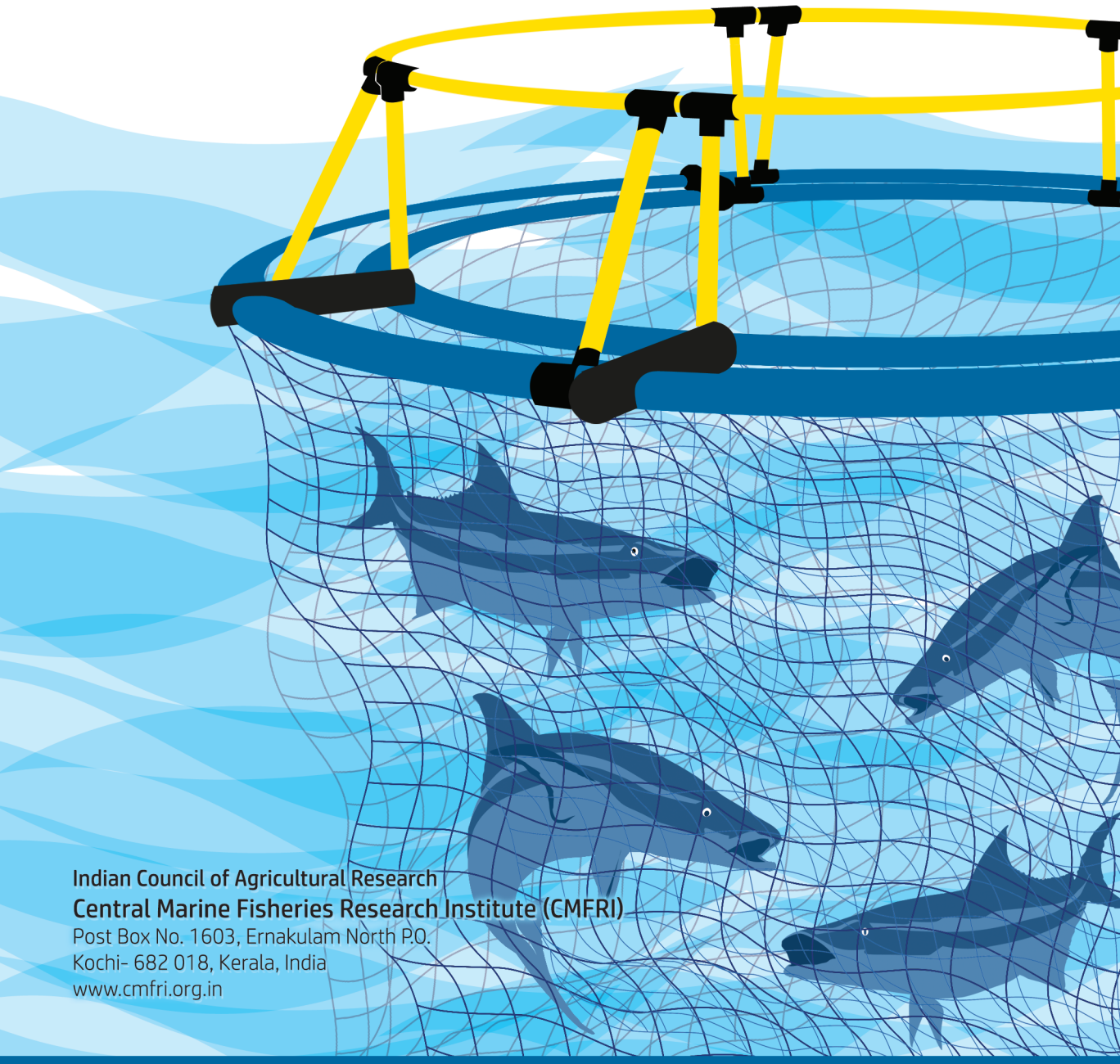
CMFRI Marine Fisheries Policy Series No.17/2020
ISSN: 2394-8019

Draft

# NATIONAL MARICULTURE POLICY 2019

[Report of the Committee constituted by the
National Fisheries Development Board (NFDB)
Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India]



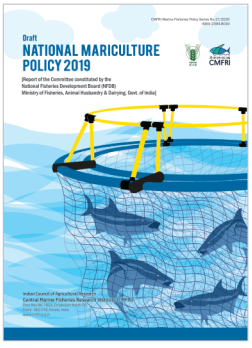
Indian Council of Agricultural Research
Central Marine Fisheries Research Institute (CMFRI)
Post Box No. 1603, Ernakulam North P.O.
Kochi- 682 018, Kerala, India
www.cmfri.org.in

CMFRI Marine Fisheries Policy Series No.17/2020
ISSN: 2394-8019

# Draft
# NATIONAL MARICULTURE POLICY 2019

[Report of the Committee constituted by the
National Fisheries Development Board (NFDB)
Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India]

Indian Council of Agricultural Research
Central Marine Fisheries Research Institute (CMFRI)
Post Box No. 1603, Ernakulam North P.O.
Kochi- 682 018, Kerala, India




CMFRI Marine Fisheries Policy Series No.17/2020
**Draft National Mariculture Policy 2019 (NMP2019)**
[Report of the Committee constituted by the National Fisheries Development Board (NFDB)
Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India]

ISSN: 0972-2351

Published by
Dr. A. Gopalakrishnan
Director,
ICAR-Central Marine Fisheries Research Institute (CMFRI),
Post Box No. 1603, Ernakulam North P.O.
Kochi- 682 018, Kerala, India
Web: www.cmfri.org

Design & Layout: Abhilash P.R., CMFRI, Kochi

Publication, Production & Coordination:
Arun Surendran, Library and Documentation Centre, CMFRI, Kochi

Suggested citation:
Gopalakrishnan, A., Kirubagaran, R., George John, Ponniah, A.G., Gopakumar, G., Sunilkumar Mohamed K., Krishnan P., Imelda Joseph, Boby Ignatius, Abdul Nazar, A.K., Jayakumar, R., Raju, M.S., Sreepada, R.A., Shinoj, P. and Rajesh N. (2019). Draft National Mariculture Policy 2019 (NMP2019); Report of the Committee constituted by the National Fisheries Development Board (NFDB), Ministry of Fisheries, Animal Husbandry & Dairying, Govt. of India. CMFRI Marine Fisheries Policy Series No.17/2020, 22p.

