially for youth and women

Product Diversification

Initiatives to organize International as well as national seafood trade shows.

Encouraging entrepreneurship in production and marketing of value-added fishery products

Introducing fishing vessels with onboard processing facilities even to adequately handle and process high value species like tunas. Establishment of industries for indigenization of machinery used for processing and packaging

Human Resource Development	Periodic Skill development programmes organized with the involvement of co-operatives for participatory management	Ascertaining the employees with better wages matching their skill involved in the operational procedures.
Quality water and ice supply	Renovation of existing ice plants. Ensuring potable municipal water supply	Establishment of approved ice plants either independent or confined to pre-processing centres/harbours/landing centres. Options for alternative source of water like filtered seawater in harbour, etc.
Upgradation of pre-processing centres	Renovation of existing pre-processing facilities.	Establishment of new pre-processing facilities. Initiatives to link pre-processing activities to Kerala Rural Employment Guarantee Scheme (KREGS).
Modernization of Harbour facilities	Establishment of standard operating procedures in harbours and its documentation. Implementation of Market Price Information System.	Develop designs/models for harbours/market in the fisheries sector.
Establishment of By-products Industry	Provisions for proper sorting, labelling and storing of rest raw material.	Common effluent treatment units in earmarked areas Commercial approaches for marine bioactive compounds from waste
Growth Should be INCLUSIVE	Schemes for the upliftment of stakeholders in fisheries sector	

Government initiatives in marketing

Formation of a co-ordination group for periodic review and recommendations to the state government.
Formation of a state nodal agency having liaison with central authority.
Initiatives to consider seafood processing under the 'Green' category and permissions for expansion of existing factories.
Single window clearances for dealing license approval issues of processing industry.
Activities hindering trade promotion must be abolished.
Exemption of seafood sector from unplanned mass protests.
Measures to liberalize the norms of the financing agencies with regard to the overdues imposed on exporters on account of pandemics.
A monitoring group for the effective implementation of five-year plan of State Planning Board.

Development of integrated fisheries development project
Establishing mega seafood parks near primary fish production centres.
Subsidy for equipment and concessional tariffs on major cost like electricity
Creation of Self-certification system for exporters
Establishment of exclusive chilled rooms in airports
Revision of conflicting export policies and regulations
Development of bulk cold storage facility.
Initiative to develop mother vessels at Kochi terminal for overcoming container shortage issues.
Establishment of efficient transportation facilities for supply of farmed aquatic varieties from neighbouring states.

1. FISHERIES – AN OVERVIEW

India is the third largest fish producing country in the world, accounting for 8% of the global production. The fisheries sector is a good source of income and employment and provides sustainable nutrition including cheap and high-quality protein to address the nutritional needs of the nation. The sector can also stimulate the growth of various subsidiary and allied industries. Almost 28 million Indians depend on this sector for livelihood. Kerala, located on the south-west coast of India has a coastal stretch of 590 kms and an exclusive economic zone (EEZ) of 0.218 million km². It occupies less than 1.3% of total area of the country with approximately 10% of total coastal line of India. Apart from the immense potential for capture fisheries, the possibilities for exploring the inland aquatic resources are also considerable with 46,129 ha of backwaters, rivers, and other water bodies. The state has 0.143 million ha of brackish water and 0.226 million ha of freshwater resources. Indian mackerel is the major resource in the state followed by Indian oil sardine, anchovies, threadfin breams, penaeid prawns, and cephalopods. About 4.75 lakh tonnes of marine fisheries and 2.05 lakh tonnes of inland fisheries were reported from the state (2019-2020). The fisheries productivity of Kerala from these resources augments its potential for post-harvest development activities including processing, value addition, and marketing of fishery commodities.

Seafood processing and value addition

Seafood has an established market on account of its availability, accessibility, nutritional value, as well as quality and safety aspects. These also offer immense potential for product diversification. However, seafood is highly perishable and requires proper processing and preservation. This is critical to maintain the inherent quality characteristics and extended stability for better returns, to abate post-harvest losses, and to ensure consumer safety and satisfaction.

Demand for seafood has shown a remarkable increase in the recent past and reports suggest that fresh seafood in the live and chilled form represents 40.5% of the world's seafood production, while processed products (frozen, cured, canned, etc.) represent 45.9% (FAO, 2012). However, in India, only 22% of fish is processed and this is mainly for export markets (16%). The marine products exported from the country undergoes only minimal level of processing, like chilling or freezing, without more value addition.

Kerala fares better in terms of processing and value addition in comparison to the national average with a contribution of approximately 34%. Among the product category, frozen fish accounts for 26% of the total fish products, followed by salted dried fish (22.3%) and unsalted dried fish (5.7%). Though the demand for dried commodities is higher, they require well-framed processing practices that follow standard processing protocol under prescribed quality norms and certification.

In India, the infrastructural facilities for the seafood processing operations are mostly located in the coastal areas. The major items processed include shrimps, fin fishes, squids, and cuttle fish. There are 589 processing plants in the country, with a total annual capacity

of 31.7 thousand tonnes. India has the largest number of processing plants in the world, but much of the capacity is under-utilized. Around 700 exporters are currently registered for seafood marketing in the country.

Marine products are the leading agricultural commodity exported from India. It occupies a prominent place with 50% share of total animal products exported. The marine products export from India have witnessed a phenomenal shift in growth performance since 2010-11. The marine export from the country was valued at Rs. 46,662 crores (USD -6.73 billion) during the year 2019-20 and Rs. 43,717 crores (USD 5.96 billion) during 2020-21. The annual export growth rate (in US \$) showed a drastic shift from 4.3% during 1995-96 to 2009-10 to 11.4% during 2010-11 to 2018-19. More than two-thirds of the export contribution is of frozen shrimps, followed by frozen fin fishes (10.4%).

The fish processing industry of Kerala is the back bone of the fisheries sector with 204 exporters and it accounts for 21% of the processing units (112 numbers) and 14% of the processing capacity of India. The export of marine products from Kerala increased from 97.2 thousand tonnes in 1995-96 to 238 thousand tonnes in 2018-19 with a corresponding increase in value from US \$ 440 million to 1163 million. In 2020-21, the state exported a total of 157,698 MT of seafood, which brought in approximately 770 million USD, equivalent to INR. 5650 Crore. However, the share of the state in the export value has declined consistently from 24.5% to 12.9% during this period. Corresponding changes have been seen in the quantity as well. From 2010-2019, the export performance has improved from that during 1995-2010 in the state, as noted at the national level also, albeit more subdued. The sharp decline in the share was due to the inability to match with the high growth in shrimp production in other states, notably Andhra Pradesh, primarily due to the low pace of aquaculture development in Kerala. Marine exports from Kerala are mainly dependent on capture fisheries like wild caught shrimp and fin fishes with minimal processing, and the South East Asian countries are our major export destination.

Fisheries sector is prominent in the food processing sector and one of the leading sources of revenue for the state government. This vibrant sector contributes nearly three percent of the economy of the state. Both the government and the industry are keen to tap the huge, under-exploited potential, with considerable stress on exports. Even though the government supports the industry through various promotional measures, seafood processing industries still face challenges that need due attention. Increasing demands from legislation and from the consumer for better quality and safer products have to be taken into account. To provide safe, high-quality seafood, its processing has to make use of the novel advancements in food science and technology.

2. CHALLENGES IN THE FISH PROCESSING SECTOR

The main challenges faced by the fish processing sector in Kerala are listed below.

Inconsistency in raw material supply

The main challenge facing the fish processing sector in Kerala is the severe shortage of raw material leading to extremely low capacity utilisation (below 20%). Approximately 112 sea food processing plants and 150 cold stores are functioning in Kerala. Most of these depend wholly on capture fisheries for their operations.

Climate change due to global warming has drastically affected the capture fisheries from marine aquatic sources. Further, over-exploitation of fishery resources without considering the maximum sustainable yield has also led to stock depletion. Due to unsteady supply or daily fluctuations in the catch, majority of these plants are not able to utilize its full production capacity. Apart from the daily fluctuations in the availability of raw material, seasonal fluctuations also impact the operation of the plants.

