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A REVIEW OF PRESENT STATUS OF MARINE FISHERIES OF KERALA

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Introduction

Kerala, located in the southern part of the peninsular India has a narrow stretch of land with a long surf-beaten coast on the western side. With its 590 km long coast line, it enjoys one of world's most productive seas bordering it and produces an average of about 24% of India's annual marine fish landings (Table 1). Its shelf waters are highly influenced by both the monsoons, the characteristic of the subcontinent. The upwelling and other environmental changes brought about by the southwest monsoon strongly influence the spatial and seasonal distribution and abundance of the living resources of the coastal waters which in turn make the dependent fisheries highly dynamic. However, the cyclic behaviour of the climatic events and the physico-chemical characteristics of the fishing grounds make most of the major fisheries predictably repetitive every year although minor deviations occur sometimes due to unknown reasons.

Marine fishing using artisanal tackles like shore seines and boat seines is an age-old tradition of the state. However, Kerala set an example to set marine fishing on modern lines about 3-4 decades ago with the introduction of mechanization of fishing craft and improved fishing techniques like trawling. The early sixties saw an important technological development, say, the shift from cotton to nylon nets. By mid sixties, individual entrepreneurs entered the scene paving way for a fast development of trawl fishery in the coastal waters. Commercial purse-seining started during the late seventies and the process of large scale motorization of traditional carft began in the early eighties. Quite recently, there has been a remarkable innovation in the form of ring seines mainly by conversion of the erstwhile boat seines.

TABLE 1. *Marine fish landings in Kerala compared to landings in India during 1980-'89*

Year	India	Kerala	%
1980	1,249,837	279,543	22.4
1981	1,378,457	274,395	19.9
1982	1,420,624	325,795	22.9
1983	1,548,475	385,765	24.9
1984	1,630,678	393,472	24.1
1985	1,534,726	325,997	21.2
1986	1,693,377	382,907	22.6
1987	1,662,550	303,286	18.2
1988	1,803,817	468,807	26.0
1989	2,230,225	647,526	29.0

At the time of independence, marine fish production in the state was of the order of 200,000 tonnes. Currently, the production stands at about 6 lakh tonnes. In between, the fishing in the state has undergone tremendous changes in the technology. From an activity confined to traditional fishermen, it has emerged as a capital intensive industry. Currently the export of marine products from the state yields to the nation a foreign exchange of Rs. 240 crores (MPEDA, 1990). An overview of the recent trends and present status of marine fisheries in Kerala is briefly presented in this paper.

Fishermen population

The fishermen population (marine) stood at 639,872 in 1980. But in a recent publication of State Fisheries Department, the fishermen population in Kerala during 1985 is reported to be 650,143. This indicates an annual growth rate of 0.3%. Hence a conservative projection of the population in 1990 would be 661,000. Survey by State Fisheries Department has further revealed that fishermen in the productive age groups (18-59 years) is 53.7%. The number of active fishermen form 22.74% (150,000). It is further reported that 61.94% of this number is engaged in real fishing activity. Hence, a conservative estimate of number of fishermen actively engaged in fishing currently will be 93,000. The per capita production of fish (in respect of fishermen population) would work out to 4.58 tonnes per annum.

Marine fish production

One of the tasks of Central Marine Fisheries Research Institute in its early days of inception was the collection of statistics on marine fish production in India. Authentic statistics on marine fish production are available from 1950 onwards when the Institute started nation wide sample survey for estimating the marine fish landings in the country. In course of time, the Institute has developed and improved a sample survey design for estimating marine fish production and also has been collecting statistics ever since. Average annual production of marine fishery resources from Kerala during the last four decades are presented in the Table 2.

TABLE 2. *Average annual marine fish landings in Kerala during the 4 decades*

Period	Average annual production	Rate of growth
1950-'59	180,508	—
1960-'69	301,401	5.3%
1970-'79	380,314	2.4%
1980-'89	378,449	- 0.05%

The production which was of the order of 200,000 tonnes in 1950 suffered in subsequent years. But the fishing activities got a momentum only in 1957 when the fish production was a substantial 301,000 tonnes. Thereafter, history of fisheries in Kerala has been that of sustained development. There had been a general increasing trend upto 1964. In 1965 the production was 340,000 tonnes. But in subsequent two decades the production fluctuated between 290,000 tonnes and 450,000 tonnes. Though there were occasional spurts between 1970 and 1975 and between 1980 and 1984, by and large, production was stagnant in these two decades. But the latter half of eighties witnessed spectacular increase in production. A reference to the Table 2 would indicate that in eighties, the annual production showed a decrease of 0.05%. Compared to seventies, the first half of eighties witnessed a reduction rate of 2.6% with an annual production of 331,000 tonnes. But the latter half of eighties recorded an annual production of 426,000 tonnes which registered a growth rate of 5.1% compared to first half.