# Preface

India is bestowed with a long coastline of about 8118 km. Mariculture is the fastest growing subsector of aquaculture and has very high growth potential. With the dwindling marine fisheries production, mariculture holds immense promise to meet the increasing demand of fish. India needs to produce about 20 million tonnes of fish by 2025 as compared to the 13.4 million tonnes produced through wild harvest and aquaculture today. The additional fish production has to come exclusively from aquaculture.

Recognizing the prospects offered by the sector, the National Board of Fisheries Development had constituted a committee to prepare the Draft National Mariculture policy (NMP). The origin of this initiative could be traced to the National Consultation on "Mariculture and open sea cage culture development in India" held during 08-09 June, 2017 at Mandapam Regional Centre of ICAR-Central Marine Fisheries Research Institute (CMFRI), where Mr. Devendra Chaudhary, IAS, the then Secretary to the Department of Animal Husbandry, Dairying and Fisheries (DADF) asked CMFRI to prepare the Mariculture policy document. As a follow up, NFDB had constituted an expert committee with Director, CMFRI as Chairman to draft the Mariculture policy vide its order NFDB/HRD/Mariculture Policy dated 06 June 2018.

The Committee had six consultations along with the scientists of CMFRI and other experts. The draft policy document was presented to NFDB on 28 September 2018 at NFDB, Hyderabad and put up in NFDB and CMFRI websites for comments from the public. Subsequently, six stakeholder consultations were organized with fishers, farmers, state fishery officials and other stakeholders at Veraval, Karwar, Kochi, Mandapam, Chennai and Visakhapatnam during 14 November to 15 December 2018. Additionally, Kerala State Fisheries Department had organized a stakeholder meeting in Trivandrum on 07 December 2018. The comments received from the stakeholder meetings and the public were discussed and incorporated in this Draft National Mariculture Policy.

The Committee is grateful to Ms. I. Rani Kumudini, IAS, Chief Executive, NFDB for assigning this task to them and for timely inputs and able stewardship all through the consultation process. Profuse thanks are also due to Dr. Joykrushna Jena, Deputy Director General (Fisheries Science), Indian Council of Agricultural Research and Prof. (Dr.) Mohan Joseph Modayil, former Chairman, Agricultural Scientists Recruitment Board (ASRB) & former Director, ICAR-CMFRI for their critical suggestions and valuable inputs, while finalizing the policy document. The Committee also places on record the inputs provided by the serving and retired scientists and experts from various organizations, private and fisher organizations and other stakeholders during the consultation process. The Committee thankfully acknowledges the technical inputs and assistance provided by Dr. P. Shinoj and Mr. N. Rajesh, Scientists of CMFRI, and the members of the PME Cell of CMFRI during the consultation process. The assistance and support provided by the officials of Department of Fisheries, GOI especially, Dr. P. Paul Pandian, Fisheries Development Commissioner; and Mr. G. Rathinaraj, Executive Director (Tech.), NFDB are also thankfully acknowledged.

The Committee is hopeful that this Policy will open new vistas in the domain of mariculture, enhance the livelihood options, nutritional security and contribute to the overall fisheries development in the country.

Kochi
05 December 2019

**A. Gopalakrishnan**
Director, CMFRI &
Chairman, Committee to prepare
National Mariculture Policy (NMP) Draft

# Contents

# National Mariculture Policy 2019 (NMP 2019) Draft

## 1. Preamble

The goal of the National Mariculture Policy 2019 (NMP 2019) is to ensure sustainable farmed seafood production for the benefit of food and nutritional security of the Nation and to provide additional livelihood and entrepreneurial opportunities to the coastal communities for a better living. The overall strategy of NMP is to increase seafood production in a sustainable and responsible manner, ensure socio-economic development, enhance food, health and nutritional security and safeguard gender, social equity and environment.

The Vision and Mission of NMP for increasing farmed seafood production in the country are based on the following:

- Recognizing that the demand for seafood is increasing year after year,
- Realizing that additional seafood requirement of the country in future years cannot be met by marine capture fisheries alone,
- Recognizing that to enhance the living conditions of coastal fishes, additional livelihood options are needed,
- Noting further that sea farming sector is still in its infancy in the country,
- Acknowledging that there is immense potential for sea farming in the country,
- Recalling that there are many mariculture technologies developed in the country which can be commercialized,
- Viewing with appreciation that mariculture has already contributed to substantial seafood production in many countries and is growing.

## 2.Vision

A sustainable and responsible mariculture sector that contributes to the food and nutritional security of the country and enhances the quality of life of the stakeholders.

## 3. Mission

Widespread adoption of mariculture technologies to meet the additional seafood demand by facilitating responsible development, co-ordination and management of mariculture production in the country while ensuring environmental sustainability and socio-economic upliftment of stakeholders.

## 4. Definition and Scope

Mariculture is a specialized branch of aquaculture involving the cultivation of economically important marine plants and animals in the sea or any other natural water bodies having tidal influence and includes onshore facilities like brood banks, hatcheries, nursery rearing and grow-out systems using seawater.

Mariculture involves three phases using the following types of facilities in land or in the sea:

(i) *Brood bank* and *Hatchery* which involves land-based facilities to rear brood stock and produce seeds of marine finfish and shellfish such as bivalves, gastropods and crustaceans.

(ii) *Nursery* which involves rearing of juveniles to a size conducive for stocking in the grow-out systems which are land-based or inshore and

(iii) *Grow-out* which includes aquaculture of marine plants and animals in the sea, open water bodies with tidal influence and closed land-based Recirculating Aquaculture Systems (RAS) systems using seawater.

