



**GOVERNMENT OF KERALA
KERALA STATE PLANNING BOARD**

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

**WORKING GROUP ON
INFRASTRUCTURAL CHALLENGES IN KERALA'S
MARINE FISHERIES SECTOR**

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 “Infrastructural challenges in Kerala’s marine fisheries sector.” The Co-Chairpersons of Working Group were Dr. Leela Edwin and Dr.B.Manoj Kumar .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. We, the Co-Chairs, place our deep appreciation and gratitude to all the esteemed members of the ESG for their valuable contributions in preparing the report. We are 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. We sincerely hope the recommendations in the report can lead to important changes in the public policy on the development of the marine sector in the State.

Dr. Leela Edwin
Expert Co-chairperson

Dr. B. Manoj Kumar
Official Co-chairperson

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HIGHLIGHTS

- Kerala is one of the leading producer and consumer of marine fishes, meets the livelihood of around 10.24 lakh fisherfolk population and around 80% of the animal protein requirement for the state is met by fish and fishery products.
- The approach paper provides suggestions for sustainable resource management, fleet size management, safety of life at sea (SOLAS), fishing harbours, fisheries institutions, markets, value addition, and mitigating the effect of Covid-19 on the industry



INFRASTRUCTURAL CHALLENGES IN KERALA'S MARINE FISHERIES SECTOR

EXECUTIVE SUMMARY

INTRODUCTION: Kerala is one of the leading producer and consumer of marine fishes, meets the livelihood of around 10.24 lakh fisherfolk population and around 80% of the animal protein requirement for the state is met by fish and fishery products. Three meetings were held to discuss the infrastructural development in the marine sector of fisheries in consultation with experts from other research institutes, organizations and stakeholders. The decisions were evolved as the proposal for 14th five-year plan considering the Terms of References as the guideline

REVIEW OF THE 13TH FIVE-YEAR PLAN: The focus of the 13th Plan was to improve the fish production by adopting sustainable fishery management measures, responsible fishing, and stock enhancement. The outlay for marine fisheries during 13th plan period was Rs.99.67 crore.

APPROACH PAPER: The approach paper provides suggestions for sustainable resource management, fleet size management, safety of life at sea (SOLAS), fishing harbours, fisheries institutions, markets, value addition, and mitigating the effect of Covid-19 on the industry.

1. INTRODUCTION

Kerala is one of the leading producer and consumer of marine fishes meets the livelihood of around 10.24 lakh fisherfolk population and around 80% of the animal protein requirement for the state is met by fish and fishery products. The growing demand of fishery products in the global market made the fishing an export-oriented industry of the state. The economy of the state is highly influenced by this sector, that contributes roughly three percentage of the state revenue. Considering the impressive development of the industry and its importance in the economy of the state, an Expert Subgroup has constituted with the following Terms of References (TOR) to ensure the sustainable growth of fisheries sector by the utilization of existing infrastructures or by the development and establishment of new ones for the sustainable growth of fisheries and to the food- nutritional security.

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 access the infrastructural requirement in Kerala's marine fisheries sector for the next ten years, including in harbours, landing structures, markets, vehicles and transport and machinery.
3. To suggest a plan to improve and modernize 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.

2. REVIEW OF THE THIRTEENTH FIVE-YEAR PLAN SCHEMES

MARINE FISHERIES

The focus of the 13th Plan was to improve the fish production by adopting sustainable fishery management measures, responsible fishing, and stock enhancement. Redeployment of fishing effort from the over exploited continental shelf area to deeper waters was also encouraged.

The outlay of the umbrella scheme ‘Marine fisheries’ during 13th Plan period was Rs.99.67 crore.

Table 1: Budget outlay and expenditure for marine fisheries in the 13th FYP

Particulars	Amount allotted in 13th Five-year plan (Lakh)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budget outlay	860	1307	3000	2300	7967	2000
Expenditure	557.04	942.64	614.17	1366.72	3969.41	

Conservation and Management of Fish Resources (Marine)

The trend of marine capture fisheries showed an 18% decline in the last decade (5.86 lakh MT in 2007-2008 to 4.83 lakhs MT in 2017-18), mostly due to impact related to climate variations, increased fishing capacity, and juvenile fishing, among other factors. Therefore, improving marine fish production by adopting sustainable fishery management measures and ensuring responsible fishing practices, efforts towards eco-labelling and certification for fetching better value to the catch etc., were the major focus areas during the 13th plan period.

- The timely amendment of the Kerala Marine Fishing Regulation Act (KMFR Act, 1980) during September 2017, introduction of KMFR Rule in 2018 and its strict enforcement had led to an increase of about 26% in the marine capture fishery of the State. The catches increased from 4.83 lakhs MT in 2017-18 to 6.09 lakhs MT in 2018-19.
- An important aspect of the KMFR (Amendment) Act, 2017 is the thrust given to participatory management. The legislation aims to set up Fisheries Management Councils (FMCs) at the State, District and Village levels (Formation of three tier system of Fisheries Management Council) involving the participation of the fisherfolk. Harbour Management Societies including fishermen were also set up in all major fishing harbours.
- Aimed at ensuring sustainability of the Marine fisheries sector, as per the recommendation of CMFRI, the Minimum Legal Size (MLS) of 58 commercially important species has been fixed and Government had issued notification in this regard. Also, from 2018 onwards, the trawl ban period has been raised from 47 days to 52 days.
- Banning of unscientific fishing methods, mesh size regulation for all major fishing gears, online registration and licensing of fishing vessels, colour coding of fishing vessels, fitting of holographic registration plate and equipping fishing vessels with

lifesaving appliances and firefighting equipment were implemented.