On account of capacity underutilization, most of the enterprises face financial challenges and investors are forced to invest more on capital. The plants should receive a continuous supply of raw material for sustainable growth. A few plants get surplus materials from neighbouring states like Tamil Nadu and Andhra Pradesh for their processing operations as the state's primary production is very less. However, since processing units in Andhra Pradesh are diversifying their production through value addition, the availability of raw material from this state is becoming a major challenge.

Constricted seafood value addition

A major issue in seafood trading is the low level of diversification in terms of products and export destinations. Approximately 90 % of all exports are in a state where they undergo only primary processing viz., live, fresh, chilled, or frozen. Only less than 10% seafood exports form high-end value-added forms like RTE products. This leads to much lower value realisation, and hence, requires immediate appraisal. One reason for this is difficulty in adapting to the taste and preferences of the consumers.

Lack of focus on domestic markets

The seafood industry is yet to focus on domestic market on par with its export market as there is a remarkable increase in the demand for seafood and its value-added products among the domestic customers. This is evident from Kerala's per capita fish consumption of 19.41 kg, which is higher than in other states.

Insufficient supply of quality water and ice

Good quality water and ice in sufficient quantity are important requirements for maintaining fish quality throughout the seafood cold chain. All seafood processing activities demand potable water as well as ice. However, the shortage of potable water as well as ice remains a major challenge, compromising the product quality.

Scarcity of pre-processing facilities

A distinct feature of the seafood processing sector in Kerala is its dependence on the pre-processing sector. Many of the pre-processing centres do not have sufficient infrastructure required for maintaining the high hygiene standards required and are in a state of decline. Further, the socio-economic challenges faced by the personnel involved in these skilled activities are not properly addressed. In addition to pre-processing facilities in processing units, shortage of these units in harbours and landing centres also leads to poor quality raw material.

Shortage of amenities in fishing harbours

The basic facilities required for fishing harbours/landing centres like pre-processing, cold storage, waste disposal, etc., are limited, thereby affecting the primary processing as well as further secondary and tertiary processing operations. Further, the unhygienic practices adopted by the personnel at the landing centre also affects the post-harvest food chain leading to poor quality raw material.

Shortage of skilled manpower

Shortage of skilled manpower for coping with the advanced processing operations and value addition is a major limitation in the industry. Currently, the sector is in acute shortage of certified and trained machine operators, production supervisors, purchase supervisors, skilled graders, fish filleters, tuna grade checkers,, etc.

It is a major challenge faced in every operational stage of the seafood supply chain and calls for immediate consideration.

Unfair trade practices

There is a prevalence of bad trade practices in the sector, such as the use of harmful chemicals like formalin and ammonia, which is a major concern that needs serious and immediate appraisal.

A fair and transparent system for selling raw material shall help the processors to estimate the cost better. The current system does not facilitate the effective procurement of raw material by direct transactions with the harvesters due to existence of technical barriers and involvement of middlemen between the fisherfolk and the trader.

Lack of upgradation in fishing techniques

Technological advancement in fishing methods and equipment including gear and craft is a pre-requisite for responsible fishing. This should be addressed effectively so as to facilitate the availability of good quality and targeted seafood for further processing and value addition, minimizing the post-harvest losses in the supply chain.

Controversies in implementation of projects

Implementation of national policies like Blue Economy is thought to be controversial as it may adversely affect the marine fishery resource of Kerala.

Growth in sea food industry is not inclusive

Growth in sea food industry is currently not inclusive, with the benefits being limited to a certain group. It is not conducive to the gross development of the stake holders.

3. RECOMMENDATIONS AND WAY FORWARD

Conservation of fishery resources for boosting primary production

Sustainability of fisheries is a major issue to be addressed as it simultaneously affects the post-harvest and related activities. Aquatic ecosystems including marine, back waters, rivers, etc., should be conserved by revival of the natural ecological parameters, thus reducing adverse environmental effects and boosting productivity by the natural breeding of shrimps and fishes. There is an urgent requirement to plan and execute a mechanism to control the over exploitation of fishery resources by following the norms of “Maximum Sustainable Yield”.

Action Plan

- A comprehensive revival policy for aquatic ecosystems that covers aspects like protected areas, seasons, species, etc. should be implemented. This should also cover the establishment of artificial habitats in the selected aquatic environment, certification for sustainability of major fishery resources like Kollam karikkadi, squid, cuttlefish, etc. This policy can be implemented through the state fisheries department in consultation with research organization like CIFT, CMFRI, and CMLRE.
- The State Fisheries Department must ensure that fishes are harvested by following responsible harvesting practices like the usage of by-catch reduction devices, encouraging mesh size regulations, etc. Species-wise catch quota needs to be fixed for each vessel to prevent over exploitation.
- Boosting of sea ranching programmes in various project schemes implemented by the state fisheries department.
- Unpredictability in the daily catch need to be sorted out by implementation of various scientific technologies such as remote sensing. Intense scientific research needs to be directed in this regard by equipping techniques like predictive modelling. The government can initiate projects under fisheries upgradation schemes with institutes like CMFRI as the NODAL agency.
- Issues affecting the seafood trade such as US ban on export of wild caught shrimp from India under the misconception that TEDs designed in India have an adverse effect on turtle resources, need to be addressed immediately. This can possibly increase exports to the US market by 0.3 billion USD. For this, the state government in consultation with MPEDA should take immediate action for environmental assessment studies in association with NOAA (National Oceanic And Atmospheric Administration) in Kerala waters to confirm the sustainability in operations.

Upgradation of fishing methods

Scientific interventions and advanced fishing methods should be popularized and proper extension services should be ensured by providing hands-on training to the fisherfolk community involved in responsible harvesting practices like deep sea fishing, high-tech fishing, etc. Larger boats equipped with efficient fishing gear to catch deep sea fishes and shellfish need to be considered.

Action Plan

- Compliance to the design, construction, and material requirements of fishing vessels with reference to post-harvest handling and storage may be ensured. Vessel monitoring system with GPS needs to be strictly implemented for establishing traceability. Record keeping and auditing of fishing vessels must be made mandatory. The State Fisheries Department should ensure that license is given only to those vessels equipped with specific requirements for following responsible harvesting practices. In this regard, a checklist for the same need to be established.
- Financial support should be ensured by state government for the upgradation of gear and craft in fishing in the form of diesel subsidy, fish holds, etc. Grant should be in par with other states like Karnataka and Tamil Nadu.
- Periodic training programmes should be ensured for fisherfolk through state fisheries department in consultation with scientific research institutes and certificates in this regard may be issued which needs to be made mandatory for licensing of fishing vessel.

Adoption of scientific farming practices

In view of the dwindling sea catches, effective strategies need to be recommended for the ailing seafood processing sector by supplementing sea catches with high-demand aquaculture species such as Etroplus, Tilapia, Pangassius, Channa, Mulletts, Milk fish, Vannamei, etc. which can be promoted as international brands for trade and attract better earnings/profits. The state, which is blessed with abundant water resources, can be used to develop effective aquaculture practices with scientific and sustainable eco-friendly approaches. Some specific suggestions are given below

- Seaweed farming has considerable potential as the value addition options from them are immense with a major potential in both domestic and international markets.
- Cage farming in sea is a promising option to enhance production. Species like Cobia and Sea bass are identified to be excellent for cage farming.
- Aquaculture of fresh water species like Scampi, Pangasius, and Tilapia as well as indigenous varieties like pearl spot, wallago attu, and shrimp need to be promoted on account of their scope for value addition.
- Exploration of the possibilities of L. vannamei culture in non-conventional aquaculture areas subjected to use of certified SPF (Specific Pathogen Free) seed sourced from Coastal Aquaculture Authority (CAA) approved hatcheries. Government should initiate steps to start hatcheries in the public sector for the availability of quality seeds.
- Adoption of new technologies like recirculation aquaculture systems and biofloc to improve aquaculture productivity.
- Focus on organic aquaculture with eco-certification schemes may be promoted as there is a huge demand projected for organic-certified seafood, particularly in European countries.

Action Plan

- Seaweed is a highly promoted seafood source under various national-level schemes like PMMSY which can be adopted by the state for its possible culture, harvest, and post-

harvest utilization.

