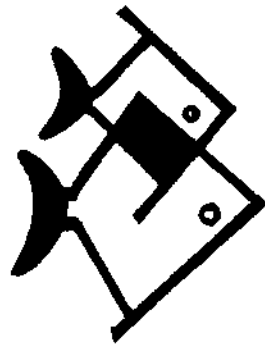


INDIAN FISHERIES

1947 - 1977



**ISSUED ON THE OCCASION OF THE FIFTH SESSION OF
THE INDIAN OCEAN FISHERY COMMISSION HELD AT COCHIN FROM
19TH TO 26TH OCTOBER, 1977**

exploited and potential fishery resources

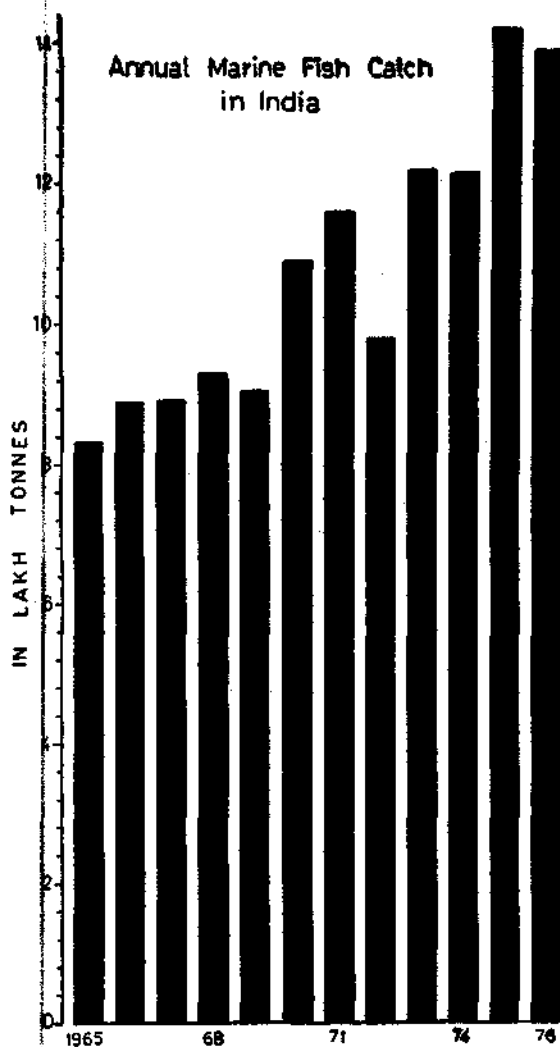
MARINE FISHERY RESOURCES

As indicated earlier, marine fishery resources of the country are characterised by a variety of fishes, crustaceans and shell fishes, that co-exist in the fishing grounds. The fishery at present is restricted to the inshore waters of the continental shelf. The topographical features of the coastline and the environmental and meteorological conditions on the east and west coasts influence the distribution pattern and seasonal abundance of fishes. This together with the diversity of fishing crafts and gears employed in the fishing, numerous landing centres distributed all along the coast and the conservative nature of the fishermen, make the collection of fishery statistics data more complex and complicated. Taking into consideration the various characteristics of the marine fisheries of the country, a multi-stage stratified random sampling over space and time has been evolved at CMFRI to

collect the exploited fishery resources data. Under this system, the entire Indian Coast is divided into zones, each zone comprising of about 20-30 landing centres. From each zone, a trained field staff collects information on the fish landings, gears employed, effort expended, and data on size, weight and maturity conditions of the major commercial species, price structure and developing infrastructure facilities. Based on these data, estimates of species-wise, gear-wise and the season-wise catch for All-India as well as for each State are made. Trend of exploited fishery resources in terms of catch and effort, season and region, as well as variety is studied.

