

Reeling in Good Fortune for a Sector of Immense Possibilities: Analysing the Performance and Challenges Surrounding the Fisheries Sector of Kerala

Athul Joseph

MA Economics, Department of Economics, University of Kerala

1. Introduction:

With a coastline of about 590 Km and the Exclusive Economic Zone (EEZ) of the state stretching 2.18 lakh sq. Km, Kerala is blessed with a large bounty of fish resource. In addition to this the state also has the right to regulate fishing up to a distance of 12 nautical miles. Kerala is endowed with a large number of fresh water resources including 44 rivers and nine major lakes which have a combined area of 1620 hectares. The fisheries sector occupies a pride of place among various sectors of Kerala economy, in the sense that it provides livelihood to a large mass of underprivileged sections of the Kerala society and at the same time is crucial in achieving the nutrition and food security goals of the state. The fisheries sector in Kerala employs around 10.44 lakh people, with 2.4 lakh of them being inland fish workers. India, being one of the largest food producing countries in the world, accounts for about 7.58 per cent of global production. The fisheries sector contributes about 1.24 per cent to GVA and 7.28 per cent of GVA from the agriculture sector. In 2019-20 alone the country exported around 12.9 lakh metric tonnes of marine products (Rs. 46,662 crores).

For the year 2020-21, the share of the sector to Gross State Value Addition (GSVA at constant prices) 0.82 per cent and accounts for 0.72 per cent of the GSDP. But the combined contribution of the fisheries and aquaculture sectors is around 8.71 per cent of GSVA at constant prices. The value of output (VOO) from fisheries sector in Kerala rose by 13 per cent between 2011-12 and 2017-18. Of this, the inland sector's contribution is barely 20 per

cent of the total VOO from fisheries and aquaculture. However, with a rise of 6.3 per cent, the marine sector showed a moderate growth in its VOO, while at the same time the inland fisheries sector showed a substantial increase in its VOO (growth of 58 per cent). Fish production in Kerala, in 2018-19, was estimated at 1.92 lakh tonnes from the inland sector and 6.1 lakh tonnes from the marine sector. As per data released by the Department of Animal Husbandry Dairying and Fisheries (Handbook of Fisheries Statistics) and by the Department of fisheries government of Kerala, while a lion's share of fish production in India comes from inland fisheries (74%), we get to see an opposite trend in Kerala where production is dominated by marine fisheries (64%).

Kerala occupied the fourth position in marine fish landings in India with a production of 4.75 lakh tonnes. Some of the most common species of fish abundant found along the Kerala shores and which also constitutes a major chunk of the total catch are - seer fish, prawns, ribbon fish, sardines and mackerel. The Kerala Marine Fishing Regulation Act (KMFRA) was amended to strictly regulate the fisheries sector, such as preventing juvenile fishing, and this led to an increase of 26 per cent in marine capture in 2018-19. However, the marine fish production in the same showed a decline in the years 2019-20 and 2020-21, mostly due to the rough weather at sea. Infact, marine fisheries sectors across the globe are going through challenging times due to climate change issues, change in ocean temperature and the current rate of marine biodiversity loss due to exploitative fishing practises.

In the budget of 2022-23, an amount of Rs. 240.64 crores is earmarked for various schemes in the fisheries sector (Rs. 37 crores more than the previous year's allocation). The total outlay provided for the sector in the Budget 2022-23 is as follows.

2. Problems Faced by the Sector:

Perhaps the single biggest problem haunting the fisheries sector in Kerala is the fact that the state is not self-sufficient in fish production and is import dependent. As in the case of food grains and vegetables, Kerala is deficient in fish production. While the total domestic fish consumption in the State is approximately 9.12 lakh tonnes per annum, or about 2000-2500 tonnes per day, the marine production lags behind at just 4.75 lakh tonnes per annum. Of the annual consumption, about 3 to 4 lakh tonnes (or about 60 per cent) is imported from other States or countries, especially for consumption in urban areas.