- Ranching programme should be strengthened by the state fisheries department under various state level schemes in panchayat and block level. Recreation of Pearl Spot natural culture in the Vembanad Lake, in other back waters can boost the productivity of this indigenous high demand species.
- Implementation of a cage-culture project in patches along the entire length of the Kerala Coast entrusted to self help groups (SHG's) formed by fisherman communities. Suitable species must be identified and the project must be run by the fisherfolk community with the financial and technical assistance of the government. This requires an initial feasibility study and an environmental impact assessment may be done in collaboration with National research institutes like CMFRI through KVKs. Under the central scheme for business model of fisheries, an urgent need for sea cage farming in India was identified and initiated with a committee comprising of representatives from the State Fisheries Department/ Fisheries Development Corporation, ICAR-CMFRI, and NFDB. This scheme can be further leveraged by the state government by expanding the scheme.
- An intense survey needs to be carried out by the state fisheries department in consultation with FFDA and ADAK to estimate the extent of non-barren paddy fields and traditional prawn filtration fields in the state, and a comprehensive plan needs to be prepared to effectively utilize it for diverse aquaculture practices incorporating fresh as well as brackish water species. Currently, only about 35% is targeted for scientific aquaculture while the remaining area is used for age-old shrimp filtration practices. State projects similar to Janakeeya Matsyakrishi, Subhiksha Kerala scheme, etc. should be promoted. The project report on unused paddy fields for the past ten years done by Seafood Exporters Association of India (SEAI) and Central Institute of Brackish-water Aquaculture (CIBA) can be taken as reference for shrimp farming in these neglected paddy fields.

Focus on domestic trade

On account of the increased demand of internal customers for value-added and convenient food items, the seafood sector should concentrate on the domestic markets by adopting high end processing technologies with better value addition approaches. Market surveys have also indicated a huge potential for convenient seafood items. High quality and eye-catching designs will help meet the demands of local consumers. Considering the per capita fish consumption of the state, the industry can make effectual utilization of the domestic market with diverse value-added options with the slogan “FISH FOR ALL”.

Action Plan

- New candidate species like tilapia, pangasius, etc. can be effectively introduced in domestic sector with an array of value addition options. In this regard, scientific studies need to be undertaken to develop protocols for value addition. Detailed scientific investigations on the quality and safety of farmed fishes subject to their culture conditions with special emphasis on its feed, harvest season, and size need to be

taken up along with effective preventive strategies for pungent muddy smell of farmed species including traditional species like *etroplus*. Schemes can be initiated by the state government with budgetary provision for such research involving institutes like CIFT. Schemes and programmes of KSCSTE for research and development can be explored in this regard.

- Market promotion schemes must be initiated by the state for promoting value-added fish products in the domestic sector including its branding and subsidies. Under this scheme, an initial market survey needs to be undertaken for understanding the demand of value-added products in the domestic sector. Identify credit/investment requirements for the small/medium-scale production of value-added fishery products. Further establishment of retail outlets for the marketing of fish-based value-added products may be promoted to increase the marketing of fish and fishery products in the domestic market. Kerala government should link with NABARD, other commercial banks, etc. for extending the credit facility for the development as well as expansion of marketing infrastructure and other facilities. Funds under NABARD's RIDF can be made use of more effectively. Sub schemes like Agricultural Marketing Infrastructure (AMI) under the Integrated Scheme for Agricultural Marketing (ISAM) can also be referred for the same.
- Entrepreneurship Development Programs may be initiated, especially for youth and women. Initiation from State fisheries department in collaboration with incubation centres of research institutes like CIFT, NIFPHATT,, etc. is appreciated in this regard.
- Hubs for seafood value addition with a networking system needs to be set up to share information and profit throughout the value chain. Model hubs established by NIFTEM can be taken as reference for the same.

Product diversification

The fish processing industry oriented towards value added products to domestic and export market need to be well developed in terms of facilities and quality assurance mechanisms. To raise the capital and labour productivity in the marine fisheries sector, the export needs to target high value realisation by establishment of high-end processing facilities to cater the needs of niche markets. The exports have to graduate to higher level addition with additional capacity in terms of introduction of technologies like high pressure processing, irradiation, pulsed light technology, and technologies like modified atmosphere, active intelligent packaging, and other advanced packing technologies. Other than the export markets, the demand pattern for seafood consumption in the domestic market is also shifting gradually with higher propensity to purchase processed and semi-processed fish and fishery products. This has the potential for entrepreneurship development and income generation, particularly among the communities who are traditionally involved in fish harvesting and processing.

The seafood industries of China or Vietnam who meet the value addition requirement through seafood import can be treated as examples. Though they do not have enough primary production to meet their processing capacities, they export large quantities of seafood by importing raw materials from other countries for value addition. Our state too

can adopt such practices and upgrade into a hub of value-added products by using world class processing plants and skilled manpower capabilities. The consumer needs continue to evolve and become more sophisticated. Hence, for the successful launch of new value-added seafood, the basic five principles like quality, safety, convenience, taste, and affordability may be considered. With proper scouting of markets and tie-ups, there are opportunities for improving value addition especially in the case of ready-to-eat/ ready-to-cook (RTE/ RTC) products for both the domestic and export markets.

A few specific suggestions for value addition in seafood sector include the following

- Possibilities of the state to emerge as a major exporter of sashimi grade tuna, targeting Japan is to be looked into. Production of sashimi grade tuna requires a paradigm change in the approach requiring advanced tuna handling and treatment throughout the value chain. Though state possess specialised skills in tuna harvesting, the entire tuna value chain is ill-equipped to produce sashimi grade.

Other diverse possibilities in fish processing include

- Diversification of ethnic/traditional recipes like fish/shrimp pickle, fish/shrimp dishes of different cultural populations, marinated fish with Indian spices, etc.
- In spite of having a number of lean varieties of candidate species globally identified for surimi manufacturing, it remains as a least explored area of value addition. Shellfish analogue products from surimi is in high demand in both domestic and export markets.
- 'Ready to eat/serve products' that are prepared through thermal processing is a promising option. Though capital intensive, the higher price realization for these commodities opens huge possibilities for these convenient products both in domestic and international markets.
- Upgradations in curing and drying processes. Currently the demand for dried fish export is fast increasing. Further, the demand for these products among the local customers is also not met through supply from the state.
- Convenient products like Fish-based extruded products have high market demand among the urban entities.
- Battering and breading have contributed significantly to the value addition of fishes, shell fishes and molluscs. A lucrative market is discovered for this category of products. Different forms like coated butterfly shrimp, squid rings, stuffed squid rings, etc. are a few items that cater to the luxury markets.
- Sophisticated machineries must be adopted by the seafood industry to meet the upcoming value addition requirements of the customers.
- Live seafood trade is a thriving industry globally, especially in south-east Asian countries. However, in India it is started relatively recently, limited to carps as well as air breathing hardy fishes like cat fishes. Promoting the transportation and marketing of a wide variety of live seafoods can ensure better price realization to the producers for the commodity as well as quality products to the customers.

Action Plan

- Steps may be initiated to introduce fishing vessels with on-board processing facilities. These vessels must be adequately equipped to handle and process high value species like tunas. Suitable storage facilities like slurry ice/RSW/CSW may be introduced. Such schemes can be promoted by state government by adopting central schemes like PMMSY.
- Facilities for the indigenization of machinery used for processing and packaging as well as ingredients may be established. Subsidiary schemes may be promoted by State government for the promotion of such indigenous brands for the production of value-added fishery products by adopting the Make in India scheme.
- State government in association with MPEDA should take the initiative to organize sea food trade shows at the international as well as national levels to showcase the value addition opportunities of Kerala, thereby promoting the state's seafood trade among international and domestic buyers. Trade promotion to build up a brand name for ethnic recipes like fish peera, diversified products from mussels like Arikadukka, chutney powders,, etc. can be made through such exhibitions.
- For encouraging entrepreneurship in production and marketing of value-added fishery products, appropriate credit sources may be made available by the state in association with R&D institutions and incubation centres. Initiatives like government-funded workshops must be conducted in universities and colleges to sensitize fisheries professionals to the seafood sector, thereby boosting the entrepreneurship track record.
- Value addition in the seafood industry is labour intensive and one of the reasons that the industry is shifting away from this track is the labour volatility in Kerala. Changing labour laws can attract more capital to fund the huge factories needed for intensive value addition. This can be achieved by a three-prong strategy to generate a conservative estimates of approximately 1,25,000 direct jobs and 25,000 indirect jobs.