Besides conventional mariculture, using the same type of facilities and skill sets, other activities that can be promoted are (i) Culture Based Fisheries (CBF) which is the practice to enhance fish stocks in waters that do not have enough natural recruitment to sustain a fishery (ii) Capture Based Aquaculture (CBA) which is the practice of collecting "seed" material from the wild, and growing to marketable size in captivity, using aquaculture techniques (iii) Conservation Mariculture which is the practice of stock enhancement of endangered, threatened and protected (ETP) species and depleted marine fish stocks for replenishment and (iv) farming of non-food species such as microbes, micro algae and seaweeds for extraction of bioactive compounds, bio-fuels, bio-chemicals, nutraceuticals and natural growth promoters and (v) farming of marine ornamental fishes and invertebrates; pearl oysters and seaweeds. Along with mariculture, CBF, CBA, conservation mariculture and farming of non-food species need to be promoted.

The mariculture activities covered under this policy do not include pond based brackishwater aquaculture including coastal shrimp farming. The term 'fish farmer' mentioned in this document denotes those undertaking mariculture activities.

## 5. Status of Mariculture in India and Opportunities

Globally, aquaculture has emerged as the fastest growing food production sector with an annual growth rate of >6% in the last two decades. In India, inland aquaculture has emerged as a fast growing sector and it has shown steady growth over the years and has become a viable alternative to declining capture fisheries. It started at a modest production of 0.75 million tonnes in 1951 and reached 4.9 million tonnes in 2017 and India is the third largest producer in the world. Similarly, coastal shrimp aquaculture production has grown steadily and crossed 0.68 million tonnes in the last couple of years.

Mariculture is the fastest growing subsector of aquaculture and has very high growth potential. In 2016, mariculture contributed around 28.7 million tonnes of food fish which formed about 35.8% of the global food fish aquaculture production. The total mariculture production including seaweeds was 58.7 million tonnes, which constituted 53.4% of the total world aquaculture production during 2016.

It is evident that mariculture presents a great opportunity for increasing seafood production in the face of growing demand for marine protein and limited scope for expanding wild fishery harvests. The projected annual mariculture production potential based on area available in the Indian region is 4 to 8 million tonnes, whereas the current estimated mariculture production is less than 0.01 million tonne per year. The success in the development of inland and brackishwater aquaculture in India also corroborates with the prospects of the emergence of a mariculture production sector. In addition, the development of a mariculture sector also strengthens the Blue Revolution Scheme of Government of India (GOI).

Mariculture activities in India were initiated through the research and development activities of the Central Salt and Marine Chemicals Research Institute (CSIR-CSMCRI) during the 1970s with culture of seaweed, *Gracilaria edulis* in Krusadi Island, Tamil Nadu. This was followed by the Central Marine Fisheries Research Institute (ICAR-CMFRI) in the early 1980s through commercial culture of bivalves and sea weeds. Additionally, in the 1990s, Central Institute of Brackishwater Aquaculture (ICAR-CIBA), National Institute of Ocean Technology (NIOT) and the Marine Products Export Development Authority (MPEDA) also contributed significantly to the development of mariculture. Open sea mariculture was initiated for the first time in India by ICAR-CMFRI in 2005 by establishing the first open sea floating cage in Visakhapatnam with funding support from the Department of Animal Husbandry, Dairying and Fisheries (DADF), Ministry of Agriculture, Government of India. Further refining of technologies by CMFRI and their adoption has led to rapid spread of cage mariculture along both the coasts in near shore waters by self-help groups, fisher societies and small-scale entrepreneurs. Technologies currently available in India include seed production and farming of finfishes such as cobia, pompano, sea bass, groupers, snappers, breams and ornamental fishes; shellfishes such as mussels, oysters, clams, Indian white shrimp, green tiger shrimp, blue swimmer crab, pearl oyster, seaweed and ornamental shrimps.

India needs to produce about 20 million tonnes of fish by 2025 as compared to the 13.4 million tonnes produced through wild harvest and aquaculture today. The additional fish production has to come exclusively from aquaculture. As stated in the National Policy on Marine Fisheries 2017 (NPMF, 2017), assessment of the exploited fish stocks in the Indian Exclusive Economic Zone (EEZ) showed overcapacity in the territorial waters with respect to different categories of mechanized fishing vessels in all maritime states/Union Territories and indicated that further increase in production from capture fisheries has limited scope. Hence, steps for the promotion and further development of a mariculture production sector are the only options for meeting the demand for fish in the coming years. Considering this, it is stated in the NPMF 2017 that *"Mariculture if carried out can play an important role in increasing fish production from the coastal waters. Government will encourage schemes to set up mariculture farms /parks and setting up of hatcheries for supply of seeds for the development of the sector. Institutional and commercial needs of this emerging sector, which will include leasing rights policies, spatial planning, technological inputs such as husbandry, seed, feed and health management, environmental and social impacts, capacity building of local fishers and local entrepreneurs to take up mariculture; and development of local markets and value chains will be addressed in consultation with coastal states/Union Territories (UTs) and concerned stakeholders.*

*Participation of small fishing communities, fishermen groups, fishery co-operatives or government organizations will be specifically encouraged and supported."* Therefore, the need of the hour is to formulate a robust and implementable policy for guiding the development of mariculture in India.

## 6. Objectives

(i) To enhance mariculture production in the country and increase income, employment and entrepreneurship opportunities in a sustainable and responsible manner.

(ii) To promote cooperative partnership in mariculture by encouraging the infrastructural, technical and other inputs.

(iii) To adopt an environmentally sustainable approach for development of mariculture.

(iv) To provide an enabling environment for sustainable development of mariculture in India by providing the required policy and legal framework and support to entrepreneurs.

## 7. Mariculture Area Development

7.1. Suitable potential mariculture sites will be demarcated for different mariculture activities such as cage farming, bivalve farming, pen culture, seaweed culture, hatcheries and nurseries as mariculture zones, in consultation with local area planning departments, traditional fishers/fishermen cooperatives, coastal dwellers, relevant state and central government departments and other stakeholders.