A major problem affecting the income of fisherfolk is that the composition of high value species in the total catch is very low. Some of the common commercially important fish species found along the Kerala coast are White Prawn, Pink Shrimp, King Prawn, Karikadi, Scampi, Deep Sea Lobster, Mud Crab, Sea Crab, Green Mussel, Clam, Indian Mackerel, Seer Fish, Black King Fish, Little Tunny, Snapper (exclusive to the Malabar Coast of Kerala), Malabar Reef Cod, Croaker, Malabar Trevally, Ribbon Fish, Indian Oil Sardine, Commerson's Anchovy, Barracuda, Pearl Spot etc. and many of these are endemic to the Kerala shores. Thus, while Kerala's per centage share in the total quantity of fish harvested in India is 13.3%, its contribution to total value is just 12.84%.

Due to climate change and anthropogenic activities such as juvenile fishing, overfishing, unscientific fishing, the catch of marine fisheries shows a declining trend in the last decade. The marine fish production in the State in 2020-21 however shows a decline. This may be because of poor climatic conditions and rough weather at sea. The decline in marine fish catch is due to overfishing, indiscriminate juvenile fishery, and the capture of brood fish. The inland fisheries sector has great scope for further development but as of now remains underexplored and underutilized. The loss of man-days due to Covid-19 pandemic also aggravated the stressful situation in the sector.

3. Inland Fish Production:

The fisheries sector in Kerala is characterized by the predominance of the marine fisheries production over inland production, whereas the opposite is true in the case of the country as a whole. While the total marine capture fish production in 2018-19 was more than 600,000 tonnes, inland aquaculture contributed to just about 25,000 tonnes only. The Central Marine Fisheries Research Institute (CMFRI) in one of its reports raised an alarm that the demand-supply gap for fish is only going to increase in the future. It is estimated that Kerala has already attained an optimum-level of production in marine fish resources. Thus, it is high time that the state tap into its potential in developing the inland fisheries sector.

Kerala, with its vast aquatic resources in brackish water, sea water, and freshwater, has immense potential for developing inland aquaculture. The state is blessed with 44 rivers with a total length of 3092 km, 5295.93 ha of freshwater ponds and tanks, 65213 ha of brackish water areas and 46128 ha of backwater stretches that are suitable for aquaculture, pen and cage culture. The table below shows the major fresh water resources of Kerala.

The outlay earmarked for inland fisheries in the budget of 2022-23 is ₹ 8423.00 lakh which includes 7 main schemes.

3.1. Aquaculture Development:

In recent times aquaculture has become a very profitable business, with elaborate cage facilities in inland and brackish waters supported by multi-species seed-production hatcheries. The proposed aquaculture activities include (with an expected outcome of 45000 tonnes of aquaculture production):

One paddy - one fish/shrimp farming;

Farming of shrimp, crab and mussel

Farming of carp, Nile tilapia, Pangassius and indigenous fish in the pond

Intensive fish farming viz. aquaculture in bio floc tank, cage, Pond and Recirculatory Aquaculture System (RAS).

3.2. Reservoir Fisheries Development:

The scheme envisages fish stock enhancement programme for small reservoirs, with it being limited with the seeds of endemic carps, endemic catfishes, Pearl spot and Mahaseer, in the case of reservoirs within wildlife sanctuaries. Also, it discusses the possibility of cage farming of fish in the case of large reservoirs. An amount of ₹ 200.00 lakh is provided for implementation of the scheme.

4.0. Social and Financial Security of Fisherfolk:

It is estimated that the population of fish workers in Kerala is around 10.50 lakh, with 2.4 lakh of them being inland fisherfolk. The number of active fish workers, those fish workers who are engaged in fishing for their livelihood, registered with the Kerala Fishermen Welfare Fund Board in the State as of 2020 is 2,40,211. The Government has rolled out several schemes to ensure the social security and livelihood of fish workers. Such schemes are implemented by the combined efforts of the Fisheries Department, KFWFB and Matsyafed. The schemes include those for housing, insurance and pension apart from the ones which enable fish workers to earn livelihood on a continuous basis.

The Society for Assistance to Fisherwomen (SAF) has put in huge efforts for enhancing the entrepreneurial skills among fisher women by encouraging microenterprises. SAF offered assistance to 398 fisherwomen beneficiaries (138 groups) to start micro-enterprises. The government showed support to 242 Theeramythri activity groups which have been assisted with interest free working capital in 2020-21.

4.1) Saving cum Relief Scheme (2017-18):

A total of 1.58 lakh fish workers and 21,743 allied fish workers were provided support under the 'Saving cum Relief Scheme'.