Human resource development

Personnel involved in the post-harvest seafood supply chain should be properly trained on responsible handling practices so as to minimize post-harvest losses and ensure availability of quality and safe seafood to the customers. Proper training to the market players in this regard can ensure dual benefits like better price realization for the producers and high-quality products to the customers, thereby meeting the demands at both ends. Though Kerala has a history of having enough skilled man power, recent trends indicate a lack of personnel involved in seafood post-harvest activities and hence, it is high time that the industry brings in enough skilled stakeholders.

Action Plan

- Modernized training must be provided to personnel on trends in the seafood sector for the sustained benefit of all the stakeholders in the value chain. Programmes can be taken up by the state by adopting the Skill India initiative. Periodic capacity building programs have to be organized for bringing awareness among the players in the processing and marketing sector regarding various aspects like the importance of

hygienic handling and processing of fish, proper packaging, etc. Co-operatives may be formed at different levels along the value chain for participatory management.

- Including skill development programmes pertaining to the post-harvest sector in fisheries via the Additional Skill Acquisition Programme (ASAP) in consultation with the research and academic institutions in the sector. State-funded entrepreneur development schemes managed by DIC and KSIDC need to be looked into.
- Offering employees better wages commensurate with their skills. Rationalization in this regard can be done by setting guidelines by the competent authorities in consultation with representatives from different work groups along the supply chain.

Ensuring quality water and ice

- Most landing centres have limited or no facilities for potable water and good quality ice. Availability of ice is poor in domestic markets too and icing is often not done as per recommendations. Lack of ice plants in the vicinity of markets is one reason for this. Availability of portable water and ice in the harbour should be ensured as it is a pre-requisite for hygienic handling practices and mandatory for seafood cold chain management.

Action Plan

- Pre-processing centres as well as harbours/landing centres should be encouraged to set up captive ice plants. Where this is not feasible, sufficient ice must be ensured from registered ice plants. FIFD Schemes can be referred to in this regard for implementation by the state government. Further facilities for periodically checking the quality of the water and ice used should be ensured.
- Municipal supply of potable water should be ensured for post-harvest operations and where it is limited, other methods like the use of filtered sea water need to be investigated. An estimate of the demand for water, which depends on landings, the number of fishing vessels in harbour, the number of personnel, and other harbour facilities like ice plants, pre-processing plants, etc., need to be looked into by the harbour committee. The FAO guide for estimating water requirements can be used as a reference in this regard.

Upgradation of pre-processing centres

- The seafood sector is in immediate requirement of upgradation, particularly in pre-processing facilities. Infrastructural and other facilities in the existing units need to be improved. New units need to be established in the harbour/landing premises for the smooth flow of the cold chain. The working status of the personnel involved in pre-processing activities need to be enhanced by occupational health service provision emphasising the medical surveillance of workers. Further recommendations should be in place for upgrading the living status of the pre-processing workers.

Action Plan

- Special schemes should be in place for the renovation of existing pre-processing facilities with attached ice plants or provisions for quality ice from registered plants. Further

independent pre-processing units should be networked for collection of effluents and solid waste to a common treatment plant.

- The pre-processing sector should be linked to Kerala Rural Employment Guarantee Scheme (KREGS) adopted under Mahatma Gandhi National Rural Employment Guarantee Scheme (NREGS) as it facilitates the upgradation of pre-processing activities by strengthening the personnel involved and leads to more employment generation in the sector.

Modernization of harbour facilities

Due to the lack of facilities in the landing centres/fishing harbours to meet the quality standards stipulated by exporting countries, ensuring product quality is challenging. Instances of rejection of sea food consignments on quality grounds are not rare and this adversely affects the sustainability of fisheries in the state. Urgent interventions in terms of design and technology are required to mitigate these issues to facilitate the promotion of seafood trade in the export as well as domestic market.

A few specific interventions required with regard to the fishing harbour upgradation include

- Harbour-based pre-processing centres should be created. The industry has enough tertiary infra structure units/world class processing plants, but not enough pre-processing facilities in the landing centers. Hence, there is an urgent need to create such facilities so that fish handling is done in a time bound manner without compromising the product quality. Through the supply chain, these centres can act as back-end facilities for developing superior quality value added seafood products.
- Smaller fish landing centers should be interconnected with temperature-monitored insulated cold trucks and proper transportation containers to facilitate timely loading and unloading of catches from vessels to organized trading platforms during peak landing seasons.
- A centralized facility for providing potable water, good quality ice and fuel pumps with necessary automation, should be provided in all landing centres/ harbours so that the activities can be efficiently managed. Other infrastructural facilities like chill rooms, waste disposal and treatment facilities,, etc. need to be ensured for smooth functioning of the harbour.
- Constitution of a harbour managing committees to ensure sustainable harvest and post-harvest practices like standardization of craft and fishing gears by monitoring the mesh size, size of catches, fish hold quality, maintenance of quality of catch,, etc. It is advisable to rank the vessels on the basis of a tier system for auctioning with Tier 1 products getting priority or premium value. This can ensure responsible fishing practices and product quality.
- Effective measures for the fair price realization of fish at the primary levels or fish landing centers should be made so that disparities due to the involvement of middlemen can be avoided. This can ensure fisherfolk or primary stake holders with fair price for commodity and facilitate steady supply of quality products to processors avoiding major price fluctuations.

- Further transparency should be ensured in the payment system promoting digital mode of payment.

Action Plan

- Develop designs/models for the development of harbours/market in the fisheries sector as per Indian Standard-IS 14520 :1998 to ensure efficient operational capabilities including proper handling, processing, packing, and sale of fish, collection and utilization of secondary raw material,, etc. Replicating the upgradation scheme adopted for Thoppumpady fishing harbour, the state government can take the initiative to mobilise resources from various central government schemes in association with MPEDA and Cochin Port Trust.
- Proper SOP must be established for each harbour and the documentation of all harbour operations including the involvement of direct as well as passive personnel utilizing the harbour, the volume of inflow and outflow of raw material, the revenue generated, the cleaning schedules, waste disposal information, etc. should be maintained by the harbour management committee.
- Market Price Information System may be developed and implemented, linking all landing centres/markets in a region or state(s). Adoption of these price systems should be made scientifically by the relevant stakeholders with special emphasis on the quality and grade of raw material as well as their demand /supply swing and should be implemented in association with government bodies like Matsyafed.

Establishment of by-product industries

On an average it is estimated that in fish processing, about 60-70% of the total raw material is categorized as waste. Bio conversion of this waste is an environment friendly and profitable option for the industry. A number of viable options are available for generating wealth from waste through the development of diverse by-products, and converting the seafood industry in to a zero-waste industry. These raw materials can be converted into high value by-products including fishmeal, fish oil, fertilisers, and hydrolysates gelatine. Wider acceptance of effective bioconversion techniques can facilitate significant reduction in wastes going to landfill and reduce their damaging impact to the environment.

Action Plan

- Provision has to be made for proper sorting, labelling, and storing of waste material at places where considerable volumes are generated. This will ensure its proper utilization further down the line for production of other high value sought-after products. Some areas can be designated as common centralized collection centres where clearly sorted and labelled secondary raw material from various points of value chain can be aggregated. These collected material can be transported to respective industries for the production of high value products. This can be implemented by identifying personnel at the harbour as well as processing units by the respective management committees.
- State government in consultation with the pollution control board can initiate provisions for common effluent treatment units in certain earmarked areas which can

be effectively operated under fixed and nominal charges. The ongoing pilot project run by ACCEPT Environment Solutions Pvt Ltd. under the chairmanship of the district collector of Alappuzha may be taken as reference with necessary fundings initiated by the Government.

- Subsidy schemes should be initiated by the state government based on Swachh Bharath mission to utilize marine bioactive compounds for the development of marine nutraceutical sector which has immense scope in domestic and export market. Scientific approaches in this regard can also be exploited by involving research institutes like CIFT.

Growth should be inclusive

A comprehensive development plan that considering all stake holders is a must for the state's economic progress and development. Development in the fisheries sector should ensure the socio-economic prosperity of the fisherfolk communities along with the commercial success of the ventures. Equity and access should be important considerations.