- As efforts towards improving the Monitoring, Control and Surveillance, installation of camera surveillance at Neendakara, Puthyappa, Beypore fishing harbours were completed and installation of LED display board at Munnambam and installation of CCTV are being undertaken at Vizhinjam, Sakthikulangara and Ponnani harbours.
- To make the search and rescue operations more effective, the operation in the entire territorial waters is conducted in co-ordination with Indian Coastal Guard and Indian Navy. The five fisheries stations in the State, at Vizhinjam, Neendakara, Vypin, Beypore and Kannur are made the hub for such operations. Patrol boats have been made available for sea patrolling in all nine coastal districts and engagement of fisheries guards on contract basis, modernization of existing five fisheries stations with new building and sophisticated safety equipment, establishment of state level master control room at Fisheries Directorate and three regional control rooms based at Vizhinjam, Vypeen and Beypore, establishment of effective communication network, etc were all achieved during the Plan period. Action was taken for establishment of new fisheries stations at Thottapally (Alappuzha), Azheekode (Thrissur), Ponnani (Malappuram) and Kasaragod.
- Establishment of artificial reefs by the placement of trapezoidal RCC modules for the replenishment of marine stock were taken up. During the 12th five-year plan period, Artificial reef was established off the coast of Puthukurichy, Kochuthura, Pulluvila, Thumba, Poonthura, Beemapally and Valiyathura fishing villages in Thiruvananthapuram. Artificial reef installation off the coast of Poovar and Puthiyathura Fishing Villages in Thiruvananthapuram is going on

Table 2: Budget outlay and expenditure for conservation and management in 13th FYP

Head of account 2405-00-103-91	Amount allotted in 13th Five-year plan (Lakh)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budget outlay						
Expenditure	490	507	1200	900	3477	800
Expenditure	486.50	469.45	481.48	739.08	2555.34	

Suitable components of fishing gear

The scheme envisaged assisting the traditional fishermen for procuring large-meshed gill nets and sophisticated equipment for line fishing for country crafts, by providing subsidy limited to the cost of 50% or Rs. 10,000/- whichever is less. A total of 800 traditional fishermen who have crafts fitted with OBM below 10 hp were benefited with this scheme.

Table 3: Budget outlay and expenditure for fishing gear in the 13th FYP

Head of account 2405-00-110-98	Amount allotted in 13th Five-year plan (Lakhs)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budgeted amount 2405-00-110-98	-	40	40	40	120	40
Expenditure 2405-00-110-98	-	-	40	40	80	
Expenditure AA 2405-00-103-87	-	-	-	30	30	
No. of Beneficiaries assisted	-	-	400	400	800	

Table 4: Fishing gear subsidy provided during 13th FYP

SL. No	Name of District	Fishing gear subsidy (Amount in lakh)					
		2016-17		2019-20		2020-21	
		Beneficiaries	Amount released	Beneficiaries	Amount released	Beneficiaries	Amount released
1	Thiruvananthapuram	188	18.8	100	10.0	70	7.0
2	Kollam	179	17.8	100	10.0	112	11.2
3	Alappuzha	59	5.9	100	10.0	87	8.6
4	Ernakulam	7	0.7	0	0.0	4	0.4
5	Thrissur	12	1.2	0	0.0	22	2.2
6	Malappuram	33	3.3	31	3.1	13	1.3
7	Kozhikode	93	9.3	50	5.0	61	6.1
8	Kannur	27	2.7	9	0.9	23	2.3
9	Kasargod	2	0.2	10	1.0	8	0.8
	Total	600	59.94	400	40.00	400	39.97

Motorisation of country crafts

The main objective of this scheme was to aid the traditional fishermen in procuring new outboard motor having a capacity of less than 10 HP with a subsidy of Rs. 30,000/- per unit. The subsidy could be availed for existing units and those constructed in replacement of existing units. The unit cost of OBM is up to Rs.2,40,000 per unit and the subsidy is 25% of the cost of OBM limited to a maximum amount of Rs.30,000/- per unit. Subsidy for about 200 nos. of such units were disbursed.

Table 5: Budget allocation for motorization of country crafts during 13th FYP

Head of account 2405-00-110-98	Amount allotted in 13th Five-year plan (Lakh)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budgeted amount	70	60	60	60	190	60
Expenditure	70	60	0	60	190	-
Beneficiary assisted	-	200	0	207	400	-

Table 6: Subsidy for motorization of country crafts during 13th FYP

SL. No		2016-17		2018-19		2020-21	
		Beneficiaries	Amount released	Beneficiaries	Amount released	Beneficiaries	Amount released
1	Thiruvananthapuram	13	2.7	63	18.9	15	3.3
2	Kollam	11	3.3	2	0.6	3	0.9
3	Alappuzha	32	9.6	11	3.3	42	12.6
4	Ernakulam	3	0.9	26	7.8	15	4.5
5	Thrissur	5	1.5	15	4.5	8	2.4
6	Malappuram	14	3.8	20	6	14	4
7	Kozhikode	35	10.3	27	8.1	34	10
8	Kannur	16	3.2	32	9.6	24	7
9	Kasargod	16	4.7	4	1.2	52	15.3
Total		145	40	200	60	207	60

Deep Sea fishing and sea safety equipment

The scheme was intended to provide grant to the fishermen for procurement of sea safety equipment such as Marine communication equipment, Global Positioning System, Life Jacket, Life buoy, etc to traditional vessels and Automatic Identification System (AIS) and Satellite based communication/ vessel tracking devices for mechanised fishing vessels. During the 13th Plan period from 2017-18 to 2020-21, a total of 1667 nos. of GPS, 64 nos. of DAT, 66 nos. of Echo sounder, and 1132 nos. of life buoy were distributed to traditional fishermen. In addition to this 300 nos. of mechanised fishing vessels were equipped with vessel tracking device. Administrative sanction has been obtained in 2021-22 for distributing 200 nos. of Vessel tracking device for mechanised fishing vessels and 1744 units of GPS to traditional vessels.

Table 7: Budget allocation for deep sea fishing and sea safety equipment during 13th fyp

Sea Safety and Promotion of Deep-Sea Fishing Head of account 2405-00-103-79	Amount allotted in 13th Five-year plan (Lakh)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budgeted amount	50	50	0	0	100	-
Expenditure	0.55	0	14.52	30.88	45.95	-
Sea Safety& Sea Rescue operations Head of account 2405-00-103-76	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budgeted amount	0	550	1300	900	2750	500
Expenditure	0	193.75	71.33	308.09	573.17	

Table 8: Distribution details of Sea safety equipment

Sea safety equipment	2017 -18	2018-19	2019-20	Total
GPS	66	500	1098	1664
Lifebuoy	132	1000	-	1132
Eco Sounder	66	-	-	66
DAT	-	-	64	64

Insurance coverage for marine fishing implements

The premium amount was 1.5% of the cost of the marine fishing implement and tax. As part of this project, 90% of the premium amount was provided as Government Share and 10% as beneficiary share.