Traditionally, the trend of marine fish production in the state has been determined by the availability of pelagic resources, mainly oil sardine (*Sardinella longiceps*) and mackerel (*Rastrelliger kanagurta*).

TABLE 3. *Percentage contributions of pelagic and demersal resources*

Year	Pelagic	Demersal
1980	52	48
1981	74	26
1982	69	31
1983	71	29
1984	64	36
1985	63	37
1986	57	43
1987	50	50
1988	57	43
1989	68	32

Table 3 gives the percentage contribution of pelagic and demersal resources to the annual production in the state durig the period 1980 to 1989. Reference to Table 3 would reveal that pelagic resources have been dominant in the production in the state consistently. The landings of major groups of marine fishery resources during the last five years 1985-'89 are given in Table 4. Among the major commercially important groups of fish occurring in Kerala, oil sardine ranks first with a percentage contribution of 19.3 currently. This is followed by shrimps (11.2%). Carangids (9.6%), perches (8.8%), mackerel (8.4%) and *Stolephorus* spp. (8.0%) form the other major groups currently exploited in Kerala waters.

Trends in mechanization

Mechanized fishing was started in Kerala in mid fifties by the erstwhile Indo-Norwegian Project. By mid sixties, individual entrepreneurs entered the scene paving way for the fast development of trawl fishery in the state. Experiments conducted on motorization of country craft under the Indo-Norwegian Project in mid fifties were found not successful. But in 1970 under Indo-Belgium Fisheries Project about 100 boats were fitted with outboard engines at Muttom in Kanyakumari district. In 1974, Marianad Fisheries Co-operative Society in Trivandrum district initiated a similar experiment. But these were also not successful. The results of Purakkad trials conducted in 1980 showed encouraging results. The successful trials carried out at fishing village, Kannamaly, in Ernakulam district during 1979-'80 attracted the fishermen of this region. Soon motorization programme picked up

TABLE 4. *Landings of major groups of fishes in Kerala during the period 1985-'89*

Group	Year					Average	%
	1985	1986	1987	1988	1989		
Elasmobranchs	6,013	6,056	4,473	6,761	4,680	5,597	1.3
Cat fishes	5,184	8,589	4,667	9,960	4,097	6,499	1.5
Oil sardine	79,237	40,595	44,717	60,618	184,879	82,008	19.3
Other sardine	2,473	8,954	8,697	12,592	13,752	9,294	2.2
Stolephorus spp.	36,235	27,158	16,599	45,994	45,127	34,223	8.0
Perches	30,710	45,990	30,133	32,367	48,985	37,637	8.8
Croakers	8,637	12,701	8,161	8,458	11,402	9,872	2.3
Ribbon fishes	25,146	11,880	15,295	8,952	7,179	13,690	3.2
Carangids	12,899	71,570	22,772	47,066	50,219	40,905	9.6
Silverbellies	3,419	6,029	6,027	6,522	5,354	5,470	1.3
Pomfrets	892	1,856	2,123	1,605	1,739	1,643	0.4
Mackerel	18,115	21,881	10,068	43,938	85,272	35,855	8.4
Seer fishes	8,459	4,859	5,181	10,162	8,029	7,338	1.7
Tunnies	10,857	14,840	10,611	12,913	22,288	14,302	3.4
Shrimps	26,887	37,202	53,125	67,661	53,335	47,642	11.2
Cephalopods	8,308	15,017	7,535	15,155	23,488	13,901	3.3
Others	42,526	47,730	53,102	78,083	77,701	59,829	14.1
Total	325,997	382,907	303,286	468,807	647,526	425,705	

acceleration in Kerala. Fishermen of Alleppey, Ernakulam and Quilon districts were credited with the initiative and large scale adoption of motorised fishing. From about 50 outboard engines during 1979-'80, the number has now increased to about 10,000.