Action Plan

- State Subsidy schemes should be strengthened for the upliftment of stakeholders in fisheries sector. Existing schemes like saving-cum-relief schemes for fisherfolk, group insurance schemes, Kerala Migrant Worker's Welfare Scheme, and central schemes can be used as reference for further upgradation.

Government initiatives

Owing to the vibrant fisheries sector, seafood processing segment has been recognised as a priority sector. The Central Government has also recognised food processing as a sunrise sector, and provides support through various programmes through four ministries, viz., Ministry of Food Processing, Ministry of Commerce and Industries, Ministry of Agriculture and Farmers Welfare, and Ministry of Small and Medium Enterprises. A draft National Food Processing policy circulated recently envisages the creation of food processing clusters. Provision of agro-processing sector allows significant supports in terms of funds and setting up of infrastructure. The state needs to leverage the schemes for the processing sector provided at the national level and link it with the state's initiative at industrial level and at the decentralised level. A few recommendations and action plans in this regard include

Formation of Committees/ Groups

- To support the seafood industry, a "coordination group" is mandatory, which can do a periodic review on the industry and make necessary recommendations to the Government. The members of the group should be from different departments including fisheries and industry, universities, institutes, industries, and fisherfolk community.
- A state-level fish marketing regulating authority can be established for regulating of marketing activities in the state. The management of markets may be strengthened by forming management bodies on cooperative lines. Market Management Committees may be formed ensuring participation from all stakeholders.
- State government should have one nodal agency having liaison with central authority

for direct dealing of all the post-harvest matters including trade issues of the seafood sector. This approach can facilitate timely sorting of the problems faced by the industry.

Interventions in marketing

- An integrated fisheries development project must be considered that focus towards the economic development, targeting an employment generation of nearly three lakhs in the sector covering aspects including deep sea fishing, value addition, domestic and export trade. For this, a detailed feasibility study is required for its implementation considering the existing organizations like the Kerala State Coastal Area Development Corporation (KSCADC) or formation of a new entity in this regard which can be operated on a partnership mode.
- Government-backed co-operatives like MatsyaFed can establish more seafood processing factories in the State to support the fisherfolk and domestic markets. The Kerala Industrial Infrastructure Development Corporation (KINFRA) plays a significant role in promoting the food processing industry in the state, mainly by facilitating the setting up of a number of food theme-based parks. The seafood industry should also bring in an organized structure for sea food processing and exports - an integrated approach by establishing more seafood parks/clusters and supporting units. Separate budgetary allocation for establishing Mega seafood parks with advanced fish processing and packaging facilities in the vicinity of primary fish production centres may be done. The plots for establishing units may be given on long term lease basis to parties interested. The labour climate in the project zone can be controlled such that the labour can be retrenched by giving them their gratuity pending. About 150 acres can house around 25 processing units and can generate an employment of approximately 75,000. These parks can be equipped with a common ETP, cold storage, and other facilities. Limitation in the allocation of a single area for the park can be thought of splitting in different locations preferably in Kochi and Kollam. Further pre-processing centres about 50 numbers with state-of-the-art facilities can be established within the seafood park and in smaller seafood hubs which can be leased out to smaller operators or factories which can generate an employment opportunity of about 25000 numbers.
- In order to assist Indian seafood processors to promote value addition, a financial assistance scheme should be in place for the establishment of state-of-the-art processing / manufacturing facility to make retail convenience product aiming at increasing the share of high end/innovative/ ready to eat value added products to the total sea food exports from the country. Subsidy for the modernization of existing factories, procuring machinery, cold chain trucks, etc. should be promoted for adding value to the seafood supply chain. State can leverage the central schemes like PMMSY, PMFME schemes in this regard.
- Most seafood factories are located in areas which have a developed residential area around it. For old factories taking the 'no objection consents' of surrounding neighbours to increase the horsepower and expansion/construction needs are nearly impossible. Growth in seafood processing cannot be achieved without the enhancement of capacity of these plants. Government should take initiative with MPEDA and EIA in bringing

seafood processing under the 'green' category and permissions should be granted for the expansion of existing factories without consent from neighbours. Existing factory buildings need to be regularised wherever required. Wherever space is available and only new machinery needs to be installed all required permissions must be granted for additional horse power and process fast tracked. This can facilitate an employment generation of about 25000 without any capital investment from government.

- Support and assistance for the import, value addition, and re-export of seafoods is mandatory. Necessary initiatives should be taken by state government in consultation with MPEDA and EIA for necessary amendments in import policy and also in the AQ policies to facilitate faster clearance of imported lots. Provisions of allowing foreign vessels to dock and unload their catch for reprocessing and re-export must be promoted with necessary government interventions
- With reference to broodstock imports, Department of Fisheries under Ministry of Agriculture should exempt the imported raw material for value addition from the purview of SIP (Sanitary Import Permit). Importer should have the provision to move stocks immediately to the state-run cold store and start using the product within seven days of receipt of stock. Within this time bound period, FSSAI and Animal Quarantine should give approval post sampling and testing. At present, considerable delay happens in clearance leading to payment of demurrages and detention charges. Liberalization in this regard by necessary government initiatives with the support of MPEDA and EIA can be a big boon to processors, as the country's off season for cephalopod fishing coincides with good landings of the same in some other fishing nations.
- State government in collaboration with the Port Trust should take initiative for the development of a cold storage which can be run with 'cold energy' from LNG making the warehouse one of the cheapest in the country. This storage can be given on hire at concessional rate to processors to hold the imported raw material as well as the finished goods instead of paying costly storage charges to private players in cold chain business.
- International seafood trade is markedly affected on account of the scarcity of containers. This situation calls for assistance from the government to coordinate with the Vallarpadom container terminal and related ministries to enable mother vessels to dock at Kochi terminal. For this trade union and port authority should create a time-bound action plan to reach the efficiency level of the turnaround times as shown in best of ports such as Singapore.
- Single window clearances should be adopted for processing plants that facing license approval issues. Duration of licenses from local bodies must be issued for 5 yrs to reduce unnecessary hassles.
- Seafood sector must be treated as a priority sector as it significantly contributes towards state's economy and hence, may be exempted from unplanned mass protests like hartals, strikes, etc. that hamper the economic development of the sector.
- Self-certification system monitored by an export inspection agency can be created for chilled and live fish exporters. Relaxations with regard to reporting time at the airport should be revised. Insistence of current pre-departure time of five hours should be

relaxed to two hours for the convenient and proper transportation of commodities especially live consignments. State government in collaboration with Airport Authority / Management should establish chilled rooms in the airport premises exclusively for fish & fishery products to support the fresh & chilled fish exports to different countries.

- Major cost overheads following raw material cost in seafood processing are wages and power. Government of Kerala should support the industry by considering concessional tariff. Fixage of electricity charges during peak seasons and off-seasons should be implemented. Cold storages need to be treated like factories under HT industrial tariff as they are often made in different locations for want of space only.
- State Government in consultation with the railways should facilitate uninterrupted cold chain transportation facilities for farmed varieties like Vannamei shrimps from neighbouring states.
- Government should take measures to strengthen the bonding between departments viz., industries department, revenue department, etc. so that the rules and practices that severely hamper functioning of the seafood sector be simplified with better practicability.
- The recent pandemic has created havoc in the processing sector, especially the export market. The trade crisis has put many seafood traders in debt. State should intervene more seriously in this regard by promoting the existing schemes like the Vyavasaya Bhadratha Scheme and take necessary measures with the central finance ministry / RBI to instruct the financing banks in liberalization of their norms like avoiding the classification of the firm as an NPA (non-performing asset), etc.
- A monitoring group should be constituted by the government to see that the suggestions put forth in the five-year plan of the State Planning Board is effectively implemented.

Recommendations and action points for fisheries sector

Recommendations	Immediate Action points*	Long-term Action points*
Conservation of Fishery Resources for Boosting Primary Production	<ul style="list-style-type: none"> • Measures to ensure responsible harvesting practices in the vessel. • Implementation of sea ranching programmes. • Issues affecting the seafood trade such as US ban on export of wild caught shrimp from India. 	<ul style="list-style-type: none"> • A comprehensive revival policy for aquatic ecosystems. • Implementation of various scientific technologies like remote sensing.
Upgradation of Fishing Methods	<ul style="list-style-type: none"> • Compliance to requirements of design and construction of fishing vessels with reference to post-harvest handling and storage. • Upgradation of gear and craft in fishing. 	<ul style="list-style-type: none"> • Periodic training programmes to the personnel involved in fishing activities.