Table 9: Budget allocation for insurance coverage for fisherfolk during 13th FYP

Head of account 2405-00-800-27	Amount allotted in 13th Five-year plan (Lakh)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
Budgeted amount	50	100	400	300	850	-
Expenditure	0	19.45	6.84	128.67	154.96	-
No. of crafts insured	-	647	858	924	2429	-

The project implementation was initiated in 2018-19 during which insurance was provided for hull of the vessel alone. From 2019-20 insurance is provided for both the hull and the engine. Physical achievement includes insuring 2429 traditional vessels during the Plan period.

Mariculture activities

An amount of Rs.100 lakh was earmarked for various Mariculture activities during 2020-21

for mariculture development utilizing suitable technologies developed by CMFRI which included marine finfish farming in cages. The project could not be initiated due to certain local issues

Table 10: Budget allocation for mariculture activities during 13th FYP

Head of account	Amount allotted in 13th Five-year plan (Lakhs)			
	2019-20	2020-21	Total	2021-22
2405-00-103-70				
Budgeted amount	0	100	100	100
Expenditure	0	0	0	-
National Fisheries development Board				
2405-00-101-55				
Budgeted amount	0	0	0	0
Expenditure (AA)	268.32	234.02	502.34	-

Marine ambulance for the security of fishermen

After the devastating Ockhi disaster in 2017, it was decided to introduce three marine ambulances equipped with all modern gadgets, paramedical staff, and provisions for onboard medical care, to serve as a rescue vessel for the fishermen getting into accidents at sea.

Three marine ambulances were launched, and functioning is based at Vizhinjam, Munambam and Beypore. During 2021-22, an amount of Rs. 250.00 lakh was provided for the operational expense which includes manning charges, fuel cost, purchase of medicines, paramedical staff, Annual Maintenance Charges (AMC) and insurance charges.

Table 11: Budget allocation for marine ambulance during 13th FYP

Head of account	Amount allotted in 13th Five-year plan (Lakh)					
	2017-18	2018-19	2019-20	2020-21	Total	2021-22
2405-00-103-86						
Budgeted amount	200	0	0	0	200	250
Expenditure	0	200	0	0	200	-

Insulated fish boxes to traditional fishermen

One of the focus areas of 13th plan was to reduce the rate of fish wastage by at least 10 per cent of catch by ensuring a cold chain network from the boat to the plate. The scheme aimed to provide around 220 nos. of high-quality roto moulded insulated fish boxes ranging in capacity from 300 litres to 700 litres to traditional fishermen group was implemented in 2021-22.

Table 12: Budget allocation for insulated fish boxes during 13th FYP

Head of account	Amount allotted (Lakh)	
	2405-00-110-98	2021-22
Budgeted amount		50
Expenditure		-

Kerosene subsidy to fishermen

The fishermen are provided white kerosene at subsidised rate through Matsyafed and the subsidy is released as DBT to the account of the fishermen. The details of subsidy released are as follows:

Table 13: Kerosene subsidy for fishermen during 13th FYP

Year	2017-18	2018-19	2019-20	2020-21	2021-22
Subsidy (Rs. crore)	44.7	41.38	32.43	37.74	5.25

Okhi Rehabilitation Programme

This scheme was implemented in the aftermath of the Okhi disaster, which claimed the lives of many fishermen and destroyed their fishing gear. The goal of this project was two - fold: first, to replace damaged fishing equipment for the small-scale sector, and second, to equip the industry with current technology to deal with such extreme weather at sea.

The project included the replacement of damaged FRP boats, the formation of a marine rescue squad trained at the National Institute of Water Sports in Goa for rescue missions, the distribution of life jackets, and the distribution of communication equipment.

The specifics are provided in the following tables

Table 14: Constitution of sea rescue squad

Sea Rescue Squad					
Sl No:	District	Target number of Fishermen	Application received (number of Fishermen)	Screening test completed	Training completed
1	Thiruvananthapuram	150	165	163	150
2	Kollam	105	112	93	87
3	Alappuzha	105	50	44	42
4	Ernakulam	105	99	58	36
5	Thrissur	60	76	67	55
6	Malappuram	60	64	62	60
7	Kozhikode	105	109	97	60
8	Kannur	90	126	105	85
9	Kasargode	120	36	22	10
TOTAL		900	837	711	585

Table 15: Life jacket distribution across districts

LIFE Jacket Distribution			
Sl. No.	District	Target Number of Fishermen	Total No. of Life Jacket Distributed to Fishermen
1	Thiruvananthapuram	12500	12500
2	Kollam	3750	3750
3	Alappuzha	5000	5000
4	Ernakulam	3750	3750
5	Thrissur	2500	2500
6	Malappuram	3750	3750
7	Kozhikode	3750	3750
8	Kannur	2500	2500
9	Kasargode	2500	2500
TOTAL		40,000	40,000

Table 16: NAVIC distribution to fishermen across districts

NAVIC Distribution to Fishermen						
Sl. No	District	Target (First Phase)	No. of Applications Received	No. Of Unit Issued By Firm	Beneficiary Contribution Received	Number of Unit Distributed To Fishermen
1	Thiruvananthapuram	1300	1162	650	491	491
2	Kollam	500	352	200	27	27
3	Alappuzha	800	207	150	67	67
4	Ernakulam	500	73	100	87	87
5	Thrissur	300	36	50	46	46
6	Malappuram	500	96	50	19	19
7	Kozhikode	500	79	100	46	46
8	Kannur	300	221	199	132	132
9	Kasargode	300	114	50	26	26
TOTAL		5000	2340	1549	941	941

Table 17: Satellite phone distribution to fisherfolk across districts

Satellite Phone - Distribution										
Sl.No	District	Target		No. Of Unit Issued By Firms	Beneficiary Contribution Received		No. Of Units Activated & Distributed To Fishermen		Balance To Be Issued	
		T	M		T	M	T	M	T	M
1	Thiruvananthapuram	200	Nil	100	100	Nil	99	Nil	1	Nil
2	Kollam	50	150	83	66	Nil	66	Nil	Nil	Nil
3	Alappuzha	30	20	15	15	Nil	15	Nil	Nil	Nil
4	Ernakulam	50	150	4	4	Nil	3	Nil	1	Nil
5	Thrissur	30	20	6	1	Nil	NIL	Nil	1	Nil
6	Malappuram	30	20	6	3	Nil	3	Nil	NIL	Nil
7	Kozhikode	50	100	14	6	Nil	8	Nil	6	Nil
8	Kannur	30	20	6	6	Nil	6	Nil	Nil	Nil
9	Kasargode	30	20	6	NIL	Nil	Nil	Nil	NIL	Nil
Total		500	500	240	201	Nil	198	Nil	9	Nil