With the introduction of large scale commercial trawling in Kerala in the inshore waters during the early seventies, the production of marine fish showed substantial increase. Average annual production during 1971-'75 increased to 406,000 tonnes registering an annual growth rate of 3% compared to 349,000 tonnes during 1966-'69. However, the production was stagnant in the subsequent years. The big leap in the production of shrimps since 1965 for a period of over one decade had served as a fillip to the fisheries sector as a whole and trawler operations in particular. Due to increase in catches of prawns and its heavy demand in foreign market, the industry flourished vertically and horizontally. This resulted in overall development of infrastructure facilities, including roads and transport facilities. A number of ancilliary establishments sprang up which gave immense employment potential. Additional production of prawns and its export has significantly contributed to the national income. Foreign exchange earnings had a phenomenal growth. Thus eventhough the total production of marine fish did not show any marked improvement, due to the heavy concentration on shrimp fishery, the economy of the sector improved significantly.

Commercial purse seining in the inshore waters started by the end of 1979. But unlike in Karnataka, where the purse seining is the mainstay in fishery, in Kerala it did not pick up.

A reference to the Table 5 would reveal that the contribution from mechanized craft has been tremendously increasing in recent years. Mechanized craft can be classified into two type (a) where power is used for fishing (b) power used only for propulsion. We can easily see that the

proportion of the contribution from type (a) units has been more or less steady in the decade while that of (b) has been increasing very fast. This is mainly due to the trend setin in the early eighties with the introduction of outboard engines being fitted to traditional craft in the half of eighties and quite recently by the employment of mini purse seines or popularly known as ring seines. The resultant effect has been the drastic reduction in the contribution of non-powered units which was the mainstay in fifties and sixties and to a great extent in seventies. As could be seen from the Table, there was an initial spurt in the total production since 1981 but it cannot be conclusively said that it was due to motorization of the traditional craft. Even though the production by motorized units increased sharply, there was a consistent reduction in the landings by other traditional units which would imply only a shift in catches from non-motorized to the motorized sector. It can further be seen that the increase in these years has, as well, been contributed by other mechanized units.

However, the motorization of country craft has changed the techno-social structure of the traditional fishing industry in Kerala in recent times. From a meagre fifty units in 1979-'80, now the number of such units is in the order of 10,000. Advantages of motorization of traditional crafts by fitting outboard engines are many. The motor replaces human labour for propulsion of the craft. This reduces time taken to reach the grounds and scouting for shoals thereby increasing fishing time and labour efficiency. Encircling of shoals can be effected speedily thereby reducing escapement possibility. Because of the mechanical power, going beyond the conventional limits can be done with ease, thus, widening the operational area and making it possible to tap additional resources. Due to time saving it may be possible to make more than one trip a day. Most important benefit is that the catches can be brought in fresh condition which would fetch a better price. The outboard engine can be declamped easily at the close of operation and removed. Hence beach landing does not create any special problem and safety of engine is assured. The physical strain in rowing is almost eliminated and this helps in better health and leisure time for social engagements. The resultant effect of all these features has been overall improvement in the socio-economic status of fishermen families.

Motorization of country craft has resulted in many changes in the size and shape of craft and gear. Some of the boats are made flat in the rear side so that engine can be fitted there conveniently thereby increasing the propulsion efficiency. In some areas, craft made of plywood are in operation with good performance. Recently, in Trivandrum area, catamarans and fibreglass canoes fitted with outboard engines are becoming popular. In Alleppey area, mini trawlers have been introduced using canoes with engines.

Artificial reef structures (ARS)

The creation of man-made structures to enhance marine resources is the basis of a specialised branch of marine technology known as artificial reef development. Artificial reefs are

TABLE 5. *Contribution of mechanised and traditional craft to the marine fish production in Kerala during 1980-'89*

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Mechanised Type (a)*	122,540	66,986	73,817	82,182	114,634	108,519	120,155	144,817	196,729	208,013
Percentage	(43.9)	(24.4)	(22.7)	(21.3)	(29.2)	(33.3)	(31.4)	(47.7)	(42.0)	(32.1)
Type (b)**	12,243	28,918	74,423	114,970	148,320	139,892	195,912	118,545	239,534	405,947
Percentage	(4.4)	(10.6)	(22.9)	(29.9)	(37.7)	(43.0)	(51.2)	(39.1)	(51.1)	(62.7)
Total	134,783	95,904	148,240	197,152	262,954	248,411	316,067	263,362	436,263	613,960
Percentage	(48.3)	(35.0)	(45.6)	(51.2)	(66.9)	(76.3)	(82.6)	(86.8)	(93.1)	(94.8)
Traditional	144,238	178,074	177,127	188,128	129,939	77,125	66,824	39,924	32,545	33,566
Percentage	(51.7)	(65.0)	(54.4)	(48.8)	(33.1)	(23.7)	(17.4)	(13.2)	(6.9)	(5.2)
Grand Total	279,021	273,978	325,367	385,280	392,893	325,536	382,791	303,286	468,808	647,526

* Where power is used for fishing.