Adoption of Scientific Farming Practices	<ul style="list-style-type: none"> • Seaweed may be adopted for its possible culture, harvest and post-harvest utilization. • Ranching programme should be strengthened to boost the aquatic productivity. 	<ul style="list-style-type: none"> • Implementation of a cage-culture project along the entire length of the Kerala coast. • An intense survey to estimate the unbarren paddy fields and traditional prawn filtration fields in the state and a comprehensive plan to be prepared.
Focus on Domestic Trade	<ul style="list-style-type: none"> • Introducing the value addition options of emerging candidate species like tilapia in the domestic sector. • Market promotion schemes for promoting value added fish products in the domestic sector. • Entrepreneurship development programs especially for youth and women. 	<ul style="list-style-type: none"> • Hubs for seafood value addition with a networking system.
Product Diversification	<ul style="list-style-type: none"> • Initiatives to organize International as well as national seafood trade shows. • Encouraging entrepreneurship in production and marketing of value-added fishery products 	<ul style="list-style-type: none"> • Introducing fishing vessels with onboard processing facilities even to adequately handle and process high value species like tunas. • Establishment of industries for indigenization of machinery used for processing and packaging
Quality water and ice supply	<ul style="list-style-type: none"> • Renovation of existing ice plants. • Ensuring potable municipal water supply. 	<ul style="list-style-type: none"> • Establishment of approved ice plants either independent or confined to pre-processing centres/ harbours/landing centres. • Options for alternative source of water like filtered seawater in harbour, etc.
Upgradation of pre-processing centres	<ul style="list-style-type: none"> • Renovation of existing pre-processing facilities. 	<ul style="list-style-type: none"> • Establishment of new pre-processing facilities. • Initiatives to link pre-processing activities to Kerala Rural Employment Guarantee Scheme (KREGS).
Modernization of Harbour facilities	<ul style="list-style-type: none"> • Establishment of standard operating procedures in harbours and its documentation. • Implementation of Market Price Information System. 	<ul style="list-style-type: none"> • Develop designs/models for harbours/ market in the fisheries sector.
Establishment of By-products Industry	<ul style="list-style-type: none"> • Provisions for proper sorting, labelling and storing of rest raw material. 	<ul style="list-style-type: none"> • Common effluent treatment units in certain earmarked areas operated under fixed and nominal charges. • Commercial approaches for marine bioactive compounds from rest raw material for nutraceutical sector.
Growth Should be INCLUSIVE	<ul style="list-style-type: none"> • Schemes for the upliftment of stakeholders in fisheries sector. 	

Government initiatives in marketing

- Formation of a co-ordination group for periodic review and recommendations to the state government.
- Formation of a state nodal agency having liaison with central authority.
- Initiatives to consider seafood processing under the 'Green' category and permissions for expansion of existing factories.
- Single window clearances for dealing license approval issues of processing industry.
- Activities hindering trade promotion must be abolished.
- Exemption of seafood sector from unplanned mass protests.
- Measures to liberalize the norms of the financing agencies with regard to the overdues imposed on exporters on account of pandemics.
- A monitoring group for the effective implementation of five-year plan of State Planning Board.
- Development of an integrated fisheries development project focused towards the economic development of the sector
- Establishing mega seafood parks with advanced fish processing and packaging facilities in the vicinity of primary fish production centres.
- Subsidy for modernization of existing factories, procuring machinery, cold chain trucks, etc. and concessional tariffs on major cost like electricity
- Creation of Self-certification system for Chilled and Live fish exporters monitored by Export Inspection Agency.
- Establishment of chilled rooms in the Airport premises exclusively for Fish and Fishery products.
- Revision of conflicting policies and regulations that hinder export competitiveness.
- Initiative for the development of a bulk cold storage facility.
- Initiative to develop mother vessels at Kochi terminal for overcoming container shortage issues.
- Establishment of efficient transportation facilities for supply of farmed aquatic varieties from neighbouring states.

Details of the action point with its implementation strategies are mentioned under the respective suggestions

4. CENTRAL GOVERNMENT SCHEMES RELEVANT FOR POST-HARVEST FISHERIES SECTOR

Pradhan mantri matsya sampada yojana (pmmsy)

Pradhan Mantri Matsya Sampada Yojana (PMMSY) is a new flagship scheme with a substantial investment of Rs. 20,050 Crores for the holistic development of fisheries. The scheme is proposed to be implemented across the country over a period of five years to facilitate an additional fish production of 70 lakh tons, double the fisheries exports to Rs. 1,00,000 crores and to generate 55 lakh employment opportunities. This scheme covers post-harvest activities by critically addressing gaps in the value chain, including infrastructure, modernisation, traceability, production, productivity, post-harvest management, and quality control. The objectives envisaged include making available need-based production and post-production machinery and equipment for storage and transportation; services offering value addition at user charge basis under nominal rates, undertake high value additions/processing units for better price realization and exports, traceability related interventions, carry out higher income generating activities like cold chain development, seaweed cultivation, fish kiosks, etc., activities associated with fisheries supply chain as door-step support, marketing and branding of collective produce with better negotiation strength in marketing channels, facilitate market information about the produce for educated decision-making in production and marketing, development of fish and fisheries related products / byproducts and tie ups for domestic and export sales.

Funding Pattern

1. Central sector scheme component

The entire project/unit cost will be borne by the central government (i.e. 100% central funding). Wherever direct beneficiary oriented i.e. individual/group activities are undertaken by the entities of central government including National Fisheries Development Board (NFDB), the central assistance will be up to 40% of the unit/project cost for General category and 60% for SC/ST/Women category.

2. Centrally Sponsored Scheme (CSS) Component

- a) Non-Beneficiary oriented activities – Centre 60% and State 40% of the total project cost
- b) Beneficiary orientated activities – Governmental Assistance (Centre + State)
General Category – 40% of the project cost
SC/ST/Women – 60% of the project cost

The Governmental Assistance will be shared between Center and States as below

60: 40 for General States

90: 10 for North Eastern and Himalayan states

100% for Uts

The key strategies of the scheme relevant to the post-harvest sector are

- Encourage private sector participation-entrepreneurship models-PPP
- Grouping of activities into integrated projects with end-to-end solutions

- Development of integrated coastal fisher villages livelihoods & participatory approach
- Focus on fisheries exports-promotion of export-oriented species
- Collectivization of fishers and fish farmers (FFPOs)

Key Activities and investments envisaged under PMMSY relevant to post harvest sector are

- Fishing Harbours and Landing Centers (Rs 3340 Cr)
- Post-harvest and Cold Chain Infrastructure (Rs 1400 Cr)
- Markets and Marketing Infrastructure (Rs 1000 Cr)
- Development of Deep-sea Fishing (Rs 1605 Cr)
- Integrated Modern Coastal Fishing Villages (Rs. 750 Cr)

Scheme for blue revolution-integrated development and management of fisheries

The Ministry of Agriculture and Farmers Welfare, Department of Animal Husbandry, Dairying & Fisheries has accordingly restructured the scheme by merging all the ongoing schemes under the umbrella of 'Blue revolution'. The restructured scheme provides focused development and management of fisheries, covering inland fisheries, aquaculture, marine fisheries including deep sea fishing, mariculture, and all activities undertaken by the National Fisheries Development Board (NFDB). This scheme on blue revolution is formulated at a total central outlay of 3000 crore for five years with relevant components on fisheries which effectively addresses post-harvest sector also by considering the infrastructural requirements and post-harvest operations.

Fisheries and Aquaculture Infrastructure Development Fund (FIDF)

To fill the large gaps in fisheries infrastructure, the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying has set up a dedicated Fisheries and Aquaculture Infrastructure Development Fund (FIDF). FIDF envisages the creation of fisheries infrastructure facilities both in the marine and inland fisheries sectors and augment the fish production to achieve the target of 15 million tonnes by 2020 set under the Blue Revolution. Besides, the FIDF aims to achieve a sustainable growth of 8- 9 per cent, in a move to augment the country's fish production to the level of about 20 million tonnes by 2022-23.