Table 18: Replacement of FRP boats

REPLACEMENT OF FRP BOATS			
Sl. No	District	Target	No. of groups formed, and work order issued
1	Thiruvananthapuram	75	35
2	Kollam	15	15
3	Alappuzha	17	17
4	Thrissur	8	9
5	Malappuram	3	3
6	Kozhikode	1	-
7	Kasargode	1	1
TOTAL		120	80

3. APPROACH PAPER

SUSTAINABLE RESOURCE MANAGEMENT

- a. The average total catches during 2014-2018, which was 627249 tonnes, decreased to 475368 tonnes in 2019, which further reduced to 360867 tonnes in 2020.
- b. This general decline in the catches is reflected in reduced contribution by different commercially targeted species along the Kerala coast. Out of the total of 29 catch groups/species studied, in 2020 the catch rates for 21 groups are found to decline, when compared to the five-year average of the catches during the period 2014-2018. Significant decreases were noticed during 2020, which could be the effect of COVID and the related lockdown and fishing closures. However, when compared to the average catches from 2014-2018, the catches of 18 species/groups are found to have decreased. The major declines observed are for oil sardine, perches, ribbonfish, cephalopods, and other clupeids (Annexure-I-Table 5).
- c. A recent assessment of the stock status by CMFRI (Sathianandan, et al, 2021), shows that out of the 25 stocks assessed, 52% are only sustainable, 24% over fishes and 16% of the stocks are recovering. The multi-gear model used for computations, have clearly indicated the level of overcapacity in multiday trawls, outboard ring seines and hooks and lines and have recommended a drastic reduction in fishing effort (Annexure-I-Table 6; Figure 1).
- d. Among the major five groups that have showed steep decline in catches, three of the stocks are primarily targeted by trawlers. There is a need to rethink on the management measures in addition to the monsoon ban, which is already implemented effectively in the state. Regulations regarding Minimum Legal sizes (MLS), mesh size and dimensions of the gear, should be strictly enforced in case of ring seines / motorized mechanized vessels to ensure sustainability of the sardine stocks, which is already under severe pressure due to direct and in-direct effects of climate change (Annexure-I-Table 7).
- e. The state has a good potential for mariculture with an area of 1292 hectares and the estimated production from this area 46500 tonnes. The marine fishes like seabass, groupers, snappers, pompanos and other carangids are suitable for farming in these identified areas. Similarly, there is a potential of about 80 hectares for cultivation of seaweeds in the state, which can be utilized. It is seen that funds allocated for cage farming in the 13th plan, it was not utilized citing local issues. This sector has huge potential for employment generation and production of quality fish for domestic and export markets. Addressing the issues and allocation of funds are urgently required in this sector.

FLEET SIZE MANAGEMENT

- a. The total registered fleet in the state consists of 41086 fishing vessels comprising of 6278 motorized mechanical (mechanized), 31968 motorized non-mechanical (motorised) and 2840 non-motorised fishing vessels (Appendix). The existing marine fishing fleet in the state outnumbers the recommended fleet size for Kerala as per Mohammed et

al., 2014 and the recent estimates by Sathianandan et al., 2021, also recommends an immediate reduction in the fleet size in the state. The study recommends reduction in fleet size of multi-day trawls by 34%, outboard ring seines by 43% and a reduction of 27% in effort for hook&c lines and gillnets.

- b. In addition to the increase in the number of vessels, it is observed that the size of the fishing vessel and the installed engine power is also increasing. This trend will significantly affect the fishing capacity, will lead to over exploitation and the profitability of the fishing operations. Steps should be taken for strict compliance to the stipulation regarding the vessels size and the installed engine power in KMFR.
- c. The outboard motors currently being used, are started using petrol and run-on kerosene. This causes considerably high amount of carbon emissions and are found to pollute the waters. Diesel propulsion system has already been established in our State. Engines run on diesel/ diesel- electric/ CNG/ LPG/ LNG may be considered as suitable alternatives. Schemes in this regard are recommended.
- d. Marine plywood sheathed with FRP vessels are extensively used due to the commercial feasibility, high economic viability, relatively low damage in normal aquatic conditions. However, the drawback is that its service life is below 7 years and has low strength to withstand strong waves and is prone to physical deterioration. There are also increasing number of instances where floats, PUF and plastic bottles are tied together and are being used as boats for fishing. This is unsafe and such contrivances should be banned considering both the safety and the polluting potential of the materials.
- e. Fibre Reinforced Plastic (FRP) fishing vessels are becoming popular due to their low production cost, easiness to fabricate, no bio-deterioration, good anticorrosive property, and high durability (>20 years). However, discarded/ abandoned FRP boats/ FRP sheathed marine plywood boats are marine debris that fall under the category 'plastic'. Burning of FRP boats, is resorted to in many parts of Kerala, which emit dioxins and furans during burning process which are harmful. So proper recycling facilities for disposal of FRP through conversion for useful ends is proposed. Use of BIS certified raw materials are to be ensured for safety and durability of FRP fishing vessels. The FRP vessels without plywood insert are to be designed according to boat building rules/ ISO standards and use of certified standard raw materials for boat construction to be made compulsory for ensuring safety, durability and for preventing pollution.
- f. The optimum dimensions and mesh size of the different gears, to be used in each fishery, is already recommended in the KMFR amendment 2018 (annexure). But it is observed that the adoption of these stipulations equivocal and hence strict measures is to be taken for implementation and adoption of the regulations. It is recommended that production, keeping, transportation and operation of illegal gears need to be regulated.
- g. Marking of fishing gears as envisaged in the KMFR amendment is to be enforced to minimize the impact of ghost fishing and associated damages caused by gears in the marine environment.