7.2. The mariculture zones will be demarcated based on evaluation of environmental parameters, including the probability of occurrence of harmful algal blooms (HAB), and impact on environment. The demarcation of zones will also factor in socio-cultural attributes, local area master plans and other logistics, with consideration to protect the livelihoods of local fishing communities and their access to fishing grounds and avoiding conflict with other users. Satellite remote sensing data and Geographic Information System (GIS) will be employed to provide essential tools to support the demarcation. A road map will be prepared for phase-wise expansion of mariculture to reach the targeted production.

7.3. The State governments will prepare Marine Spatial Plans (MSP) based on guidelines prepared by the central government for data management, analysis, modelling and decision making, after taking cognizance of Coastal Regulation Zone (CRZ) rules.

7.4. Such mariculture zones earmarked in the inshore/coastal areas shall exclude Marine Protected Areas (MPA), ecologically sensitive areas like coral reefs, mangroves, seagrass beds, turtle breeding/nesting grounds, navigational channels, port and harbor entry, major fishing grounds and other coastal areas of strategic importance.

7.5. Within the identified mariculture zones, the government shall designate certain areas as mariculture technology parks. Government shall also encourage the setting up of off-shore technology parks.

7.6. In mariculture zones where there is potential for large number of small scale mariculture units or in technology parks, onshore support infrastructure needs to be developed and necessary logistical support for breeding, nursery rearing, feed storage, fish processing and domestic/international trade needs to be provided.

7.7. All relevant information regarding mariculture area development will be available in the public domain.

7.8. Mariculture shall be a component of the integrated coastal/fisheries development plans developed by the maritime states/UTs to enhance their economy. Mariculture will be promoted as a potential livelihood option under the Integrated Coastal Zone Management (ICZM) programmme of GOI.

## 8. Leasing and Licensing

8.1. States are empowered to manage and promote marine fisheries and allied activities which include mariculture within 12 nautical miles. The fisheries departments of the coastal states will lease out / license the waters for mariculture as per guidelines formulated by the Union Government under this Policy for small and large scale mariculture enterprises. The guidelines shall mandate undertaking Environment Impact Assessment (EIA) for the mariculture activities taking cognizance of the prevailing rules governing EIA. The state could also involve the Panchayat Raj Institutions (PRI) or other local governing bodies for promoting mariculture in natural water bodies with tidal influence. In such leasing, priority will be given to local groups/dwellers. Leasing of areas for mariculture parks will be reviewed before renewal.

8.2. In developing mariculture activities, the Policy will take into account the public trust doctrine, the interest of all stakeholders as well as principles of Ecosystem Approach to Aquaculture (EAA), ensure limits to biological production based on carrying capacity and environmental sustainability.

## 9. Mariculture Systems and Species

9.1. Mariculture systems currently in use are different types of cages, longlines, rafts, racks, pens, raceways, Recirculating Aquaculture Systems (RAS), and Integrated Multi Trophic Aquaculture (IMTA). Major focus will be given for the improvement of existing technologies to be on par with international standards, bio-security and code of practices. In view of the versatility and efficiency of cage culture systems to produce both high volume and high value species in different environments, cage farming will be promoted. New aquaculture systems will be promoted in identified areas after their farm level validation.

9.2. All native food and non-food marine species having mariculture potential will be promoted. Recognizing the active role of women and enterprising family members of the coastal fishers in taking up mariculture of oysters, mussel and seaweeds, and in view of the demonstrated potential of mariculture of these species for alternative income and social empowerment, technical support will be provided for these activities.

9.3. In view of the high risk of escapees from the culture systems, especially during natural calamities like cyclones, floods and their likely establishment in the wild, exotic species and/or Genetically Modified Organisms (GMOs) will not be allowed for any mariculture activity in open systems. Such species may be considered after stringent risk assessment and monitoring in land-based closed mariculture systems, such as Recirculating Aquaculture System (RAS) subject to the clearance as per relevant national rules governing quarantine, exotics and GMOs.

9.4. Diversification of species will be encouraged based on site suitability, availability of technology, demand and commercial feasibility, ecological impacts and economic benefits.

9.5. Marine ornamentals and pearls have significant market globally. Considering the risk of over-exploitation of wild ornamental species, hatchery production of ornamental species and pearl oysters for which technologies are available, will be promoted. Special schemes will be drawn to develop marine ornamental sector. Appropriate mechanism will be put in place to detect, pre-empt and regulate trade of wild-caught ornamentals.

9.6. For expansion of seaweed culture using existing cultivated species, additional areas will be identified. Technologies for culture of native species (edible and industrial use) will be upgraded. Grazing by fishes will be controlled and eutrophication due to fertigation will be avoided.

## 10. Precautionary Approach to Environmental Sustainability

10.1. According to the FAO, an ecosystem approach to aquaculture (EAA) is a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable and responsible development, equity and resilience of interlinked social-ecological systems. Incorporating the principles of ecosystem approach in mariculture will promote a process of enhanced sectoral management at different scales, taking into account environmental limits and the interests of other users and stakeholders. It will also aim to improve human well-being and equity for all stakeholders and mariculture will be developed in alignment with other cross-cutting sectors, policies and legal provisions.

10.2. In order to promote sustainable mariculture with minimum ecological footprints, the baseline status of the demarcated mariculture zones will be assessed comprehensively. Provision of periodic review of the impacts of mariculture on environment, natural fish resources and the livelihood based on those resources will be put in place. Similarly, technological innovations and their implications will also be reviewed periodically. Relevant guidelines will be put in place for assessment, monitoring and implementing regulations covering the ecological and social impacts of water use, user conflicts, use of drugs and chemicals, organic load, disposal of used cages, nets and plastics from mariculture activities. Capacity of fishers/farmers will be strengthened through their co-operatives to take up science-based activities to address climate related issues.

10.3. In order to tap export markets and ensure food safety for the domestic markets, farmed

bivalves will have to meet strict quality criteria with respect to microbial, heavy metal and other pollutants in the growing water bodies. To promote export of farmed bivalves, major farming regions will be continuously monitored to meet the water quality criteria set by national and international agencies. Adequate depuration facilities will be developed near such culture sites to help farmers depurate the harvested bivalves before marketing.