For the 15 year period, 1962-1976, the maximum, minimum, and average marine fish production for the country as a whole were 14,22,693 tonnes (1975), 6,44,244 tonnes (1962) and 1011484 tonnes respectively. All India and State-wise annual catch are depicted in the accom-

panying Map. Most of the fishing at present is confined to the near shore waters up to about 50 m depth. Along the south-west coast of India, the fishing has been extended to grounds beyond 75 m to about 450 m along the



Total annual marine fish catch in India 1965-1976

upper continental slope for perches, deep water lobsters, prawns and fishes. The explored areas in the continental shelf, the continental shelf edge and the upper continental slope are also shown in the Map. Among the maritime States, Kerala ranks first in the total marine fish production followed by Maharashtra, Tamil Nadu (including Pondicherry), Gujarat, Andhra Pradesh, Karnataka, Goa and West Bengal and Orissa. The best fishing seasons for the country as a whole is

during October to December, when all the maritime States of the west coast of India record higher landings. For Maharashtra and Gujarat the period July to September and for Kerala and Karnataka the period April to June, are relatively poor. On the east coast, conditions vary from State to State. In West Bengal and Orissa, the peak fishing period is during October to December, while in Andhra Pradesh and Tamil Nadu, it is from January to March. Fishing is relatively poor in these two States during the period April to June.

The trend of exploitation of marine fishery resources shows a steady increase in the demersal fish catches along the Maharashtra Coast, a decrease in the fishery for Bombay duck in the Gujarat waters, and wide fluctuations in the mackerel and sardine fisheries along the Kerala, Karnataka and Goa Coasts. Hardly anything is known about the pelagic fishery resources of the north-west coast and the east coast. Available information indicates the occurrence of mackerel, sardine, lesser sardines, anchovies, carangids and other important groups of pelagic fishes from these areas also. Epipelagic and Meso-pelagic fishes such as Myctophidae and oceanic squids may also form important components in this area. There is an urgent need for planned exploratory surveys in these regions to assess the pelagic fisheries potential.

The All-India fishing effort shows an overall increase. However, the catch and catch per unit effort evince variations mainly due to the large scale fluctuations in the major pelagic fisheries for mackerel and oil sardine. The catch per unit effort for the country as a whole is not more than 5 kg per man-hour. Along the west coast, in Gujarat the catch per unit effort is less than that of the other States.

Estimates of 10 to 20 million tonnes of potential fish production for the Indian Ocean have been given by various authors based on the relative productivity of the waters, exploratory surveys and so on. For the Indian Seas, the potential annual fish production has been estimated at about 4 million tonnes, which in other words represents slightly over a three fold increase of the present. Recent surveys carried out in the depths beyond 50 m have brought to light the potentially good fishing grounds for demersal fishes and shell fishes at different depths along the continental shelf edge and upper continental slope. In the sub-surface

or column waters in the deeper neritic zones and upper continental slope, the potential resources of *Nemipterus* spp. *Emmilichthys* sp., *Psenes indicus*, *Chlorophthalmus agassizi*, *C. corniger*, *Cubiceps natalensis*, *Pseniopsis cyanea* and Prawns such as *Parapandalus spinipes*, *Heterocarpus gibbosus*, *H. wood-masoni* and *Aristius* sp. are available. Along the northwest coast of India, an abundance of the catfishes in the depth zone 40–59 m and elasmobranchs in the depth zone 60–75 m has been recorded. Good catches of deep-sea lobsters and the deep-sea prawns along the upper continental slope off Quilon are indications of good potential resources along the upper continental slope. Estimated potential demersal fishery resources of the continental shelf edge and the upper continental slope of the southwest coast of India are given in Table 5.

Table 5. *Estimated potential demersal fishery resources of the continental shelf edge and the upper continental slope off the southwest coast of India*

Depth zone	Area (Sq. km)	Estimated total demersal fishery resources based on average catch rates (in tonnes)	Estimated potential sustainable yield at 60% (in tonnes)
Depth zone - I (75–100 m)	11,363	7,542	4,525
Depth zone - II (101–179 m)	11,916	32,556	19,539
Depth zone - III (180–450 m)	20,240	58,891	35,335

The studies carried out on the major pelagic fishery resources of the country (oil sardine and mackerel) have indicated that an increase in the fishing effort in the traditional fishing grounds, will not yield any increase in the catch of these fishes. The average annual stock of these two major fisheries has been estimated as 127,000 tonnes for mackerel and 400,000 tonnes for oil sardine in the present fishing grounds. The surveys have also shown that along the west coast in depths upto 40 m there exists a diversity of species such as anchovies, ribbonfishes, catfishes, silverbellies and lesser sardines of several hundred thousand tonnes.