- h. Fishing practices like pair trawling, night trawling, purse seining, pelagic trawling, etc. are banned in the state. However, the effective enforcement of these laws is yet to be realized, which requires urgent interventions.
- i. The bulk of the fishing operations along the Kerala coast occurs in the near shore waters and a general decline in the catches from the traditional fishing grounds is observed. Diversification of fishing to deeper waters to target the lesser targeted resources is essential and hence combination fishing vessels with LOA of more than 24 m, that can fish in the deeper waters is recommended. Operation of the deep-sea vessels may be taken up in association with traditional fishermen groups by forming societies or any viable associations.
- j. ICAR-CIFT has exclusively designed fuel-efficient combination deep sea vessels, approved by Indian Register of Shipping (IRS), and is recognized by the Government of India, for the “Blue Revolution scheme”. Steps should be taken up to accelerate the works related to the deep-sea fishing vessels allotted to Kerala under PMMSY. Construction and approval of deep-sea vessels should be by following this approved design.
- k. A large number of fishing vessels are non-operational mostly during the lean seasons, due to reduced returns from fishing operations and there is significant excess capacity in the fishery, which is already mentioned in the report. Taking into view the present condition of fisheries and the overall loss, a phased removal of excess fishing capacity is recommended, and funds should be allocated specifically under this head for buy-back schemes or for conversion to low-energy, low-impact fishing methods.
- l. The state provides many social welfare programs and cash packages to fishermen to aid them with their rather poor socioeconomic situations. Some of these schemes, such as fuel (kerosene) for the motorised industry, are detrimental and can lead to overcapacity, as has previously been highlighted. Schemes that are currently in place or that are being considered should be connected to the compliance with the provisions specified in the Marine Fisheries Regulations Act. This would be a reward for adopting appropriate fishing practises and adhering to other rules and regulations.

SAFETY OF LIFE AT SEA (SOLAS)

- a. With increasing number of cyclones and inclement weather, to save the fishers at sea, it should be ensured that Life Saving Appliances (LSA) such as life buoy, life jackets and life rafts should be made mandatory in all deep-sea fishing vessels. Day and night signal must be enforced so that accidents with other marine vehicles is avoided. This will help other ships and boats, especially foreign vessels to detect and understand the position/ heading of the fishing vessels both during day and night. (G.O.(P)No.23/2020/F&P Dated, Thiruvananthapuram, 12/11/2020 to be strictly implemented).
- b. The facility of bio-toilet and galley (kitchen) to be made mandatory in all existing multi-day fishing vessels for safety and hygiene. Approval should be given to new vessels only with these facilities.
- c. Small scale vessels to be designed and constructed as per national standards to withstand severe weather conditions. Navigational lights, radar reflector, buoyancy chamber, chine

rod, and colour code for small boats to be enforced for safe navigation, fishing, and emergency rescue operations. (The Kerala Marine Fishing Regulation (Amendment), Rules, 2021 and Notification of the Govt. of Kerala G.O. (P) No. 01/2021/F &PD, dated 6th January 2021 regarding colour code to be followed).

- d. Training on the use of lights (during night navigation and fishing), shapes (during day navigation and fishing), and sound signals (emergency/ communication) to be provided for fishermen.
- e. Inspection and fitness certificate to be made mandatory for all vessels of size greater than 15 m LOA every three years. Staff of the dept. should be made competent for the inspection of vessels or suitable people with adequate qualifications may be posted in the department – naval architect / marine engineers can be deputed/posted.
- f. One marine ambulance each at major fishing harbours to be made operational with trained manpower. Facility for special rescue boats with basic rescue kits and trained personnel can be kept in readiness in major fish landing centres. The personnel trained by the Govt. of Kerala may suitably deputed for rescue operations round the clock.
- g. Boat building and design approval as per the specifications in KMFR should be made mandatory.
- h. Patrolling system as per the existing norms to be continued – sea rescue squad based on landing centres and harbours for urgent situations.
- i. Sarang / skipper to be trained in the aspects related to sea safety
- j. Vessel monitoring system (VMS) to be made mandatory – UHF/ VHF should be made mandatory for vessels fishing within 50 km range and for deep-sea going fishing vessels, satellite-based monitoring system are to be made mandatory.
- k. Considering the points listed above, due consideration may be given to allot sufficient funds to equip fishers and vessels with safety features and other life saving appliances.

FISHING HARBOURS

- a. No new harbours are suggested in the report. The already existing harbours and FLCs have to be strengthened to improve the handling and quality issues.
- b. Lack of proper periodic maintenance of harbours which ensures the quality of catch landed has been much discussed in Kerala. The use of contaminated ice for chilling is often found to affect the quality of fish. This can be avoided by introducing a conveyance system for transport of ice from production unit in the harbour to the vessel.
- c. The engagement of trained personnel in the handling of fish, and the establishment of quality checking units at and near to the harbour can result in assuring better quality of catch landed and transported. Experts trained as per FSSAI, and HACCP guidelines should be employed at quality checking units of harbours.
- d. Clean water distribution system with overhead tanks and pump house is very essential in the harbour for the primary washing of landed fishes and auction halls of harbour. A drainage system connected directly to the effluent treatment (ETP) plant for treating the effluent cleaning water can reduce the contamination of sea water near harbours.
- e. Proper toilet facilities and rest rooms for both fishermen and fisherwomen including

- pay and use facilities is needed in all major and minor harbours.
- f. Besides the fishers, issuing of identity cards for personnel involved in fish handling is suggested to improve the handling and thereby improve quality of the catch.
 - g. Multiple shore electric connections to be provided at all fishing harbours for fishing boats to reduce fuel burning at the harbour. Use of toilets, accommodation, and galley to be strictly banned at harbours and provide this as centralized / common facility inside the harbour for the crew. Installation of suitable powered solar units in the harbour for powering the common facilities is suggested.
 - h. A market structure with wholesale - retail sale mechanism can be developed at harbours by establishing processing - value addition units, fish restaurants or ornamental live fish sale unit within the premises of the harbour, with access to public for effective utilization of the facilities.
 - i. The total ice requirement in the fishing harbours is about 1500-2000 tonnes, considering 1:1 ratio of icing, and about 30% of the total quantity is transported for processing, there is a requirement of about 1200-1400 tonnes of ice per day in the fishing harbours alone. The existing facility for ice production in the fishing harbours (about 80 tonnes), need to be enhanced, and provisions including financial assistance like subsidies is suggested for setting up quality ice making units/ ice plants in the state. Necessary checks to ensure the quality of ice is also required, by providing adequate supply of potable water to the harbours and to the ice plants.
 - j. Potable water facilities presently available in the fishing harbours is estimated to be around 900 tonnes per day, which is grossly inadequate, where the daily catch by mechanized vessels is around 1500 tonnes. Proportional increase in the quantity potable water available for cleaning and other purposes is urgently required. Provision for desalination plants, ozonation, recycling etc. can be explored.
 - k. Plastic waste collection points and recycling units should be introduced in all landing centres and fishing harbours. The model adopted at Shaktikulangara fishing harbour, in which fishermen were involved in collection and utilization of plastic wastes from oceans (Suchitwa Sagaram) can be replicated in other fishing harbours and major landing centres of the state. Sufficient funds should be ensured for continuation of such programs and efforts to involve societies and private parties can be explored.
 - l. Shaktikulangara, Munambam, Beypore/ Puthiyapla to be made model fishing harbours as an initial step towards modernizing the fishing harbours by adding the facilities for modern fishing and accessories.
 - m. Based on the assumption, that 25% of the vessel operating from the fishing harbour land their catch on the same day, and a maximum of four vessels can use the jetty by berthing side to side. It is estimated that except in the fishing harbours of Kasaragod and Thalayi, all other fishing harbours need construction of landing quay for effective unloading of catches. It is estimated that about 6900m stretch of quay needs to be constructed in the fishing harbours. The estimates regarding this are given in annexure. Finger jetties which would have lower construction costs and space requirements could be considered as an option depending on the geography of the region. Sufficient funds should be allocated for such schemes.