** Where power is used for propulsion.

man-made under-water structures that provide habitat for many types of fishes. Fishes are attracted towards artificial reefs because the reef shelters the fish from predation and make good feeding sites. The Brotherhood Society of Valiathura coast constructed artificial reefs which are being monitored by CMFRI scientists. The artificial reef was constructed at a depth of 33 m, using discarded tyres, concrete rings, granite stones broken earthen pots, branches of *Cassia* tree and coconut leaf fronds. The cuttlefish congregated around the ARS and an estimated 5.8 t were hooked from this area during 1989. The fish catch comprised mainly of carangids, perches and kilimeen.

'Karikkadi' fishery and ban on trawling during monsoon period

It is well known that a good monsoon fishery exists in Kerala, at Sakthikulangara and Cochin for the prawn, *Parapenaeopsis stylifera* popularly known as 'Karikkadi'. Trawling operation during monsoon months has been a subject of controversy between trawler operators and traditional fishermen. Government of Kerala was seized of the problem. Expert committee appointed by Government of Kerala has interalia recommended that trawling should be banned completely in inshore waters during monsoon months on an experimental basis. The study undertaken by the Institute has revealed that maximum abundance of this species is found in Kerala coast upto 60 m depth. Experimental shrimp trawling conducted has shown that during the non-monsoon period (September/ October-May) most of the stocks occupy the coastal waters within the 20 m depth contour. With the commencement of southwest monsoon and consequent changes in the environmental conditions, this leaves the inshore areas and moves to the deeper zones. They remain mostly in the 20-40 m depth zone during July and August/September. Small portion of the stock however exists very close to the shore within 5 to 6 m depth during the monsoon period which is predominantly constituted by adults in spawning condition. 'Karikkadi' is caught throughout the coast mainly by shrimp trawls operated by small mechanized boats (9-13 m size). The major landing centres for this fishery are Sakthikulangara, Cochin, Munambam and Calicut. The trawl fishery usually commences by September or October and extends upto the onset of southwest monsoon except at Sakthikulangara and Cochin where it continues during monsoon reaching a peak in July-August. Trawlers account for about 95% of the total 'Karikkadi' landings in the state. It may be interesting to observe that two thirds of this is caught in monsoon season particularly at Sakthikulangara and Cochin.

Kerala Government imposed partial ban on trawling during monsoon season during the last three years. This was in force except at Sakthikulangara during 1988 and throughout the State in 1989 and 1990. The ban on trawling does not seem to have influenced the production of major demersal fishes like 'Kilimeen' (*Nemipterus* spp.), cat fishes, lizard fish etc. It appears that these resources were available to the fishery even if left unexploited during the monsoon period. On the other hand, a steep decline in the landings of prawns at Sakthikulangara and Cochin during the monsoon period of 1989 and failure of recovery in the post monsoon period indicate that the resources have been lost unexploited.

The Kerala Marine Fisheries Regulation Act 1980

In the context of social conflicts on the issue of fishing by mechanised crafts in the near shore waters, Kerala Government promulgated the Kerala Marine Fishing Regulation Act, 1980. In this act, the coast line has been divided into two sectors, a southern sector, 78 km from Kollengode to Edava and a northern sector, of 512 km from Paravoor south to Manjeswaram. In the southern sector, a distance upto 16 fathom depth line from shore and in the northern sector a distance upto 8 fathom depth line has been exclusively reserved for the traditional crafts, and all types of mechanised boats have been prohibited from fishing in this area.

In the second bathymetric division which is the area upto 20 fathom line in the southern sector and 10 fathom line in the northern, fishing by all mechanised boats except motorised country crafts have been prohibited.

In the third division, which is upto the 35 fathom line in the southern sector and the 20 fathom line in the northern sector, fishing by mechanised vessels of 25 gross registered tonnage and above have been prohibited. Since October 1983, the Government has also prohibited the use of bottom trawl with less than 35 mm mesh size.

While demarcation of areas for different types of fishing crafts is to protect the interest of the traditional fishermen, the regulation of mesh size of trawl gears has a conservation angle of protecting young fishes from being caught indiscriminately by the trawlers.