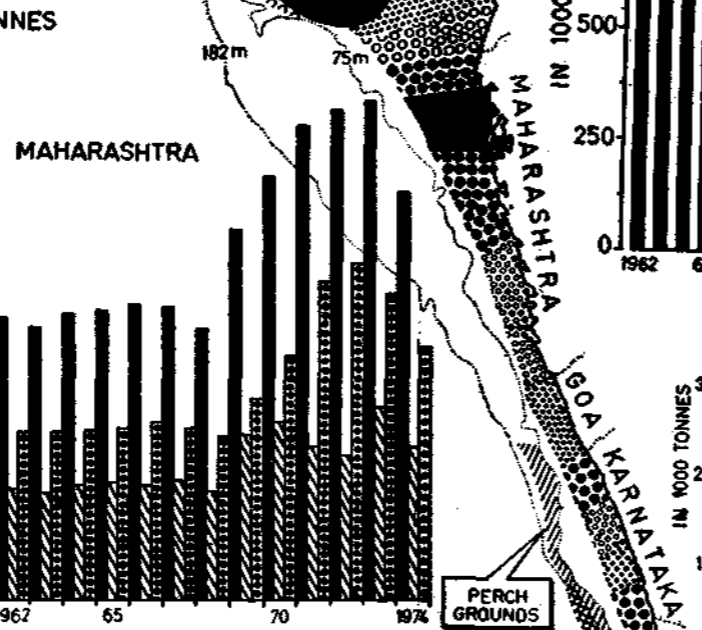
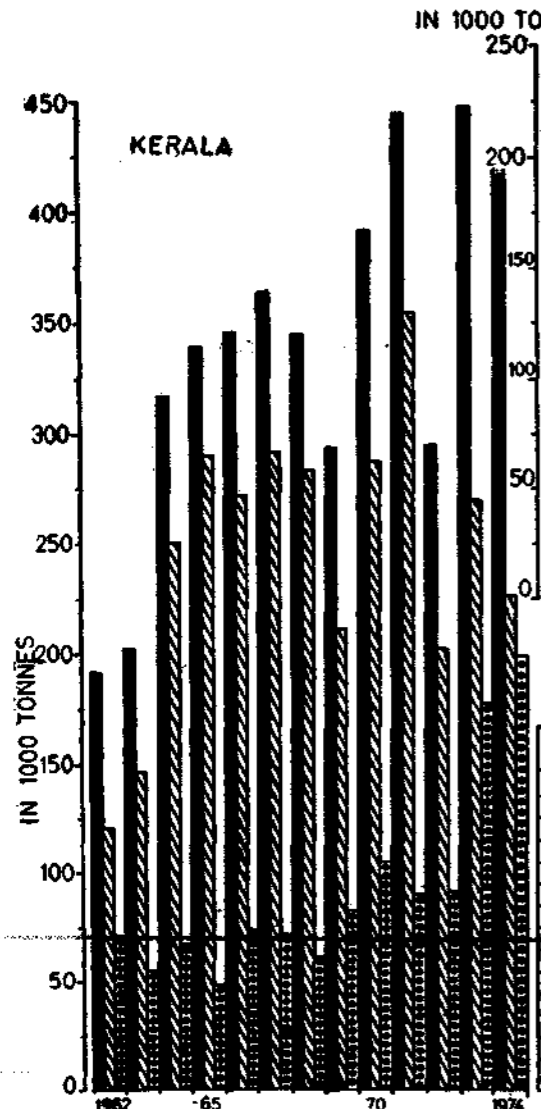
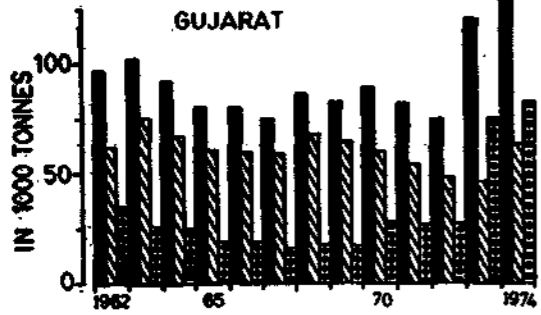