- n. Necessary steps should be taken to convert the non-insulated trucks to insulated trucks for transport. About 20% of the fish catch is reported to lose quality and this can be averted by increasing the number of insulated trucks for fish transport. At present there are 791 trucks based at fish landing centres and 729 at the major fishing harbours. Necessary steps need to be taken to increase the number of insulated trucks based at the landing centres.
- o. Most of the approach roads to the fish landing centres and fishing harbours in the state are either tiled or bitumen laid and the average distance to the major highway or state highways is about 3 km. It is observed that only about 0.5% have mud roads, and these should be tiled, or bitumen laid.
- p. A total of 70 CCTV cameras are only installed in four of the 17 fishing harbours from which data is available. Feeds from the CCTV camera give an excellent opportunity to understand the activities in the fishing harbour. Steps should be taken to install CCTV cameras in all the fishing harbours.
- q. Supply of potable and treated water should be ensured. An efficient water treatment system with automatic chlorine dosing has to be installed in every fishing harbour. The taps provided should be numbered and fitted with NRV's.
- r. Since auctioning starts in early morning, night stay facility is required for women in harbours where women vendors are high. Neendakara (about 450 women vendors) has such a facility, but it is not being utilized properly. Additional night stay facilities with dormitories are required at Vizhinjam (550 women vendors), and Cheruvathoor (100 women vendors).
- s. Other common facilities required like boat repair (only 4 harbours have this), engine workshop (10 harbours), display units (present in only one harbour), canteen facilities (12 harbours), and fuel refilling (15 harbours) should be developed considering the total number of vessels operating in the harbour and the number of users.

Considering the quantity of fish landed in the state, the total landings is about 6 lakh tonnes, in a period of 250 days, and 70% of the total catch is landed by mechanized fishing vessels. So about 4 lakh tonnes of fish from the mechanized sector alone. Therefore 4 lakh tonnes are caught in a time of 200-250 days, so per day catch from all the landing centres is around 1600 -2000 tonnes from the mechanized fishing vessels alone. The survey conducted by the Fisheries Department shows the average quantity of fish landed in a day from the fishing harbour is about 2200 tonnes. Facility for an estimated 10% of the total catch landed in a day for chilling is required, so the total chilling capacity estimated is 200 tonnes. In extreme cases, double the capacity estimated for a day is recommended. So, the chilled storage facility recommended for the state is 400 tonnes. It is recommended that small units of about 1 tonne capacity can be installed, considering the ease of operations and maintenance.

At present an ETP is functional only in one fishing harbour and it has issues about operational problems. It is suggested that an ETP should be installed in all the fishing harbours to treat wastewater. Those non-operational should be made functional. Harbour management councils (HMC) should be entrusted with the role of functioning the ETPs.

There are 315 ice factories, 31 cold storages, 56 freezing plants, 414 curing yards, 153 peeling sheds, 3 Solar fish drying units, one Value added fish production centre and 4 fish meal plants in the state as on date.

Development of Model Fishing Villages: Model fishing villages should be made with facilities like housing, drinking water, sanitation, roads, fish landing centres, chilled storage, fish dressing centres, electrification, and other common facilities.

None of the fishing harbours have facilities/ setup for fish waste collection and utilization. This should be addressed, and the location of units, can be decided based on the access to different processing facilities, in the private sector and easy access to fish markets. The technologies already available with ICAR-CIFT for waste utilization can be explored. Small to medium facilities are appropriate for operational ease and economy of operations.

Fishermen training needs

- a. Trained and certified persons are required as Skipper, Engine driver and Deckhands to reduce the risks of life at sea. With KUFOS as the nodal office, training can be imparted on Navigation, Engineering, KMFR Rules, Personnel Safety and Social Responsibility (PSSR), Elementary first aid (EFA), Personal Survival Technique (PST) and Fire Prevention and Fire Fighting (FPFF), weather warning systems, electronic communications equipment and Monitoring Control and Surveillance etc. Certificate of competency from Dept. of Fisheries, can be issued after training for the Serang and engine driver, which can be considered as mandatory for working on vessels.
- b. KUFOS should be entrusted in the conduct of examinations to the existing vessel crew, handling personnel & trained new recruits under a Board of Examiners formed by Dept of Fisheries.

REVIEW OF FISHERIES INSTITUTIONS

- a. The functioning of the Fisheries Management Councils (FMC) formulated at State, District and Village level aiming to the implement and enforce the rules under KMFR Acts should be strengthened. Regular orientation programs are needed for the members of management council at all three level.
- b. Management committees at the harbours and the landing centres should be entrusted and mandated to maintain the health and hygiene conditions in the respective harbours and a member of the FMC can be part of this committee for effectively understanding the problems and integration with the state's machinery.
- c. Rather than increasing the number of courses, KUFOS should streamline the number and quality of courses offered. Courses that deal with entrepreneurship focussing on start-ups should be taken up. More focussed core courses in basic fisheries discipline are required.

MARKETS

- a. Already about 40 modern hygienic fish markets are in place in Kerala. There is a need for additional hygienic fish markets constructed in all major municipalities with the assistance of agencies like NFDB.

- b. Effluent treatment facility is available in 40 fish markets and among these 32 of them are functional. Suggested that at least the major fish markets should have a solid waste collection and effluent treatment facilities.
- c. Open street vending should be discouraged, and hygienic fish vending stalls should be provided. The chilled fish vending kiosk developed by ICAR-CIFT can be adopted by coming up with suitable schemes for their popularization.