## 11. Seed and Feed

11.1. Ensuring the availability of seed material for the targeted mariculture species is critical to sustain the momentum of proposed expansion of mariculture sector in the country. State-run finfish/shellfish hatcheries, nursery units, seed banks, and specific pathogen free (SPF)/specific pathogen resistant (SPR)/genetically improved brood banks will be established.

11.2. Stockable size fingerlings for farming will be made available through financial and technical support to farmers' co-operatives and private sector for establishment of brood banks, hatcheries and nursery units.

11.3. Centres for the supply of fresh stock of planting materials of seaweeds will be set up.

11.4. A system of seed certification will be developed in order to ensure supply of quality seed.

11.5. Currently, farmed bivalve production is entirely dependent on seeds collected from the wild, and this has become a limiting factor in the expansion of production. Technologies for bivalve seed production have already been developed by research institutions. Technical backstopping will be provided to establish bivalve hatcheries in major farming areas.

11.6. Since seed production technologies of many species are either not standardized or commercially viable, the practice of CBA will be permitted with regulations, licenses and proper management to ensure the sustainability of the wild stocks of the concerned species. Impact of such seed collection on the stock and environment will be studied before such licenses are issued. Capacity building of fishers will be promoted for sustainable collection of seed and growing to stockable size in captivity. Collection of wild seed for CBA, where allowed, will be reviewed after five years.

11.7. In implementing conservation mariculture, care will be taken to ensure that the natural genetic variability and integrity are not altered through sea ranching operations of hatchery raised seed.

11.8. Taking into account the policy of the GOI (NPMF, 2017), to control the use of lower trophic level food fishes as the source of fish meal for meeting the feed requirement of the expanding mariculture activities, sourcing of alternate and sustainably caught fish species for fish meal preparation will be promoted. Utilization of low value fishes for alternative feed for the candidate species will be discouraged and development of formulated feed encouraged.

11.9. Replacement of fish meal with other protein sources of plant and animal origin will be done as and when these technologies are scaled up.

11.10. Feed quality standards are available only for shrimp and Indian major carps (IMC). Standards for marine fish feed and feed supplements will be developed and issued as per the policy for growth of mariculture with inputs from research institutions.

11.11. The Government will also evolve guidelines for the use of feed ingredients as per local availability, mineral mixture and other nutrient supplements, based on the research advancements made by national and state level research and academic institutions. To ensure the availability of cost effective marine finfish feeds, the existing aqua feed mills will be supported to establish additional units and feed storage facilities will be supported. Schemes to supply of feed to small- scale cage farmers will be taken up.

11.12. Quality of the finished feed and traceability of the feed stuffs used will be ensured so that eco-labelling of suitable mariculture production systems will be promoted to ensure premium prices for such produce.

## 12. Food Safety and Health Management

12.1. Traceability and record-keeping of farming activities and inputs which impact food safety will be ensured by documenting the source of inputs such as feed, seed, permitted veterinary drugs, vaccines and antibiotics, additives and chemicals. The type, concentration, dosage and method of administration for their use will also be recorded.

12.2. Mariculture activities will be conducted in a manner that ensures food safety by implementing appropriate national [Food Safety and Standards Authority of India (FSSAI)] or international standards and regulations including those defined by FAO/World Health Organization (WHO) *Codex Alimentarius*.

12.3. Monitoring of bivalve culture sites for shellfish poisoning caused by dinoflagellate blooms will be taken up.

12.4. Mariculture operations will implement aquatic animal health management programmes set up in compliance with relevant national legislation and regulations, taking into account the FAO-CCRF Technical Guidelines on Health Management for Responsible Movement of Live Aquatic Animals and relevant standards of the World Organization for Animal Health (OIE).

12.5. To reduce the risks of introduction and spread of aquatic animal diseases, species-specific Good Aquaculture Practices (GAPs)/ Best Management Practices (BMPs) will be developed and implemented. Preparedness including diagnostic capability and treatment for emerging diseases and parasites will be given emphasis. Use of species in polyculture or IMTA will be carefully considered in order to reduce potential disease transmission between cultured species.

12.6. Use of medicines in mariculture will be in accordance with applicable national legislation and relevant international agreements that ensure effectiveness, safety of public and animal health and protection of the environment.

## 13. Capacity Building and Extension

13.1. The Government will strive to enhance the skills and capabilities of the traditional fishers and other potential stakeholders to undertake mariculture and popularize the vocation in India. This will enable interested fishers to move from fishing to the more economic and efficient mariculture activities.

13.2. The government will facilitate formation of mariculture cooperatives/fish-farmer producer companies and extend technical support wherever necessary.

13.3. Planned and concerted effort will be undertaken in order to develop adequate human capital with necessary skills and entrepreneurship to meet the skilled human capital requirements for the mariculture sector.

13.4. A tailor-made capacity building module will be developed by National Fisheries Development Board (NFDB) by involving CMFRI and other expert academic bodies to impart core knowledge related to mariculture operations and governance to functionaries of the fisheries department from the coastal states and UTs.

13.5. In order to provide thrust and impetus to new candidate species/technologies /areas for mariculture, frontline participatory demonstrations and technology transfer will be taken up with support and hand holding.

## 14. Insurance and Support Services

14.1. Mariculture is an emerging sector that requires considerable support from the government. It is to be treated on par with agriculture and being a capital- intensive enterprise, all institutional support in the form of affordable finance and investment subsidies will be extended. In this regard, National Bank for Agriculture and Rural Development (NABARD) will develop suitable schemes to support mariculture. Priority will be given to fish farmer groups.

14.2. Mariculture activities are susceptible to the risks of natural calamities and anthropogenic activities. Currently, there are no substantial initiatives from the insurance industry to cover these risks and those customized products that are available are with highly prohibitive rates. Suitable insurance schemes need to be introduced to plug this gap and will encourage private insurance companies to develop insurance solutions for the sector.

14.3. In view of the long gestation period and high investments required for cultured marine pearls, adequate support will be extended to entrepreneurs.