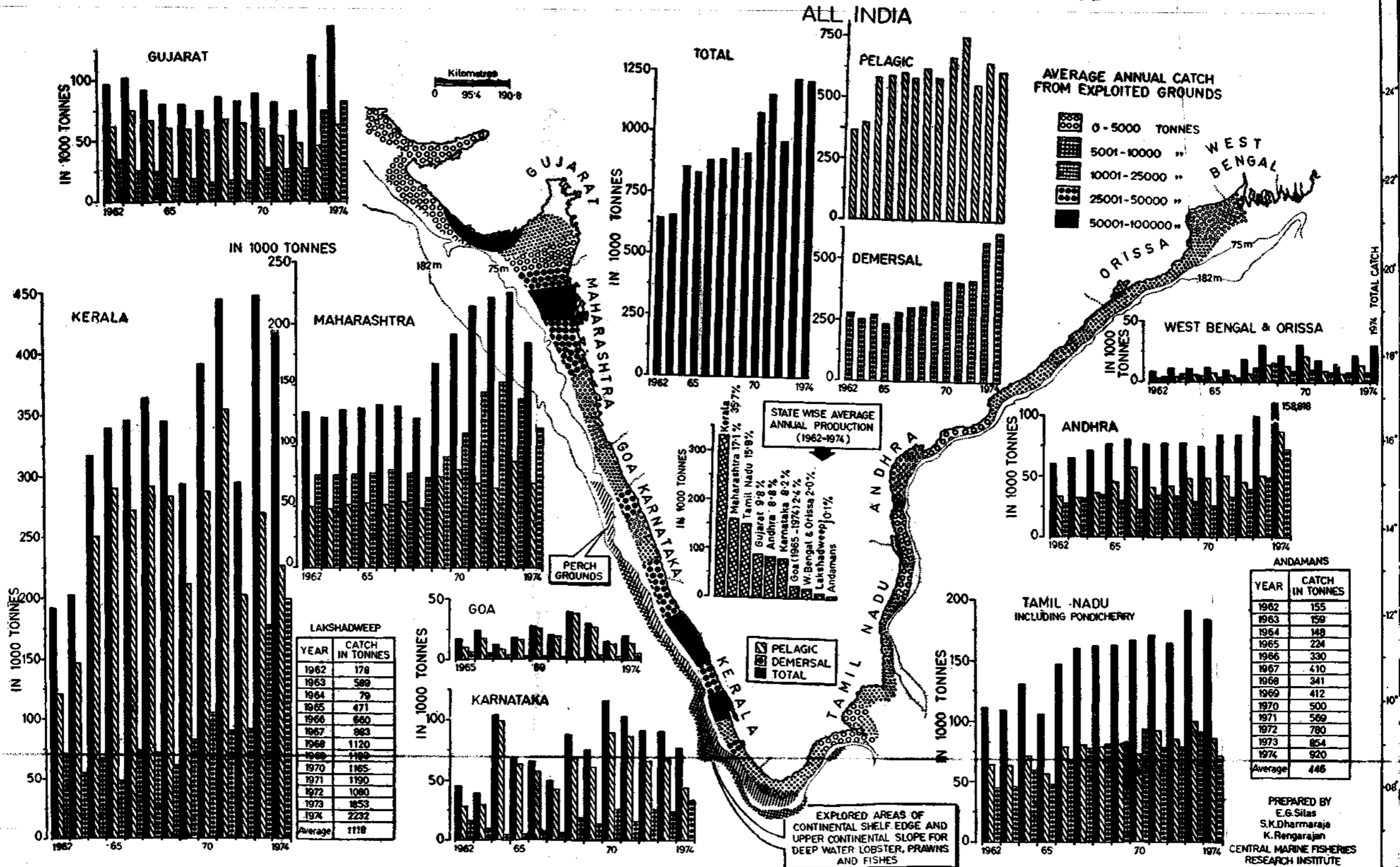
Besides these conventional resources, exploratory surveys have also indicated potential of rich resources