VALUE ADDITION

- a. Infrastructure facilities required for value addition need to be developed on a priority basis. The demand of value-added products is very high in the international markets. Govt. facility at Shakthikulangara is not working as intended, such value addition facilities should be developed in the vicinity of major fishing harbours and in city markets. Technology/ infrastructure can be developed in a PPP mode. Suitable products/ technologies with good market potential developed by ICAR-CIFT/ other sources can be considered for value addition.
- b. Cold chain management is an essential tool in maintaining and ensuring the quality and safety of fish and seafood, as well as its economic value and must be initiated right from the point of harvest until it reaches the prospective customer i.e., from the fishing craft to the retail fish outlet through the supply chain.
- c. Market survey to understand the demand and steps to popularize value added fish products in the Indian market should be explored.
- d. SHG groups can be trained in production of value-added products. Proper branding and marketing are a lacuna in this area. For minimum quality assurance, a certification centre for quality is required, the quality check labs already proposed in the major fishing harbour itself, can be utilized for quick assessment of quality.

IMPACT OF COVID 19

- a. Need based periodic disinfection should also be encouraged at the harbours and fish landing centres.
- b. Carrying of first aid medical kits in multi - day fishing vessels and recording of health conditions of all the crew members in the vessel before and after every single voyage should be enforced at harbours.
- c. A regular warning or monitoring through mobile application in local language or digital display boards depicting the health - hygienic practices are very essential in this regard.
- d. Medical assistance through Tele/ Internet help line service should be implemented by the Government.
- e. An upper age can be stipulated for crew in deep sea operating fishing vessel and crew above the age of 65 should undergo medical fitness test every year for being eligible for them to sail in multi-day deep-sea going fishing vessels.
- f. Facilities for sanitization of the hands and checking temperature.

Annexure 1

Marine Fisheries Resources of Kerala

Kerala has a coastline of 589.5 km, which form about 10% of India's total coastline with an exclusive economic zone (EEZ) of 218536 sq km. Kerala has a significant marine fisheries sector which contribute a production of about 5.5 lakh tonne fishes, and also an important source of occupation and livelihood for the coastal population of the state. It is estimated that about 8 lakh people earn their livelihood from capture and allied works in marine fisheries in the 222 fishing villages situated along the coastline of the state. The coastal line spread over nine districts of Kerala. A sharp decline in the total marine fish landings (15%) of Kerala was observed during the year 2019. In addition to the declining trend of common resources which were once prevalent in the region, unusual formations of frequent cyclones and climatic changes in the Arabian Sea was also one of the reasons for the reduced landings. Oil sardine, the most important species of the state registered the lowest catch in last two decades and mackerel also is showing a declining trend. Some less important fishes like *Odonus niger* emerged as a major component of trawl catch (FRAD, CMFRI, 2020).

Table 1: Revised Potential Estimate (MSY) from the Indian EEZ according to the Report of the Expert Committee for Revalidation of the Potential Yield of Fishery Resources in the Indian EEZ (2018).

Sl. No.	(i) Conventional Resources	Revised MSY (in Tonnes - MT)
Mainland		
1.	0 – 200m deep	4,924,016 MT
2.	200-500m deep	97,461 MT
3.	Sub Total (1) + (2)	5,021,477 MT
4.	Oceanic (Excluding Lak. & AN Isl. Oceanic 59,100 MT + 3,669 MT = 62,769 MT) (Oceanic total EEZ =230,832 MT)	168,063 MT
Island Ecosystem		
5.	Andaman & Nicobar (incl. Oceanic 43,794 MT)	47,463 MT
6.	Lakshadweep (incl. Oceanic 14,490 MT)	73,590 MT
7.	Sub Total (5) + (6)	121,053 MT
8.	Conventional Resources Total (3) + (4) + (7)	5,310,593 MT
(ii) Non-Conventional Resources		
9.	Deep-sea myctophids	1,000,000 MT
10.	Oceanic squids	630,000 MT
11.	Jellyfish	200,000 MT
12.	Marine macro algae	17,775 MT
13.	Non-Conventional Resources Total	1,847,775 MT
14.	Conventional & Non-Conventional Resources Grand Total (8) + (13)	7,158,368 MT

Table 2: Resource potential of the oceanic resources

Species	Potential (tonnes)
Yellowfin tuna	83500
Skipjack tuna	99500
Bigeye tuna	420
Albacore	112
Swordfish	6500
Sailfish	5200
Marlins	6600
Pelagic sharks	25000
Other species (barracuda, dolphin fish, wahoo, pelagic rays etc.)	4000
Total	230832

Table 3: State-wise and coast-wise resource potential

State / coast	0-200 m depth	200-500 depth	Total
Gujarat and Daman & Diu	895862		
Maharashtra	457416		
Goa	190146		
Karnataka	604603		
Total for west coast	3088309	83615	3171924
West Bengal	341894		
Odisha	292568		
Andhra Pradesh	316109		
Tamil Nadu	823834		
Puducherry	61302		
Total for East coast	1835707	13846	1849553
Grand total	4924016	97461	5021477

Table 4: Marine Fish Production in Kerala (in tonne)				
Year	2017-18	2018-19	2019-20	2020-21 (P)
Total Marine fish production	483686	609730	475368	390597

Table 5: Average catch variation for major species			
Resources	Average catch in tonnes		Estimated Potential in tonnes
	Average of 2014-2018	of 2020	
Elasmobranchs			
Sharks	3454	644	1293
Skates	155	134	118
Rays	2580	870	608
Eels	428	541	982
Catfishes	216	60	1068
Clupeids			
Wolf herring	306	64	1041
Oil sardine	94711	13154	115384
Other sardines	16725	33007	11520
Other shads	73	532	323
Anchovies			
<i>Coilia</i> spp.	30	0	13
<i>Setipinna</i> spp.	5	0	0
<i>Stolephorus</i> spp.	37581	30437	8303
<i>Thrissina</i> spp.	0	0	0
<i>Thryssa</i> spp.	6730	8253	9150
Other clupeids	10810	5324	7072
Lizard fishes	14273	13692	33143
Half beaks&full beaks	813	461	1830
Flying fishes	20	8	14
Perches			
Rock cods	3046	3885	12631
Snappers	1381	1205	195
Pig-face breams	371	521	21
Threadfin breams	39719	28469	59122
Other perches	20459	6098	20961
Goatfishes	566	402	72
Threadfins	17	1	0
Croakers	6520	4665	4289
Ribbon fishes	19799	1365	29015
Carangids	65657	0	-
Horse Mackerel	2443	1985	6768
Scads	41204	29881	32622
Leather-jackets	246	239	2319
Black pomfret	502	21581	2550
Other carangids	21263	2655	7072
Silverbellies	2665	816	6436
Big-jawed jumper	1191	0	-
Pomfrets	0	5124	-
Silver pomfret	855	1164	917
Chinese pomfret	91	0	-
Mackerels			
Indian mackerel			79044
Seer fishes			
<i>S. commersoni</i>	4713	2960	7721