4.2. Housing Scheme from 2016-17:

The Department took an initiative to build 5457 safe houses for homeless fisherfolk. The rehabilitation of another 4500 fisherfolk is currently in progress. 1619 homeless fisher families received new houses under the LIFE Mission. The government is also moving forward with the construction of a housing complex with 192 flats to rehabilitate fishermen who lost their land and houses at Muttathara, Thiruvananthapuram. The floor area of each of these flats is 542 sq. feet.

4.3. Vidya Theeram Scheme

It is a scheme brought out by the fisheries department aimed at the welfare of students in coastal areas. The project has an estimated cost of about 57 lakhs. The projects aims to provide financial support for the children of fishermen who have passed class tenth to take up medical and engineering entrance examinations. The students may attend entrance coaching along with their higher secondary classes. Students in CBSE schools too are eligible for the aid, provided they have 80 per cent marks n their class X examination. The government will take up the tuition fee and hostel fee of around 50 students from the coastal areas.

5. Infrastructure Development, adoption of Technology and R&D:

The government spent a total of Rs 403.5 crore under marine infrastructure development schemes. Using this fund eight fishing harbours at Chellanam, Vellayil, Muthalapozhi, Chetuva, Tanur, Koyilandy, Thalai, and Manjeswaram were constructed. The Parappanangadi and Chethi harbours were completed at a cost of Rs 209.04 crore using KIIFB funds. The

Plan has also supported the development of Thankassery, Puthiyappa, Beypore and Arthunkal fishing harbours as well as establishment of Harbour Management Societies to manage these harbours. Total earnings from fishing harbours and fish landing centres in 2020-21 was ₹4.36 crore. For the very first time in India, Fisheries Management Councils were formed with the participation of managements, fisheries representatives, people's representatives, and fisheries experts. In addition to the construction of fishing harbours, NABARD funds and other funds were utilized for construction of fish landing centres, roads, bridges, locker rooms, artificial reef in the coast of Poovar and Puthyathura fishing villages as well as modernization of existing fishing harbours. Between 2017 and 2021 around Rs 704.1 crore was spent for the construction of more than 1600 coastal roads. The government spent Rs 193.5 crore to construct more than 65 fish markets. About 200 fibre-reinforced plastic (FRP) vessels were provided to fishermen as part of the Blue Revolution scheme. The fisherfolk also received 10 deep sea fishing boats on a pilot basis. A new mobile app called 'Sagara' was developed to record the departure and return of fishing vessels at sea.

5.1 Technology Adoption:

The government has taken a very proactive role in infusing the latest of available technology to modernize the fisheries sector and improve the efficiency of fish stock breeding, fish harvesting etc. These include:

- o Bio floc Technology (BFT) - is a technique for improving the quality of water in aquaculture by balancing carbon and nitrogen in the livestock system. BFT not only treats waste but also helps nutrition to aquatic animals. Since it is viable technology Government of Kerala is promoting BFT wherever possible.

- o Recirculating Aquaculture System (RAS) - In order to maintain water quality, efficient filtration systems need to be installed to ensure the optimum growth of fish. A Recirculating Aquaculture System ensures that water flows back to the culture system after filtration (mechanical, biological or chemical filtration) so that the water quality is maintained throughout the culture. Although this is an energy intensive and expensive mode of aquaculture, it is used in urban areas where the water area available for aquaculture is limited.

- o Aquaponics - is a synergic system between fish and plants in which both grow together in one integrated system. In an aquaponics system, water flows from a fish tank into a biofilter

where bacteria break down the fish waste into an organic nutrient solution. The plants then absorb the nutrients from the water before it is re-circulated to the fish tank. This is also a dynamic and energy-intensive system and needs utmost care in implementation

5.3 Value Addition and Modernization of Post - Harvest activities:

Because of the perishable nature of the fish caught, it is estimated that every year about 18 per cent of the total fish catch is discarded as spoiled fish. This can be avoided to a great extent by expanding the cold chain networks which includes providing insulated boxes in fishing craft, reefer chilled storage in harbours, onshore chilled storage facility, modernization of fish landing centre & harbour and wholesale market (for hygienic handling and quality assurance) and insulated vehicle (for better transport), fish collection/procuring centres/base stations and hygienic fish sales outlet at the endpoint.