of cuttlefishes, squids, oceanic crabs, deep sea gastropods, oceanic tunas and pelagic sharks. The large populations of dolphins and lesser toothed whales in this area are yet another indicator of the rich pelagic fishery resource of this area. Although there has been some decline in the catches of whales from the Indian Ocean, it is reported that a good number of them are available in the southern Indian Ocean.

Besides the exploitable resources available in the sea, the potential for coastal aquaculture is considerable taking into account the vast areas along our coast which include inundated areas, coastal lagoons, swamps, etc. It is estimated that about 2.6 million ha. of estuarine and brackish water areas are suitable for culture of marine fishes, prawns, molluscs, etc. of which only about 15,000 ha. are utilized at present. The culture technology developed in the country has indicated that a production rate of above 1000 kg/ha/year of prawns; 235 tonnes of mussels with shells /ha/season could be obtained. There is also considerable scope for the culture of economically important seaweeds in our coastal waters particularly in the lagoons of Lakshadweep Island and in the protected bays of the Andaman and Nicobar Islands as well as in some areas along the east coast. Culture of fishes such as milkfish, mullets, *Sillago* and pearlspot has great possibilities in coastal aquaculture. Sea cucumber is yet another species that can be cultured in the lagoons and protected bays. It will not be too long before proper techniques for the culture of lobsters and other animals such as turtles especially the green turtle, *Chelonia mydas* are developed.

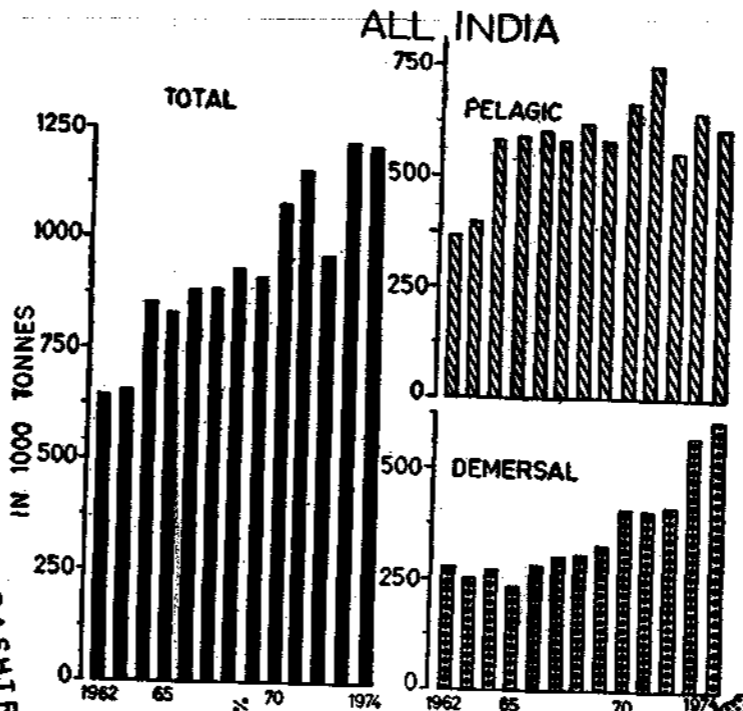
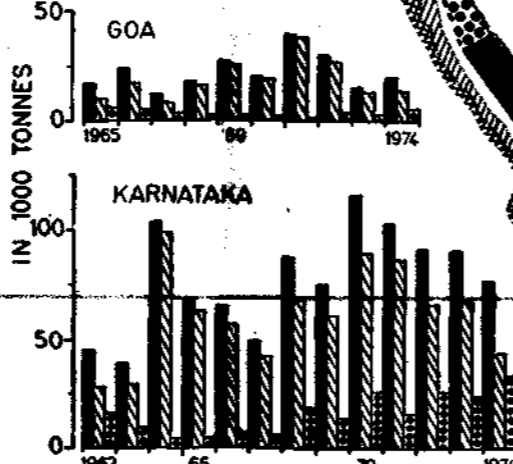
With the increasing research activities and explorations on fishery resources and corollary subjects by several national and international organisations, voluminous data on different aspects are being collected. A need has been felt to store these data in a central place for ready reference and better analysis, so that the results could be made available to the interested agencies whenever required. With this in view, a Fishery Data Centre has been established at the Central Marine Fisheries Research Institute and it has started functioning with the use of modern equipments. This centre when fully developed would form a depository of all data pertaining to fish and fisheries of the country.