14.4. For real-time damage assessment and quick processing of insurance claims, geo-spatial tools, protocols for mapping damages, interactive Information and Communication Technology (ICT) tools and mobile applications will be used.

14.5. Personal/group insurance schemes will be extended to cover life/accident risks of personnel involved in mariculture activities.

## 15. Processing, Value Addition and Market Support

15.1. Value addition and efficient market logistics will be promoted to minimize post-harvest losses and in preserving the nutritional value of fish. Awareness on nutritional value of fish will be generated through public campaigns.

15.2. The existing capacity of processing infrastructure in the exporting units of the country will be harnessed for developing frozen, live, chilled and value added products suiting both domestic and export sectors.

15.3. In order to increase the domestic consumption of bivalves, promotional schemes highlighting their health benefits will be introduced.

15.4. Institutional support will be extended for development of domestic market infrastructure for hygienic handling, processing and cold storage.

15.5. Cost-effective preservation and packaging facilities will be developed under public-private partnership (PPP) mode to enhance shelf life of fish and fish products.

15.6. The GOI will develop new voluntary sustainability standards (VSS) to gain competitiveness in the global seafood market. Till such time, the standards that are compliant with FAO, *viz.*, Aquaculture Stewardship Council (ASC) and the Global Aquaculture Alliance (GAA) will be adopted.

15.7. Appropriate measures will be taken for product diversification, branding, certification and for strengthening market intelligence. Brand building of fish will be promoted by introducing 'FishMark', a certification mark for fish and its products, and state-of-the-art marketing facilities will be developed to sell the branded products.

15.8. Capacity building, technical guidance and institutional support will be extended to stakeholders involved in the mariculture value chains. There will be a focus on development of co-operative marketing network to get a better price for the produce. Involvement of small scale fish vendors in cooperative marketing network will be promoted.

15.9. Marketing of fish through institutional sales channels or online web portals will be encouraged for reducing the exploitation by intermediaries.

## 16. Institutional Mechanisms

16.1. Mariculture is a component of marine fisheries that comes largely under the newly constituted Department of Fisheries (DoF) under the Ministry of Fisheries, Animal Husbandry and Dairying (MoFAHD), GOI, the coastal states and the UTs. Central Marine Fisheries Research Institute (CMFRI) of the Ministry of Agriculture and Farmers' Welfare (MoAFW), National Institute of Ocean Technology (NIOT) and Indian National Centre for Ocean Information Services (INCOIS) of Ministry of Earth Sciences (MoES), Central Salt and Marine Chemicals Research Institute (CSMCRI), Ministry of Science and Technology (MoST), Ministry of Environment, Forests and Climate Change (MoEF&CC) and the Ministry of Commerce and Industry (MoCI) have significant roles in technology development and promotion of mariculture, while the regulation of activities in the marine area comes under the purview of Ministry of Environment and Forests. These agencies will work closely among themselves and with the private sector, fishermen co-operatives and self-help groups (SHGs)in a synchronized manner to promote mariculture.

16.2. The Department of Fisheries (DoF), MoFAHD will be a prime mover in providing support to the new initiatives in mariculture. The National Fisheries Development Board (NFDB), along with financial institutions is expected to design new packages for expansion of mariculture. It is also essential to leverage support from government and private financial institutions and fishermen cooperative societies/fish-farmer producer companies for rapid expansion of mariculture.

16.3. The ICAR research institutes and the universities will work in a well-coordinated manner for development and dissemination of technologies for mariculture.

16.4. Effective monitoring of mariculture activities will require a paradigm shift in the extent of skill and inter-departmental coordination, given its location, and issues in access. As this effort cannot be handled as an add-on activity of any agency or department, as an interim measure, a separate Task Force is to be constituted by DoF and coordinated by NFDB involving the concerned research institutes and development agencies of MoAFW, MoES, MoST, MoCI and MoEF&CC. The taskforce will also draw representatives from the maritime states.

16.5. In order to realize the projected potential of mariculture under the blue revolution scheme of GOI and to enable a single-window system, a unified promotional and regulatory authority - *Mariculture Authority of India* - will be created. This will be the implementing agency for development and expansion of mariculture. Until then, a separate Division under NFDB will take care of the promotional functions.

16.6. An appropriate coordination mechanism at the state level will be evolved that involves Departments of Fisheries of the maritime States/UTs, Coastal Marine Police and Indian Coast Guard (ICG). An institutional mechanism for monitoring and review, with the inclusion of all stakeholders including the coastal community and fishers will be established.

## 17. Legal Framework

17.1. Mariculture in India shall be promoted in consonance with the relevant national and global instruments and other guidelines.

17.2. The States/UTs are empowered to regulate and manage marine fisheries in their territorial waters extending up to 12 nautical miles off the coastline towards the sea. To facilitate this, the central government will prepare a model bill supporting both regulation and development. The maritime States will enact their own mariculture Acts and all existing State aquaculture Acts will be aligned with the model bill.

17.3. The Central Government is mandated to regulate the fisheries activities in the EEZ *i.e.*, 12-200 nautical miles. DoF, MoAFW will draft the guidelines in consultation with the Ministry of Shipping, Coast Guard, Indian Navy, MoES and MoEF&CC for undertaking mariculture activities in the EEZ.

17.4. In consonance with the initiative of the GOI for holistic development of islands, mariculture will be made a key developmental activity apart from tourism and capture fisheries.

17.5. Government will make necessary amendments in the extant rules to permit mariculture with adequate safeguards to the conservation efforts.

## 18. Research and Development (R&D)

18.1. Mariculture is an emerging sector and in order to realize the vast potential of mariculture, towards meeting the Blue Revolution Scheme targets, significant impetus will be provided for R&D activities. The areas that need additional focus and funding are: development of breeding technologies for new species, innovative farming technologies such as RAS and IMTA, live feeds, sea weeds; cost-effective larval and grow-out feeds; fishmeal and fish oil replacement; selective breeding technologies; disease diagnostic tools; SPF and SPR varieties; culture of micro-organisms for development of non-food commercial products; protocols for low-cost depuration of farmed bivalves; post-harvest technologies including value addition and zero wastage; models for assessing carrying capacity; development of climate resilient species; systems and practices; innovative cage designs; offshore mariculture facilities and efficient mooring systems as well as automation of cage operations and preparedness for emerging diseases and parasites.