5.4 Technology Improvement Through SAF (2018-19)

6.0) Climate resilience and disaster relief:

The residents along the coasts of Kerala have long been tormented by frequent rages of cyclones causing immense damages to life and property. Many still live in houses damaged by the sea and many are waiting for rehabilitation. The government has initiated several schemes to ensure the fish workers lead a safe and secure life with no impending threat to their life or property. The activities include repair of damaged houses, rehabilitation efforts, accident insurance scheme, sea safety training, sea rescue operations and a marine ambulance service exclusively for the fisherfolk.

6.1 Rehabilitation and House Repair:

6.2 Accident Group Insurance:

2.43 lakh fish workers and 85,543 allied workers benefitted from the Group Accident Insurance Scheme. The fishing fleet of Kerala comprises of 6231 mechanised vessels, 31,664 motorised vessels and 2,806 non-motorised traditional vessels. Around 924 fishing crafts in 2020-21 has been insured.

6.3 Marine ambulance for the security of fishermen. (Outlay: ₹ 250.00 lakh)

After the devastating Ockhi disaster, in order to reduce mortality at sea, it was decided to introduce three marine ambulances equipped with all modern gadgets, paramedical staff and provisions for onboard medical care, which will serve as rescue vessels for support under distress situations. The marine ambulances were equipped with all modern facilities required for emergency medical aid for 10 persons at a time. The Government commissioned marine ambulances for three zones: Vizhinjam in Thiruvananthapuram, Vypin in Ernakulam, and Beypore in Kozhikode. An amount of ₹ 250.00 lakh is provided for meeting the operational expense which includes fuel cost, cost of medicines, AMC, insurance charges and contractual wages in connection with the maintenance of the three marine ambulances. Further, 19 coastal hospitals were constructed in the health sector.

6.4 Sea safety and sea rescue operations

The scheme aims to provide 75 per cent grant to the fisherfolk for the purchase of sea safety equipment such as Global Positioning System, Marine communication equipment, Life buoy and life jackets and Automatic Identification System (AIS)/ Satellite-based communication/ vessel tracking devices. In order to develop a comprehensive and quick-action sea rescue operation mechanism, the schemes propose the following:

"to ensure the recording of entry and exit of fishing vessel by establishing punching booths/facilities in fishing harbours and weather forecast data dissemination

"to provide training to fishermen as Deckhands/Engine driver/Syrang

"to engage harbour-based team of trained fishermen for sea rescue operations as per need

6.5 Removal of Plastic from water bodies -"Suchitwa Sagaram"(HED)

This is a proposed scheme (Clean Sea), to bring down the accumulation of plastic wastes in the sea and thereby save aquatic fauna from the plastic menace. The scheme proposes to employ fishermen to collect garbage from the sea bed and recycle the same to use in the road surfacing works. Thus, the scheme at the same time resolves to solve the problem of marine pollution, enhance employment opportunities and the additional income of the fisherfolk and use the waste collected for a more environmentally friendly method of road construction.

About 38.4 tonnes of discarded nets, plastic ropes, and other plastic items have so far been removed by fish workers from the sea.

An amount of ₹ 50.00 lakh is earmarked as outlay for this project in the budget of 2022-23. Suchitwa Sagaram was implemented in Neendakara in Kollam in collaboration with the Society for Assistance to Fisherwomen (SAF), Local Self Government Institutions (LSGIs) and the Suchitwa Mission. This project was noted by the United Nations.

6.6 Cleaning of Vembanad Lake:

The Government of Kerala has launched an initiative to clean up Vembanad and Ashtamudi lakes with a view towards protecting and conserving the natural ecosystem of brackish water lakes of the state. The scheme involves the participation of all the direct and indirect stakeholders and LSGs. An amount of ₹ 100.00 lakh is provided for the scheme in annual budget 2022-23.

7. Social Mobility:

The government established more than 2500 micro-enterprises so as to promote alternative livelihood activities, providing livelihoods for over 7000 fisherwomen. An Apparel Park Consortium was established at Kundara, Kollam, where 12 microenterprise units covering 48 fisherwomen beneficiaries were established. Employment was

8. Conservation of fish Species:

With the stock of marine fish catch dwindling by the year, it is absolutely essential to protect and preserve the local fish species along our shores (as well as the fresh water species) to ensure sustained livelihood for the fish workers and food security for the state. A total of Rs. 15 Cr. is earmarked for fisheries resource conservation in 2022-23, which includes 3 major schemes:

8.1. Conservation and Management of fish resources (inland):

The scheme aims to increase the fish production in the state by protecting the natural fish stock by conducting patrolling to prevent illegal fishing, setting up Fisheries Management Councils (FMCs), by the establishment of a protected area, by enhancing the fish stock

through ranching, mangrove afforestation and restoration of damaged aquatic ecosystems. The scheme seeks to make use of remote sensing and geographical information system for fisheries resource mapping, buy-back of licensed stake net, and Chinese net as well as assessment of fish catch.