EXPLOITED MARINE FISHERY RESOURCES OF INDIA 1962 - 1974



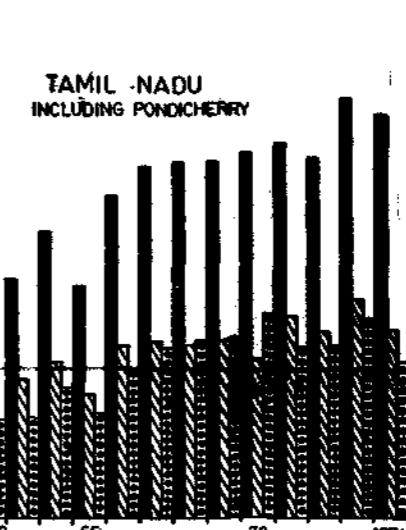
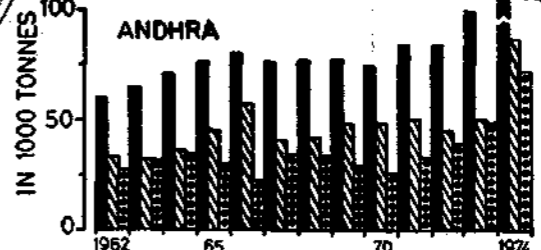
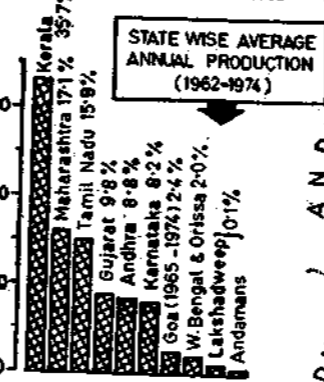
LAKSHADWEEP

YEAR	CATCH IN TONNES
1962	178
1963	589
1964	79
1965	471
1966	660
1967	983
1968	1120
1969	1169
1970	1165
1971	1190
1972	1080
1973	1853
1974	2232
Average	1118



AVERAGE ANNUAL CATCH FROM EXPLOITED GROUNDS

- 0 - 5000 TONNES
- 5001 - 10000 "
- 10001 - 25000 "
- 25001 - 50000 "
- 50001 - 100000 "



ANDAMANS

YEAR	CATCH IN TONNES
1962	155
1963	159
1964	149
1965	224
1966	330
1967	410
1968	341
1969	412
1970	500
1971	569
1972	780
1973	854
1974	920
Average	448

EXPLORED AREAS OF CONTINENTAL SHELF EDGE AND UPPER CONTINENTAL SLOPE FOR DEEP WATER LOBSTER, PRAWNS AND FISHES

PREPARED BY
E.G.Silas
S.K.Dharmaraja
K.Rengarajan
CENTRAL MARINE FISHERIES
RESEARCH INSTITUTE
COCHIN

