

# BIORESOURCES AND COMMERCIAL UTILIZATION: TRENDS, MARKET, SUPPLYCHAIN, AND SUSTAINABILITY



KERALA STATE BIODIVERSITY BOARD  
REBUILD KERALA INITIATIVE



**KERALA STATE BIODIVERSITY BOARD**

Kailasam, T.C.24/3219, No. 43,  
Belhaven Gardens, Kowdiar P.O.,  
Thiruvananthapuram - 695 003

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**Editors**

Dr. C. George Thomas  
Dr. Preetha Nilayangode



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Gopakumar G.

Former Head, Mariculture Division, CMFRI

#### Introduction

Fisheries sector is very vital in the economy of Kerala as it is a major source of protein in food, provides substantial employment opportunity and also contributes significantly to the export market. Kerala is the largest fish consuming state in the country with more than 85% of the population eating fish at an average annual per capita fish consumption of 27-30 kg which is four times the national average. The catch from the sea is the major source of fish production in Kerala and will continue like that in future years. The average annual fish catch in Kerala is around 6 lakh tones but in recent years a decline in marine fish catch in Kerala is recorded in the catch statistics of Central Marine Fisheries Research Institute. In this context, sustaining the catch is a major concern in the context of overexploitation, capture of juveniles and the climate change scenario. The demand for fish in the State is increasing steadily over the years and the exploitation pattern of capture fisheries indicates that the additional demand cannot be met by capture alone from the existing fishing grounds.

It is generally well accepted that aquaculture is the only way forward to meet the additional requirement of fish in future. Aquaculture is the fastest growing food production sector globally with an annual average growth of >6% in the last two decades. In Kerala the fish consumption preference is mainly brackishwater or marine fish and shellfish. Hence the option to become self sufficient in fish production in Kerala is to expand the saline water aquaculture (mariculture) in the State. Mariculture is a specialised branch of aquaculture involving the cultivation of economically important marine plants and animals in the sea or any other water body having tidal influence and includes onshore facilities like hatcheries, nursery rearing and grow out systems using seawater. Mariculture is the fastest growing subsector of aquaculture and has very high growth potential. At global level, mariculture produces many high value finfish, crustaceans, and molluscs viz. oysters, mussels, clams, cockles and scallops. The total mariculture production at a global level including seaweeds was 58.7 million tonnes, which constitutes more than 50% of the total aquaculture production.

#### Salinewater aquaculture in Kerala

Aquaculture in saline waters has not yet developed into a major fish production sector in Kerala. It is still confined at a meagre level farming of shrimps, mussels and cage farming. Kerala coast is endowed with protected waters in some areas and also vast brackish water areas suitable for mariculture. It has been estimated that around 1.4 lakh hectares of brackish water area is available and about 65000 hectares can be utilised for aquaculture. Currently only a small fraction is utilised for aquaculture. Small-scale farming of shrimps in certain locations, mussel farming at Malabar coast and cage farming at a minor scale in brackishwater areas are the only saline water aquaculture activities at present.



## **Mariculture technologies**

Very simple, eco-friendly technologies are available and hence can be practiced by traditional fishermen as an additional income source by enhancing farmed fish production. Mariculture activities in India were initiated by the research and development made by Central Marine Fisheries Research Institute (CMFRI) in the early 1980s leading to the initiation of small scale commercial practices by the 1990s. National Institute of Ocean Technology (NIOT) and the Marine Products Export Development Authority (MPEDA) has also significantly contributed to the development of mariculture. Available technologies in mariculture include seed production and farming of finfishes (cobia, pompano, sea bass, groupers, snappers, breams, pearlspot and ornamental fishes), shell fishes (mussels, oysters, clams, fattening of lobsters and crabs, cage culture, technologies for sea weed farming, Integrated Multitrophic Aquaculture (IMTA), Recirculation Aquaculture System(RAS) and image (mabe) pearl production. Among this the cage culture deserves special emphasis. Cage farming has been expanding in recent years on a global basis and it is viewed by many stakeholders in the industry as the aquaculture system of the millennium. Cage culture has made possible the large-scale production of commercial finfish in many parts of the world and can be considered as the most efficient and economical way of rising fish. In Kerala also cage culture is gaining momentum at certain brackishwater areas as a small-scale enterprise and through effective interventions of fisheries developmental agencies of the State it can emerge as a substantial farmed fish production sector in the near future.

## **Saline water aquaculture startups**

1. Broodstock centres for cobia, pompano and seabass, grouper, Pearl spot
2. Hatcheries for production of seed of cobia, pompano, grouper, Pearl spot and seabass
3. Nursery rearing centres for production of ready to stock fingerlings of cobia, pompano, Pearl spot and sea bass
4. Development of cage/pond farms for cobia, pompano, grouper, pearl spot and seabass
5. Production of grow out feeds for cobia, pompano, grouper, pearl spot and seabass
6. Fabrication of site specific and cost effective cages and mooring systems
7. Establishment of hatcheries for green mussel, edible oyster and pearl oyster
8. Farming systems for green mussel, edible oyster and pearl oyster
9. Hatcheries for marine ornamental species
10. Conditioning centres for green certified wild collected ornamental species trade
11. Production of seaweeds through farming
12. Commercial level production of designer pearls
13. Development of commercial level Integrated Multitrophic Aquaculture (IMTA) systems
14. Grow out Production through Recirculation Aquaculture Systems

## **Role of fisheries developmental agencies**

Even though a farming sector can emerge through small-scale entrepreneurship programmes, certain basic requirements have to be created/ formulated by the State fisheries developmental agencies. To develop a sustainable mariculture production sector in the State the major focus should be on (i) demarcation of sites for different mariculture practices (ii) mariculture polices including norms for leasing/permitting the farming sites (iii) availability of seed, feed and farming practices (iv) regulatory measures for sustainability and (v) capacity

building on hatchery production of finfish and shellfish seeds , sea cage farming, saline pond farming, on bottom and off bottom culture of molluscs (raft, rack, long line etc.) seaweed farming techniques (vi) selection of prospective farmers, financial and technical empowerment and continued support till they become self-sustainable and (vii) R&D support for developing and sustaining the sector. In this regard, a mission mode approach headed and co-ordinated by the State Fisheries Department with the active support of fisheries research institutions and other fisheries development agencies is the need of the hour to take forward salinewater aquaculture into a substantial contributing sector of seafood production in the State.

Prime significance is the development of appropriate mariculture policies. Recently as per the demand from National Fisheries Development Board (NFDB), CMFRI has drafted a mariculture policy. In this draft the strategies to be adopted for mariculture site selection, leasing policy, mariculture systems and species, precautionary approach to environmental sustainability, seed and feed, food safety and health management, capacity building and extension, ecolabelling and certification, insurance and financial support, market support, institutional mechanisms, legal framework and areas of future mariculture research are given. Fisheries being a State subject, the lead role in mariculture development need to be taken up by the State with the active involvement of Central agencies like CMFRI, NFDB and MPEDA. A concerted effort by all the concerned fisheries research and development agencies can pave the way to promote salinewater aquaculture as a substantial contributor of sea food production in Kerala.