18.2. The government shall also scout for established mariculture technologies from other parts of the world, and institutionalize mechanisms to validate and adapt them to the national needs.

## 19. Way Forward

The National Mariculture Policy 2019 has been framed to ensure a structured growth of mariculture for meeting the growing demand of fish in the country. It is hoped that it will increase fish production, enhance nutritional security, wealth creation and employment while adhering to the principles of ecological wellbeing and environmental sustainability. The policy has factored in the interests of all stakeholders especially the small and marginal fishers, while keeping in view the need of the growth of the sector in an ecologically sustainable manner. The policy has recognized that mariculture is an emerging sector that will evolve with innovative technologies and inputs as it grows.

To ensure the growth envisioned in this NMP, an implementation plan and guidelines will be developed along with the time lines to address the emerging issues. It is hoped that this Policy will also be able to tap major opportunities that are expected to emerge from the Blue Economy initiative of the country.

*******

# ANNEXURES

# Annexure I

राष्ट्रीयमात्स्यिकीविकासबोर्ड
**National Fisheries Development Board**
पशुपालन, डेयरी एवंमत्स्यपालनविभाग
**Department of Animal Husbandry, Dairying & Fisheries**
कृषिएवं किसानकल्याणमंत्रालय, भारतसरकार
**Ministry of Agriculture and Farmers Welfare, Government of India**
स्तम्भ संख्या -235, पी. वीं. एन. आर एक्सप्रेस वे, डाक- एस. वी. पी. एन. पी ए, हैदराबाद- 500 052
**Pillar No: 235, PVNR Expressway, SVPNPA Post, Hyderabad-500 052**
फ़ोन/ **Phone No. 040- 2401 5553; फैक्स /Fax No: 040-2401 5568**वेबसाइट/website: nfdb.gov.in

No. NFDB/HRD/Mariculture Policy/ Dated 06.06.2018

**OFFICE ORDER**

**Subject:** Constitution of Committee to suggest draft on National Mariculture Policy – Reg.

In order to develop sustained mariculture activities in India, it has been decided with the approval of the competent authority to set up a Committee for framing a National Mariculture Policy.

2. The composition of the committee is as below:-

| | | |
|---|---|---|
| 1. | Dr.A. Gopalakrishnan, Director, ICAR-CMFRI, Kochi | Chairman |
| 2. | Dr. R. Kirubagaran, Scientist-G, NIOT, Chennai | Co-Chair |
| 3. | Dr. George John Member, Plenary Group on Blue Economy, Sr. Adviser,DBT, Govt. of India | Member |
| 4. | Dr. A. G. Ponniah, Ex-Director, CIBA, Chennai | Member |
| 5. | Dr. G. Gopakumar, Former Head & Principal Scientist, Mariculture Division,ICAR-CMFRI, Kochi | Member |
| 6. | Dr. K. Sunilkumar Mohamed, Head & Principal Scientist, Molluscan Fisheries Division, ICAR-CMFRI, Kochi | Member |
| 7. | Dr. P. Krishnan, Principal Scientist, NAARM, Hyderabad | Member |
| 8. | Dr. Boby Ignatius, Principal Scientist, ICAR-CMFRI, Kochi | Member |
| 9. | Dr. Imelda Joseph, Head & Principal Scientist, Mariculture Division,ICAR-CMFRI, Kochi | Member |
| 10. | Dr. A. K. Abdul Nazar, Principal Scientist & Scientist-in-charge, Mandapam RC of ICAR-CMFRI, Mandapam | Member |
| 11. | Dr. R. Jayakumar, Sr. Scientist, Mandapam RC of ICAR-CMFRI, Mandapam. | Member |
| 12. | Dr. M. S. Raju, Dean, KUFOS, Kochi | Member |
| 13. | Dr. R. A. Sreepada, Senior Scientist, NIO, Goa | Member Secretary |

**The Terms of Reference (TOR) of the Committee are as below:**

i. To briefly review the status of Mariculture in India.

ii. To identify the key elements essential for sustainable Mariculture development in India.

iii. To identify cross cutting issues and facilitate multi stakeholders participation from Maritime States/UTs in preparation of draft National Mariculture Policy for overall development of the sector.

iv. To outline the latest technological development for promotion of Mariculture.

v. To build necessary safeguard for responsible development of Mariculture.

vi. The Committee would submit the final draft on or before 07.09.2018.

**Tentative timelines fixed for different events in drafting the National Mariculture Policy**

| | | |
|---|---|---|
| 1. | 19-20.06.2018 | First write shop at ICAR-CMFRI, Kochi |
| 2. | 28.06.2018 | Second write shop at ICAR-CMFRI, Kochi |
| 3. | 09.07.2018 | Final draft at NFDB, Hyderabad. |
| 4. | 11.07.2018 | Uploading of final draft in the NFDB website |
| 5. | 17.07.2018 | (First) West Coast Stakeholders meet at NIO, Goa |
| 6. | 25.07.2018 | (Second) East Coast Stakeholders meet at CMFRI, Visakhapatnam |
| 7. | 10.08.2018 | Last date to accept the suggestions on the final draft |
| 8. | 23.08.2018 | Final Meeting at NFDB, Hyderabad |

TA/DA will be admissible to non-official participants as per applicable rule.