8.2 Conservation and Management of fish resources (marine):

The state needs to adopt effective management principles and surveillance techniques if we want a sustainable use of marine resources to ensure nutritional food security, economic growth, and protect the sole livelihood of fisherfolk. This will require steps like co-management of marine fishery resources & functioning of Fisheries Management Councils (FMCs), implementation of KMFR Act, fitting of holographic registration plate, camera surveillance in the fishing harbours and fish landing centres, establishment of new fisheries stations, establishment of effective communication network, marine catch data collection, installation of square mesh & Turtle Excluder Device(TED) in trawl nets, certification of species, establishment of artificial reefs/marine protected areas, model fishing boat and hiring of 20 patrol boats for sea patrolling and employment of fisheries rescue guards on contract basis.

8.3 Surveys, Studies and Investigation for Fisheries infrastructure:

The scheme proposes to take up surveys, studies and investigation works of infrastructure works pertaining to Fisheries and Coastal Area Development and conducting techno-economic feasibility studies for fisheries infrastructure projects. Fisheries infrastructure includes fish landing centres, fish harbours, bridges, roads, groynes, offshore and detached breakwaters and beach nourishment works. The scheme seeks to establish a comprehensive and permanent data bank of the morphological and environmental changes in coastal zones which will be beneficial for the future planning and design of various coastal structures like harbours and shore protection works. The technical investigation includes surveys, hydrodynamic data collection and subsoil investigations. The scheme tries to incorporate technical assistance from competent agencies like KUFOS, wherever and whenever it is required.

8.4 Aquatic Animal Health Surveillance and Management:

This is a very practical scheme with an objective of timely identification of disease in the early stage itself, which may reduce the mortality rate and further spread. It proposed to do so by establishing Mobile Aqua Laboratories to conduct clinical examination of live/dead aquatic animals, sample fixing, water and soil quality analysis. An amount of ₹ 100.00 lakh is provided for the scheme during 2022-23.

9. Government Response During the Pandemic:

The biggest blow to the fish workers during the pandemic was the break down of international markets and global trade which affected the export performance of the fisheries sector and the income of the fisherfolk. The restrictions and the closure of global markets affected in particular fresh fish and shellfish supply chains and the processing sector due to the weak global demand. All fishing harbours and fish landing centres in Kerala were closed down with the imposition of the lockdown. Trolling with the use of mechanised fishing boats was prohibited and fish auctions too were not allowed. Only traditional methods of fishing were allowed, but they too were asked not to auction their products, as social distancing measures were difficult to implement. The government entrusted the Harbour Management Societies to manage the purchase and sale of fish at a price fixed by the government.

The government introduced a token system in the harbours to implement social distancing rules. Even a mobile application was developed for the online marketing of the catch. All aquaculture activities, hatcheries and fish farms, as well as the movement of seed, feed and other essentials were exempted from the lockdown restrictions by a special order. To financially help the fish workers traumatized by the pandemic, SAF provided financial assistance in the form of long-term loans at reasonable interest rates. During the pandemic period 359 micro enterprises were assisted with term loan of ₹5 crore from Kerala Bank.

10. Conclusion:

The fisheries sector makes significant contributions to the economy of Kerala. There is a huge scope for the further development and modernization of the sector, especially the development of inland fisheries sector and aquaculture activities. The state has much more to achieve towards ensure income stability and social security of the fish workers' community. Problems faced by the fisherfolk such as reduction in catch lately, lack of proper fishing and safety equipment, low levels of higher educational attainments, ease of social mobility, lack

of proper housing and coastal infrastructure facilities etc. should be studied in detail and attempts must be made to resolve them. The government must also look into the damages caused by climate change as well as wave after wave of cyclones on the lives of fish worker communities. The aim should be to make fishing a safe and rewarding profession in the near future and the upliftment of fishing communities who currently are amongst the most backward communities in the state.

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