<i>S. guttatus</i>	434	612	921
<i>Acanthocybium</i> spp.	159	59	1
Tunnies			
<i>Euthynnus affinis</i>	6843	4185	5989
<i>Auxis</i> . spp	4045	3520	1422
<i>Katsuwonus pelamis</i>	3116	1839	47
<i>Thunnus tonggol</i>	162	54	0
Other tunnies	6881	2648	0
Bill fishes	5759	1947	264
Barracudas	3015	4813	7856
Mulletts	96	14	703
Flat fishes			
Halibut	6	4	306
Flounders	5	31	0
Soles	12594	7513	
Crustaceans			
Penaeid prawns	40588	28115	
Non-penaeid prawns	4901	1792	
Lobsters	74	15	
Crabs	4060	3113	
Stomatopods	1307	88	
Molluscs			
Bivalves	43	47	
Gastropods	1098	178	
Cephalopods			
Squids	19808	8820	
Cuttlefish	18626	7170	
Octopus	4703	2132	
Miscellaneous	10650	6233	
Total	627249	360867	

Table 6: Fishing vessels registered in Kerala as on 17-09-2021 (ReALCRaft, 2021)

Name of Marine Districts	Deep Sea Fishing Vessel	Motorized non-Mechanical	Motorized Mechanical	Non-motorized	Total
Thiruvananthapuram	-	10328	13	1208	11549
Kollam	-	2481	1809	226	4516
Alappuzha	-	4384	206	310	4900
Ernakulam	11	799	1694	324	2817
Thrissur	-	1389	174	131	1694
Malappuram	-	4392	468	61	4921
Kozhikode	-	4301	1308	221	5830
Kannur	-	1937	398	239	2574
Kasaragod	-	1957	208	120	2285
Total	11	31968	6278	2840	41086

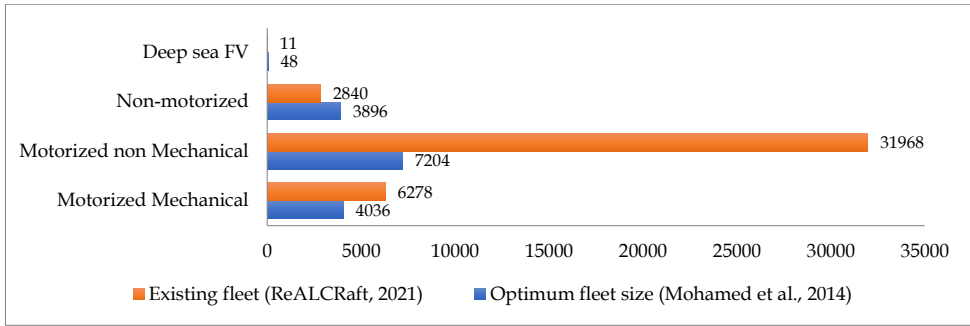


Figure 1: Optimum fleet and the existing fleet in Kerala

The mechanised fishing vessels consist of trawlers, gillnetters, long liners and ring seiners. Motorised fishing vessels conduct gillnetting, ring seining, mini trawling, boat seining and hook & line fishing. Non motorised fishing vessels comprising of catamarans/ catamarans boats, canoes (plank built, Fiberglass Reinforced Plastic (FRP), marine plywood boats, dugout canoes etc.).

Table 7: Optimum mesh size and dimensions of major fishing gears as per Kerala Marine Fisheries Regulation Act

Name of the Gear	Vernacular Name	Minimum Mesh Size (mm)	Type of mesh	Maximum dimension
Trawl nets				
Fish/cephalopod trawl net	<i>Trawl vala</i>	35	Square	-
Shrimp Trawl net	<i>Trawl vala</i>	25	Square	-
Ring seines				
Sardine/ Mackerel seine nets	<i>Chalavala</i>	22	Diamond	600m X 60m
Anchovy seine net	<i>Netholivala</i>	10	Diamond	250m X 50m
Gillnets				
Sardine net	<i>Mathi/ Chalavala</i>	33	Diamond	2000m X 10m
Mackerel net	<i>Aiyalavala</i>	50	Diamond	2000m X 10m
Seer fish	<i>Ayakoora/ Nymeenvala</i>	104	Diamond	5000m X 18m
Pomfret net	<i>Avolivala</i>	126	Diamond	5000m X 18m
Prawn net	<i>Konchu/ chemmenvala</i>	80	Diamond	5000m X 18m
Tuna net	<i>Chooravala</i>	80	Diamond	5000m X 18m
Croaker net	<i>Kora vala</i>	40	Diamond	2000m X 10m

Table 8: Details of sea patrolling, rescue operations and fishermen lives saved:

Year	Patrolling Conducted	Sea rescue operations	Fishermen rescued	Violation of KMFRA reported	Fine (Rs. in lakhs)	Fish Auction revenue (Rs. in lakhs)
2017-18	1141	568	4699	175	44.96	20.99
2018-19	1874	405	3041	150	65.99	55.89
2019-20	1999	309	2543	216	131.58	27.47
2020-21	1973	278	1998	87	262.86	22.12
Total	6987	1560	12281	628	505.39	126.47

Table 9: Landing centres facilities existing and requirement

District	Total number of landing centres	No. of fishing vessels	Total number of fishermen	Number of women vendors	Total chilled storage facility (tonnes)/ nos.	Fish landed per day (tonnes)	Nos. with auction hall facility
Thiruvananthapuram	36	4277	22680	4245	6 / 6	204	13
Kollam	26	1411	5619	186	0/0	133	5
Alleppey	25	814	8160	171	1/1	760	9
Ernakulam	18	676	5930	22	0/0	310	3
Thrissur	22	651	3800	10	0/0	113	2
Malappuram	9	838	6244	0	0/0	308	3
Kozhikode	16	1137	4330	0	0/0	12	1
Kasaragod	18	1905	9807	211	0/0	64	3
TOTAL	170	11709	66570	4845		1904	39

APPENDIX-1

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 GoI

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