The proposed Fisheries and Aquaculture Infrastructure Development Fund entails an estimated fund size of Rs 7522.48 Crore comprising of Rs 5266.40 crore to be raised by the Nodal Loaning Entities (NLEs), Rs 1316.60 crore beneficiaries' contribution and Rs 939.48 crore budgetary support from Government of India. The Nodal Implementing Agency for FIDF is the National Fisheries Development Board.

The objectives of FIDF are

- Creation and modernization of capture & culture fisheries infrastructure
- Creation of marine aquaculture infrastructure
- Creation and modernization of Inland Fisheries Infrastructure
- Reduce post-harvest losses and improve domestic marketing facilities through infrastructure support
- To bridge the resource gap and facilitate completion of ongoing infrastructure projects.

Eligible investment activities under FIDF relevant to post harvest sector

- Establishment of fishing harbours
- Establishment of fish landing centres
- Construction of ice plants (both for marine and inland fisheries)
- Development of cold storages (both for marine and inland fisheries)
- Fish transport and cold chain network infrastructure
- Development of modern fish markets and setting up of brood banks
- Establishment of state of art fisheries training centres, fish processing units, fish feed mills/plants
- Introduction of deep sea fishing vessels
- Any other innovative projects/activities designed to enhance fish production/productivity/value

PM Formalisation of Micro Food Processing Enterprises (PMFME) scheme

Ministry of Food Processing Industries (MoFPI), in partnership with the State/ UT Governments, has launched a centrally sponsored PM Formalisation of Micro Food Processing Enterprises Scheme (PM FME Scheme) for providing financial, technical, and business support for upgradation of existing micro food processing enterprises. PMFME has a Rs. 10,000 crore budget for five years (2020-21 to 2024-25) adopted with the aim of One District One Product (ODOP) approach to benefit industries in input procurement, availing common services and marketing of food products. Under this scheme, the state identifies the product of interest in each district based on the market demand. The scheme also supports strengthening of backward and forward linkages, provision of common facilities, incubation centres, training, research and development, marketing and branding for ODOP products. Further, this approach also complements and benefit from the existing promotional efforts of the government such as development of agriculture crop clusters under the agriculture export policy, the cluster approaches of the Ministry of Agriculture and the Ministry of Rural Development through the National Urban Mission.

ODOP schemes are approved for 14 districts in Kerala in which Kasaragod district has been sanctioned with ODOP scheme for mussels. The state agencies/KUFOS can avail this scheme to start a common incubation centre in the district for value addition of mussels. Financial Support for common infrastructure and marketing & branding to the tune of Rs 3 crores can be availed in this scheme for fish and fishery products. ICAR -Central Institute of Fisheries technology is the mentor institute for fish and fishery products under ODOP.

MSME Schemes

Mega Food Park

Mechanism to link agricultural production and market to maximise value addition, enhance farmers' income, create rural employment. The nature of assistance will be One-time capital grant of 50% of project cost with a limit of Rs.50 crore. Farmers, farmer's groups, SHGs are eligible for assistance under this scheme

Cold Chain

Value addition and preservation infrastructure provided from farm gate to consumer

without break. The nature of assistance will be 50% of total cost of plant and machinery, and technical civil works. Entrepreneurs, clusters, SHGs, FPOs, NGOs, PSUs,, etc. are eligible for assistance under this scheme.

Micro & Small Enterprises Cluster Development (MSE-CDP)

The Scheme supports financial assistance for establishment of Common Facility Centres (CFCs) for testing, training centres, R&D, Effluent Treatment, raw material depot, complementing production processes, etc. and to create/upgrade infrastructural facilities (IDs) in the new/existing industrial areas/clusters of MSE's such as power distribution network, water, telecommunication, drainage and pollution control facilities, roads, banks, raw materials, storage and marketing outlets, common service facilities and technological backup services for MSEs in the new/existing industrial estates/areas. Setting up of CFCs with maximum eligible project cost of Rs 15.00 cr with a GoI contribution of 70% (90% for special category States and for clusters with more than 50% women/micro/village/ SC/ ST units). Infrastructure development in the new/ existing industrial estates/areas in which the maximum eligible project cost is Rs 10.00 cr, with GoI contribution amounting to 60% of project cost (80% for special category States and for clusters with more than 50% women/micro/SC/ST units).

Subsidy schemes under marine products export development authority (mpeda), ministry of commerce, govt.Of india

Technology and Infrastructural Up-gradation Scheme for Marine Products (TIUSMP)

Technology development for specific value added products

The scope of the scheme is to provide assistance for existing units who wish to switch over their production to specific value added products and also to new entrepreneurs venturing into the seafood trade for the production and exports of VAPs. MPEDA aims at increasing the share of value added products in the total seafood exports from the country. Machinery and equipment for the production of cooked/blanched products, AFD products, Surimi based products, etc. for value addition, machinery such as IQF with cooking line, glazing, blanching, boiler, vacuum packing, battering and breading line, advance packing equipment, etc. will be considered for assistance.

Assistance for export handling units for live/chilled and dried marine products

Assistance for chilled fish export handling centre. Chilled fish is an important item which can be exported as a premium product which fetches high unit value realization. Modified atmosphere packaging (MAP), controlled atmosphere storage of fresh fish in chilled conditions will substantially increase the shelf life. Approved chilled fish handling centre is mandatory for processing and export of chilled items. Since there is a shortage of approved chilled fish handling centres in the country, the export of chilled items show only slow growth. The scheme envisages providing financial assistance for setting up of independent chilled fish handling centres to encourage the entrepreneurs who are interested in handling and export of chilled items. The main aim of the scheme is to increase the number of approved chilled fish handling centres and thereby increasing the export of chilled fish from the country.

Assistance for live fish export handling centre. Live fish handling centre equipped with holding facility, depuration facility with good quality running water, generator set, filters and aeration are very much required for maintaining the fishes in live conditions. This will help exclude the excreta, sand particles, etc. to maintain the product quality as required by the importing country. The scheme envisages the increment in the export of live items such as crabs, lobsters, fishes, shrimps, gastropods, bivalves, etc. Approved Live fish handling centre is mandatory for processing and export of live fish items. The scope of the Scheme is to motivate exporters engaged in export of live items to set up approved establishment for handling live items to increase the species exported in live condition and to improve the quality of the live fishes exported.

Assistance for dry fish export handling centre. Dry fish are important items of seafood export as it occupies major share for the items that are exported from the country. The conventional method for drying the fish in open areas are causing contamination. Approved dry fish handling centre for curing /drying / packing/ storage is mandatory for processing and export of dry fish items. The scope of the scheme is to motivate entrepreneurs to set up dried fish handling centre and storage premises to enhance the production and increase the export value of dried items from India.

Interim report on ‘environmental and social impact assessment study for assessing the suitability of derelict paddy fields for shrimp farming in kerala’

Based on the MoU between the Seafood Export Association of India (SEAI) - Kerala region and ICAR-CIBA, a study was conducted for assessing the suitability of derelict paddy fields not being used for any type of agriculture for more than 10 years in five districts (Thrissur, Ernakulum, Alappuzha, Kollam and Kannur) of Kerala for shrimp farming and to analyse the environmental and social impacts of such shrimp farming activity with the following objectives

- To identify paddy fields which are abandoned for many years, but has the potential for brackishwater aquaculture.
- To evaluate the water quality parameters of the abandoned paddy fields, and nearby brackish water resources.
- To collect the information about the agricultural activities and non-agricultural utility of the abandoned paddy fields.

Studies indicated that vast area of paddy fields were abandoned for more than 8 years in the studied districts of Kerala. Based on the soil and water characteristics analysed, as well as the prevailing environmental conditions, the site was found suitable for brackish water aquaculture. A high employment and revenue generation was projected in the report by assuming 2 crops per year. Reports suggest that the conversion of derelict paddy fields to sustainable aquaculture will not only facilitate the utilization of the derelict paddy fields which are abandoned otherwise, but also enhance the aquaculture production of the state ensuring the livelihood security to a considerable percentage of farmers.