In the situation obtaining in our country, voluntary observation of the specified area-rule by the fishermen is a remote possibility and strict enforcement of these rules by Government is also beset with practical difficulties. These rules may attract modifications when further mechanisation of fishing craft takes place. Our knowledge of the distribution of the coastal pelagic fishes like oil sardine alone the southwest coast suggests that they have a denser distribution in the inshore waters. While keeping the purse-seiners outside the 22 km line is disadvantageous to purse seine operators, it has also got to be viewed from the point of view of social justice to the vast majority of fishermen engaged in traditional fishing in the near shore waters. In this context, it appears necessary to modify these regulations from time to time.

Mud bank fishery

Mud bank formation occurs in the Kerala coast especially in Alleppey region during south-west monsoon period. Mud banks are bodies of calm water along the coast largely due to the existence of fine mud in a state of suspension during heavy monsoon days. This provides safe area of operation for the country craft. On a squally surf beaten coast these areas facilitate launching of traditional craft, which otherwise would have to remain idle during inclement weather. The traditional fishermen make bumper catches of prawns, sardines and shallow water miscellaneous species of fishes which aggregate over the calm waters of the mud banks.

Mariculture

Kerala has vast potential for development of mariculture to augment fish production. It is estimated that there are about 2.43 lakh ha of brackishwater area and 590 km stretch of shallow coastal waters available in the state where finfish and shellfish culture could be undertaken on commercial scale. Seafarming is gaining importance in the world arena of fish and shellfish production. Realising the vast potential for scientific farming of marine organisms to augment production, the CMFRI undertook several intensive research programmes for the past one and half decades at laboratory as well as field levels, in order to build up the necessary technological base. Most of these investigations are centred around the culture of prawns, lobsters, crabs, mussels, pearl oysters, edible oysters, finfishes and seaweeds and more recently on sea cucumber, clams and top shells because of their commercial importance. Based on the technology developed by the Institute a medium scale prawn hatchery has been established for the "MATSYAFED" at Mopla Bay in Kannur.

KVK established in 1976 at Narakkal under CMFRI, Cochin has been engaged in giving intensive practical training of durations ranging from 5 to 30 days in prawn and fish farming to small and marginal farmers, landless labourers, school drop-outs and the unemployed youth in order to transfer the latest low cost technologies developed by the Institute to the end-users.

Water pollution in coastal areas and its possible impact on fisheries

With the increasing urbanisation and industrialisation, the discharge of untreated or partially treated sewage and industrial wastes along with wash out of agricultural pesticides into the sea pollute the marine environment. The fish mortalities in the Chaliyar river and in the Periyar estuary due to industrial effluents are by now well known. The major coastal pollution reported in recent times is from the Trivandrum coast, originating from the titanium factory located in the area. Strict vigil on coastal pollution is to be maitained to safeguard our marine resources. CMFRI has been monitoring the coastal pollution and its effects on the living resources for suggesting several remedial measures.

Recent developments

Introduction of mini purse seines (ring seines) in the Alleppey area in 1985 has been a new development. The operation is similar to that of purse seine. The length of the net which was 450 m initially is now even more than 900 m in some parts of the state. The net is essentially a modified boat seine but the catch rate is more than double that of boat seine.

A reference to the Table 6 would reveal clearly that the production by OBE units is increasing in recent years and major share of the increase is contributed by ring seines. Percent-

age contribution of ring seines has been steadily increasing while that of boat seines decreasing. In absolute terms the increase in the landings in recent years has been mainly due to the better availability of oil sardine, mackerel and carangids and other pelagic resources as could be seen from Table 4. During the last receding monsoon season, it has been observed that these ring seine operations have inflicted large scale mortality on juveniles of oil sardine, mackerel and carangids in different parts of the state. This is attributed to the smaller mesh size of ring seines which increases the probability of juveniles being caught.