6/6/18

(Dr. Moka Swamy Kumar)
Executive Director (HRD)

## Annexure II

# List of Meetings held by the Committee to draft the National Mariculture Policy 2019 (NMP2019)

### A) Meeting of the Committee with Subject Matter Experts

| No. | Date | Venue | Number of Participants |
|---|---|---|---|
| 1 | 20-21, June 2018 | CMFRI, Kochi | 14 |
| 2 | 10-11, July 2018 | CMFRI, Kochi | 19 |
| 3 | 10-11, September 2018 | CMFRI, Kochi | 09 |
| 4 | 05-06, January 2019 | CMFRI, Kochi | 12 |
| 5 | 21, September 2019 | CMFRI, Kochi | 13 |
| 6 | 29-30, October 2019 | CMFRI, Kochi | 12 |

### B) Meeting of Committee with the Stakeholders

| No. | Date | Venue | Number of Participants |
|---|---|---|---|
| 1 | 14 November 2018 | RC*, Vishakapatnam, CMFRI | 75 |
| 2 | 24 November 2018 | RC, Karwar, CMFRI | 41 |
| 3 | 27 November 2018 | RC, Veraval, CMFRI | 87 |
| 4 | 28 November 2018 | RC, Mandapam, CMFRI | 120 |
| 5 | 03 December 2018 | RC, Chennai, CMFRI | 95 |
| 6 | 15 December 2018 | HQ*, Kochi, CMFRI | 68 |

* RC- Regional/Research Centre

* HQ- Headquarters

## Annexure III

# Experts Involved in the Consultation Process

### A) Members of the Drafting Committee

Dr. A. Gopalakrishnan
Director, ICAR-CMFRI, Kochi, Kerala

Dr. R. Kirubagaran
Scientist-G, NIOT, Chennai, Tamil Nadu

Dr. George John
Member-Plenary Group on Blue Economy, GOI,
Former Sr. Adviser, DBT,
Govt. of India, New Delhi &
Former Vice Chancellor, Birsa Agricultural University, Ranchi

Dr. A. G. Ponniah
Former Director, ICAR-CIBA, Chennai, Tamil Nadu

Dr. G. Gopakumar
Former Head & Principal Scientist,
Mariculture Division, ICAR- CMFRI, Kochi, Kerala

Dr. K. Sunilkumar Mohamed
Head & Principal Scientist, Molluscan Fisheries Division, ICAR- CMFRI, Kochi, Kerala

Dr. P. Krishnan
Principal Scientist, ICAR-NAARM, Hyderabad

Dr. Imelda Joseph
Head & Principal Scientist,
Mariculture Division, ICAR- CMFRI, Kochi, Kerala

Dr. Boby Ignatius
Principal Scientist, Mariculture Division,
ICAR- CMFRI, Kochi, Kerala

Dr. A. K. Abdul Nazar
Principal Scientist, ICAR- CMFRI, Chennai, Tamil Nadu

Dr. R. Jayakumar
Principal Scientist & Scientist-in -Charge,
Mandapam RC of ICAR-CMFRI, Mandapam,
Tamil Nadu

Dr. M. S. Raju
Dean, College of Fisheries, KUFOS,
Kochi, Kerala

Dr. R. A. Sreepada
Principal Scientist, CSIR-NIO, Goa

### B) Co-opted Members

Dr. P. Shinoj
Senior Scientist, SEETT Division,
ICAR-CMFRI, Kochi, Kerala

Mr. N. Rajesh
Scientist, Mariculture Division,
ICAR-CMFRI, Kochi, Kerala

# Acronyms/Abbreviations

| Acronym | Expansion |
|---|---|
| ASC | Aquaculture Stewardship Council |
| BMP | Best Management Practices |
| CBA | Capture Based Aquaculture |
| CBF | Culture Based Fisheries |
| CCRF | Code of Conduct for Responsible Fisheries |
| CIBA | Central Institute of Brackishwater Aquaculture |
| CMFRI | Central Marine Fisheries Research Institute |
| CRZ | Coastal Regulation Zone |
| CSIR | Council of Scientific and Industrial Research |
| CSMCRI | Central Salt and Marine Chemicals Research Institute |
| DADF/DAHDF | Department of Animal Husbandry, Dairying and Fisheries |
| DoF | Department of Fisheries, Government of India |
| EAA | Ecosystem Approach to Aquaculture |
| EEZ | Exclusive Economic Zone |
| EIA | Environmental Impact Assessment |
| ETP | Endangered, Threatened and Protected Species |
| FAO | Food and Agriculture Organization of the United Nations |
| FSSAI | Food Safety and Standards Authority of India |
| GAA | Global Aquaculture Alliance |
| GAPs | Good Aquaculture Practices |
| GIS | Geographic Information System |
| GMOs | Genetically Modified Organisms |
| GOI | Government of India |
| HAB | Harmful Algal Blooms |
| ICAR | Indian Council of Agricultural Research |
| ICG | Indian Coast Guard |
| ICT | Information and Communication Technology |
| ICZM | Integrated Coastal Zone Management |
| IMC | Indian Major Carps |
| IMTA | Integrated Multi Trophic Aquaculture |
| MoAFW | Ministry of Aquaculture and Farmers' Welfare |
| MoCI | Ministry of Commerce and Industry |
| MoEF&CC | Ministry of Environment, Forests and Climate Change |

| Acronym | Expansion |
|---|---|
| MoES | Ministry of Earth Sciences |
| MPA | Marine Protected Areas |
| MPEDA | Marine Products Export Development Authority |
| MSP | Marine Spatial Planning |
| NABARD | National Bank for Agriculture and Rural Development |
| NFDB | National Fisheries Development Board |
| NIOT | National Institute of Ocean Technology |
| NPMF | National Policy for Marine Fisheries |
| OIE | World Organization for Animal Health |
| PRI | Panchayati Raj Institutions |
| SHGs | Self-Help Groups |
| SPF | Specific Pathogen Free |
| SPR | Specific Pathogen Resistant |
| UTs | Union Territories |
| VSS | Voluntary Sustainability Standards |
| WHO | World Health Organization |




Indian Council of Agricultural Research
**Central Marine Fisheries Research Institute**
Post Box No. 1603, Ernakulam North P.O.
Kochi- 682 018, Kerala, India
Tel: +91 484 2394867 Fax: +91 484 2394909
Email: director.cmfri@icar.gov.in, wwwcmfri.org.in

भाकृअनुप
ICAR

सी एम एफ आर आइ
CMFRI