APPENDIX I
PROCEEDINGS OF THE MEMBER SECRETARY
STATE PLANNING BOARD

(Present: Sri. Teeka Ram Meena IAS)

Sub: - Formulation of Fourteenth Five Year Plan (2022-27) – Constitution of Working Group on Inland and Marine Fisheries – Revised Proceedings - reg.

Read: 1. Note No. 297/2021/PCD/SPB dated: 27/08/2021
2. Guidelines on Working Groups
3. This Office order of even number dated 08.09.2021

ORDER No:SPB/342/2021-Agri (3) Dated:14.09.2021

As part of the formulation of Fourteenth Five Year Plan, it has been decided to constitute various Working Groups under the priority sectors. Accordingly, the Working Group on **Inland and Marine Fisheries sector** is constituted. For the smooth functioning of the Sectoral Working Group (SWG), it is decided to split the Working Groups into Expert Sub Groups (ESG). Hence the Working Group is categorized into four Expert Sub Groups as indicated in the proceedings. The names of the members of the SWG are indicated under each ESG. The Working Group shall also take into consideration the guidelines read 2nd above in fulfilling the tasks outlined in the ToR for the Working Group.

1. SOCIAL SECURITY FOR FISH WORKERS: AN ASSESSMENT AND SUGGESTIONS FOR REFORM

Co - Chairperson

1. Dr John Kurien, Visiting Professor, Azim Premji University, Bengaluru

Members

1. Dr C. Ramachandran, Principal Scientist, Socio Economic Evaluation and Technology Transfer Division, CMFRI, Cochin
2. Dr Daisy Kappen, Professor, Director of Extension, KUFOS
3. Mr V. M. Shoukath, Kerala Karshaka Sangham, Kumomkulam, Manjeri, Malappuram
4. Dr A. Suresh, Principal Scientist, CIFT
5. Dr M. K. Anil, Principal Scientist, CMFRI, Vizhinjam
6. Ms Smitha R. Nair, Joint Director, Fisheries Department
7. Ms C. R. Sathyavathi, Additional Director of Fisheries (Retd.)
8. Mr P. P. Chitharanjan, Former Chairman, Matsyafed

9. Mr. Antony Kurishinkal, State Committee member, Kerala Swatantra Matsya Thozhilali Federation (KSMTF)
10. Mr. V. Vivekanandan, CEO, South Indian Federation of Fishermen Societies (SIFFS)
11. Mr Joseph Xavier Kalapurackal, General Secretary, All Kerala Fishing Boat Operators' Association.

Terms of Reference

1. To document and access the status of social security for fish workers in Kerala over the past decade.
2. To identify gaps in the existing system of social security for fish workers and suggest remedial measures.
3. To prepare a vision for social security for fish workers over the next decade taking into consideration the changing developmental needs and the growth of the fisheries sector.
4. To suggest measures to reduce the dependence of fish workers on private money lending.
5. To suggest necessary infrastructural and administrative changes required to improve the status of social security of fish workers.

2. INFRASTRUCTURAL CHALLENGES IN KERALA'S MARINE FISHERIES SECTOR

Co - Chairperson

1. Dr B. Manoj Kumar, Registrar, KUFOS
2. Dr Leela Edwin, Principal Scientist and HOD, CIFT

Members

1. Dr B. Santhosh, Principal Scientist, CMFRI
2. Dr M V Baiju, Senior Scientist, CIFT
3. Dr Madhu V R, Principal Scientist, CIFT
4. Dr Ashok Kumar, Principal Scientist, CIFT
5. Ms Smitha R. Nair, Joint Director, Fisheries Department
6. Ms S. Manju, Fisheries Extension Officer, Karunagappally
7. Mr Sivakumar, Manager, Chintha Publishers

Terms of Reference

1. To assess the major infrastructural development work undertaken in Kerala's marine fisheries sector in the last decade, including existing old harbours, landing structures, markets, vehicles and transport and machinery.

2. To assess the infrastructural requirements in Kerala's marine fisheries sector for the next ten years, including in harbours, landing structures, markets, vehicles transport and machinery.
3. To suggest a plan to improve and modernise the existing infrastructure facilities in marine fisheries in Kerala.
4. To suggest ways to better link infrastructure in marine fisheries with the livelihood of fish workers, reduction of costs in value chains, promotion of trade, addressing food safety concerns of domestic and international consumers, employment generation and creating business opportunities and investment avenues.

3. HARVESTING THE POTENTIAL OF INLAND AQUACULTURE: TOWARDS A PLAN OF ACTION

Co - Chairperson

1. Dr Riji John, Vice-Chancellor, KUFOS

Members

1. Dr Devika Pillai, Associate Professor, KUFOS
2. Dr Dinesan Cheruvat, Additional Director of Fisheries, Department of Fisheries
3. Dr K. Dinesh, Associate Professor, KUFOS
4. Mr Jothish, Chief Operating Officer, Citra Agro Peixe Private Limited
5. Mr Ignatius Mandro, Joint Director, Department of Fisheries
6. Dr M. P. Safeena, Assistant Professor in Microbiology, Department of Fish Processing Technology, KUFOS
7. Ms. C. K. Shiny, Deputy Director of Fisheries, Kannur
8. Mr. Purushothaman Payyannur, Kerala Karshaka Sangham, Asad Bhavan, Payyannur
9. Mr Santhosh Baby, Managing Partner, Aqualine Exports

Terms of Reference

1. To assess the growth and development of the inland fisheries sector in Kerala over the past decade and identify gaps in policy.
2. To prepare a vision for the next 10 years to harvest the potential of inland fisheries in Kerala (including capture and culture)
3. To assess the existing systems of input and service delivery in inland fisheries and suggest measures for improvement.
4. Suggest specific action plans for transforming the inland fisheries sector as a major engine of growth of the fisheries sector including the use of new fish types, better utilisation of

water resources, reforms in inputs and service delivery systems, infrastructure development and value chain upgradation.

4. FISH PROCESSING SECTOR IN KERALA: CONSTRAINTS TO GROWTH AND SUGGESTIONS FOR REFORM

Co - Chairperson

1. Dr C. N. Ravishankar, Director, ICAR-CIFT

Members

1. Mr Anil Kumar Rajendran, Business Head, Neelratna Aqua Farm Private Ltd, Cochi
2. Mr Lauret Sadanandan, General Manager, Amalgam Foods
3. Mr Alex K. Ninan, Managing Partner, M/s. Baby Marine International
4. Mr K. Sivakumar, Vice-President, Innovative Foods Limited
5. Ms. Jisphin Martin, Block Panchayat Member, Anjengo; Matsya Thozhilali Federation
6. Mr. Manoj T Varghese, Proprietor, Kings Marine Products, Kollam
7. Dr. George Ninan, Head, Fishery Engineering Division and Principal Scientist, Fish Processing, CIFT

Convener

Mr.S.S.Nagesh, Chief, Agriculture Division, State Planning Board

Co- Convener

Ms.Vidhya.K, Assistant Director, Agriculture Division, State Planning Board

Terms of Reference

1. To assess the growth and development of the fish processing sector in Kerala over the past decade and identify gaps in policy.
2. To document the potential for the growth of the fish processing sector in Kerala over the next decade and suggest an action plan considering the needs of domestic and export markets.
3. To ensure that the action plan appropriately gives importance to the scope for value addition to increase values per unit quantity and need for skill up gradation of the workforce.

Terms of Reference (General)

1. The non-official members (and invitees) of the Working Group will be entitled to travelling allowances as per existing government norms. The Class I Officers of Gol

will be entitled to travelling allowances as per rules if reimbursement is not allowed from Departments.

2. The expenditure towards TA, DA and Honorarium will be met from the following Head of Account of the State Planning Board "3451-00-101-93"- Preparation of Plans and Conduct of Surveys and Studies.

The order read as reference 3 is modified to this extent

(Sd/-)
Member Secretary

Forwarded By Order


Chief,
Agriculture Division

To

The Members concerned

Copy to

PS to Vice Chairperson
PA to Member Secretary
CA to Member (Dr.Ramakumar.R)
Economic Advisor to VC
Chief, PCD,SPB
Sr. A.O, SPB
The Accountant General, Kerala
Finance Officer, SPB
Publication Officer, SPB
Sub Treasury, Vellayambalam
Accounts Section
File/Stock File