TABLE 6. *Contribution of ring seines and boat seines in the production by traditional craft with OB engines*

	1986	1987	1988	1989
OBE Units				
Catch	1,86,362	1,11,726	2,30,079	3,83,804
Effort	9,37,000	7,05,000	1,050,000	1,057,000
Ring seine				
Catch	22,498 (12%)	31,558 (28%)	81,886 (36%)	2,70,903 (71%)
Effort	29,106	80,364	1,29,636	3,23,197
Boat seine				
Catch	1,18,433 (64%)	48,416 (43%)	87,802 (38%)	51,477 (13%)
Effort	3,29,713	1,70,680	1,96,240	96,636
Others				
Catch	45,431 (24%)	31,752 (29%)	60,391 (26%)	61,424 (16%)
Effort	57,800	—	—	—

Scope and strategy for development of marine fisheries of Kerala

It has already been explained that about 70% of all fish landed in Kerala are pelagic species and the rest demersal, including the prawns. Traditional fishing is practiced normally within the 50 m depth line and the fish populations outside this limit are therefore not subjected to any significant fishing pressure. It has been the considered opinion that increase in fishing effort in the traditionally fished zone can only marginally increase the catches. Shrimp trawling on the southwest coast during the last three decades shows that the increase in effort can only increase the catch upto a point and beyond that signs of economic overfishing or even biological overfishing will tend to be expressed.

Vessels operating from the Kerala bases, particularly the central and south zones could exploit the Wadge Bank perches, the Quilon Bank lobsters and the 'Kalava' on the rocky chain of outgrowths of the shelf.

Lastly, the resources of the oceanic pelagic species of larger tunas like yellowfin and bigeye along with associated bill fishes and sharks could form target species for exploitation from the Kerala based vessels.

While the above suggestions are to be gradually implemented, a close watch on the impact of these on the stocks of fishes, particularly the conventional ones has to be maintained by both the research and developmental agencies.

If development in harvesting additional resources in one or more of the above suggested lines takes place, it is imperative that the shore infrastructure has to be built up to handle the increased catches by way of construction of deep sea harbours, storage, processing and marketing facilities.

Such integrated facility one each for north zone, central zone and south zone with orientation of the infrastructure to the type of catches expected to be landed in those zones is envisaged. While a comprehensive central facility could be maintained at Cochin, infrastructure built up at Vizhinjam and a centre like Beypore or Cannanore should serve the south and north zones respectively.

When actually implemented, the points raised above will have to be looked into in depth, but, for the present, it is hoped that they will stimulate further thinking on the crucial issue of development of the marine fisheries of Kerala.

Recent hike in the production by ring seines is likely to have deleterious effect on the resources as it has been reported that tremendous mortality is inflicted on the juveniles of pelagic resources. Hence as a conservation measure, proliferation of small meshed ring seines has to be, per force, regulated.

Unlike in neighbouring states, where mechanization has resulted in wide spread social conflicts, in Kerala such instances were minimum. It is observed that the production from

artisanal sector has been decreasing over the recent years and this may result in conflicts between artisanal and motorized sector. Hence it is desirable to ensure a coastal fringe zone exclusively for non motorized traditional craft.

The options for development could be suggested on the following lines:

Firstly, marginal increase in the catches of traditionally fishes stocks could be achieved by increased pace of motorisation of country crafts and adoption of gears of better design and operational efficiency to match the improvement of the crafts. Expanding the mechanised gill net fishery in selected areas for coastal tunas, seer fish, pomfrets etc. will augment supply of these valuable table fishes.

Secondly, exploitation of the underfished conventional pelagic and columnar resources like horse mackerel, scads, white baits and ribbon fishes, of which a large part is distributed over the mid shelf, will yield substantial catches.

Thirdly, exploitation of the different demersal, columnar, meso-and bathy pelagic communities of fishes and shell fishes and cephalopods on the deeper shelf and slopes off the Kerala coast would contribute substantially to the food fish as well as industrial fish catches. Here the resources of Threadfin bream, 'Bulls eye', 'Green eye', Indian drift fish, Boar fishes, the Rock cods, the diverse species of penaeid and non-penaeid prawns of the slopes and the deep sea lobster *Peurulus sewelli* would form the core components.

The nearshore waters in 0-50 m depth zone is heavily exploited at present. Attention should be therefore paid for extending fishing ground beyond conventional limits. Resources like oceanic tuna, carangids, perches, squids, deep sea prawns and lobsters have potential in the offshore waters of Kerala. Hence medium sized and large vessels can be employed fruitfully for exploiting these resources.

The fishing industry in Kerala in recent times has become a complex phenomenon with many conflicting interests. Indiscriminate exploitation, needless to say, would be deleterious for a healthy stock. Conservation measures like restricting quota for different sectors and reduction in the mesh size of nets to avoid over exploitation of juveniles have to be thought of and implemented. To advise the Government on such matters and formulating suitable conservation measures and for implementing the same, a statutory body may be established preferably through a legislative process in order to achieve the twin objectives of maintaining the resources at sustainable levels and reducing the inequality in the distribution of benefits between different sectors.