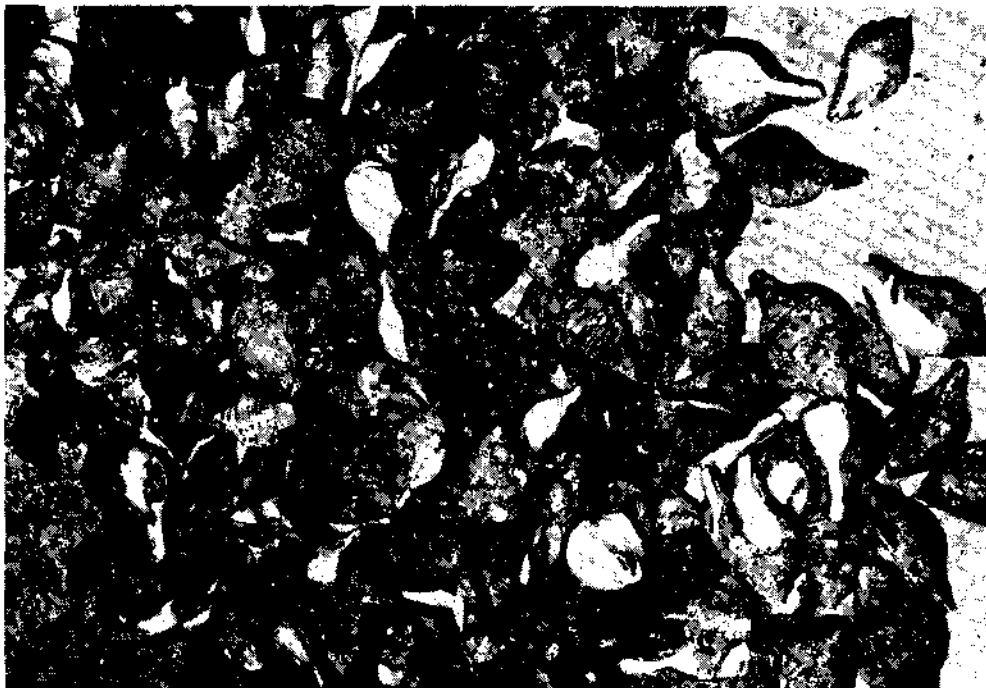


Scientists of CMFRI getting ready for under water exploration using SCUBA



Survey of the pearl bank at Tuticorin

Edible oyster beds at
Attankarai



Sacred chank at
Tuticorin
ready for market

INLAND FISHERY RESOURCES

In India, the collection of basic data on inland fish production is handicapped by various factors such as the highly dispersed and isolated nature of fishing and landing areas, the diversity of fishing gear and tackle employed, a high percentage of subsistence fishing, the innumerable landing centres, the migration of fishermen from one place to another for fishing, the disposal of the catches to fish merchants from the fishing boats at the fishing spots, the multispecies composition of the catches, the landing of catches in unsorted condition and the limited nature of transport facilities for making direct observations at lower estuaries and remote landing centres. Besides the above, the vast expanse of the fresh and brackish water areas in India poses additional problems as far as the estimation of fish production is concerned. It is estimated that the main rivers of India including their important tributaries have a total length of about 27,000 km, a network of canals and irrigation channels extends to over 112,000 km, the lakes and reservoirs cover an area of about 2.9 million ha. and fresh ponds and lakes extend to about 1.6 million ha. A sampling technique that has proved to be effective in the estimation of total landings, such as at the Hoogly-Matlah estuarine system and the river Godavari, is that based on the relation between actual catch and effort potentialities in a region, which requires a total enumeration of effort potentialities in the form of craft, tackle and fishermen population in the entire region as a prerequisite. However, the multiplicity of gears in use involved in both inter-and intra-type variations create additional problems in estimating the total effort.

The inland fish production in India was estimated at about 200,000 tonnes in 1951 and over 860,000 tonnes in 1975-76, registering almost a four-fold increase.

As seen from the available statistics for 1975-76, out of the 860,000 tonnes of inland fish, West Bengal accounted for 260,000 tonnes, Tamil Nadu 175,000 tonnes, Andhra Pradesh 100,000 tonnes, Bihar and Karnataka about 65,000 tonnes each and Kerala, Orissa and Uttar Pradesh 25,000 tonnes each. Among the major varieties of freshwater fishes supporting the fishery are crabs, catfishes, live fishes, prawns, featherbacks, mullets, eels, herrings and anchovies. Table 6 gives production of inland fish in India from 1961-62 onwards.

Table 6. Production of inland fish in India from 1961-62 onwards (in 1000 tonnes)

Year	Catch
1961-62	269.8
1962-63	261.4
1963-64	314.8
1964-65	412.3
1965-66	458.3
1966-67	473.4
1967-68	533.3
1968-69	616.8
1969-70	646.2
1970-71	659.1
1971-72	683.6
1972-73	734.5
1973-74	784.1
1974-75	803.8
1975-76	862.7

Of the total inland fish production of 0.8 million tonnes, capture fisheries contribute to less than 10%. Nevertheless by introducing improved technology of fishing it will be possible to step up the yield significantly. However, greater prospects of augmenting inland fish production is through the development of an organised culture fisheries. It is now considered possible to produce on an average 2000 kg/ha/year from freshwater culture fisheries, leading to a production of 3.5 million tonnes of fish from freshwater culturable areas.