

**CENTRAL MARINE FISHERIES
RESEARCH INSTITUTE**

Activities and Achievements

Mandapam Regional Centre

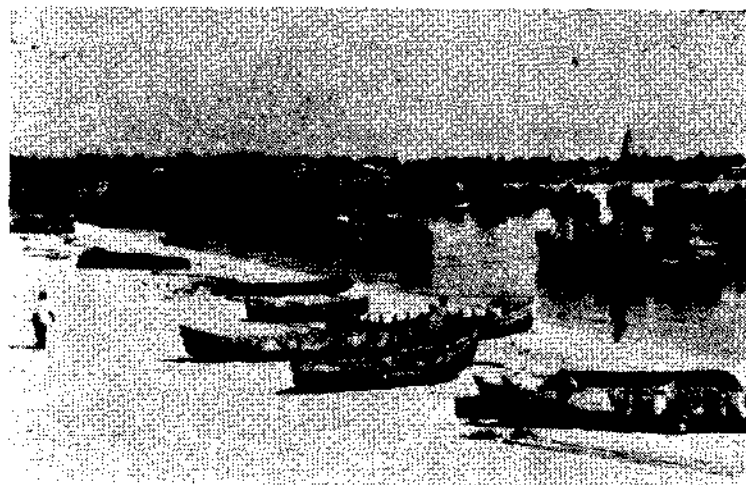


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Among the subordinate establishments of the Central Marine Fisheries Research Institute, the Mandapam Regional Centre at Mandapam Camp is the only Centre of its kind. The history and the general background of the Centre essentially recapitulate the establishment and early growth of the Institute. Following the recommendations of Lt. Col. Dr Seymour Sewell and the decision of the Government of India in 1946 to set up a marine fisheries research institute in the country, the Naval buildings complex along with 40 hectares of land at Mandapam Camp was acquired and converted into laboratories, administrative wings and temporary residences for staff. The Institute, which was functioning at the Zoology laboratory of the University of Madras from February, 1947 was then shifted to Mandapam Camp in 1949. Since then, for over two decades, until the shifting of Headquarters of the Institute to Cochin in 1970, this establishment at Mandapam Camp served as the Headquarters and the focal point for providing the research direction and support for the development of the marine fisheries of the country. On the shifting of the Headquarters of the Institute to Cochin, the establishment at Mandapam Camp was renamed as Mandapam Regional Centre of CMFRI.

The Regional Centre is situated on the south-east coast, on the Madras-Rameswaram route, 144 km north-east of Madurai and about 19 km west of Rameswaram. It is located on an impressive and picturesque elevated sand dune overlooking Palk Bay and Gulf of Mannar, in



A view of the landing centre at Rameswaram

the narrow strip of pennisular land. The calm and serene locus of the Centre provides an ideal background for concerted research on marine sciences.

MAJOR ACTIVITIES AND ACHIEVEMENTS

- Assessment of exploited marine fishery resources and their dynamics along the 260 km stretch of Ramanathapuram coast which helped to elevate the significant fishery of the early fifties to the current

fishery of considerable magnitude and improved socio-economic conditions of coastal rural population,

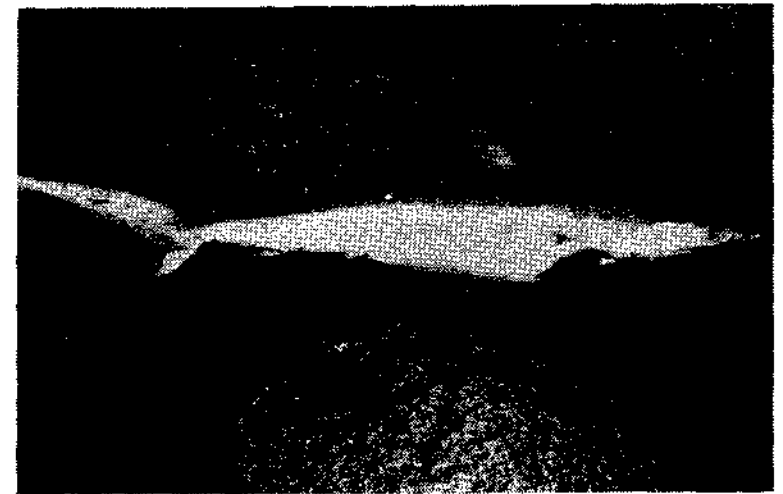
- Investigations on the biology and fishery characteristics of the commercially exploited fishes, crustaceans and molluscs of the Mandapam-Rameshwaram region.
- Pioneering studies on physico-chemical characteristics of water masses of Gulf of Mannar and Palk Bay; primary and secondary production, their inter-relationship in the food chain and at different trophic levels paving way for estimation of potential fishery resources of the area,
- Studies on seed prospecting of cultivable finfishes, their culture in the grow-out ponds, demonstrating the feasibility and prospects of fish culture in the derelict salt water lagoons and marshy places, and on the physiological processes of milkfish fry and prawns, bearing on their growth, survival, transportation and nursery management,
- Investigations on seaweed resources, their exploitation, culture and extraction of agar, alginic acid and other products enabling promotion of seaweed industry in the region.
- Studies on the biologically significant and commercially exploited resources such as corals, sponges and

- Conservation and management of endangered aquatic animals.

CAPTURE FISHERIES

Pelagic Fishery Resources

Several species of fishes inhabiting the pelagic zone contribute to the fishery of this region. From the very inception of the Centre, the commercially exploited groups received considerable attention of the scientists.



Sharks form an important pelagic resource of this area

The causes underlying the fluctuations in the annual production of the pelagic fishes such as sardines (*Sardinella*), mackerel (*Rastrelliger*), anchovies (*Stolephorus*), seer fishes (*Scomberomorus*), tunas (*Thunnus*, *Euthynnus*) and carangids and their biological characteristics have been studied. The ongoing research projects on these groups are directed to determine the population characteristics and their dynamics so as to assess the stock status of these resources to regulate the exploitation for maximum advantage.

Sharks from another important pelagic resource in this area, contributing to an annual yield of about 1,500 - 2,500 tonnes.

Demersal Fishery Resources

The most important demersal fishery resource of the Mandapam region is silver bellies (*Leiognathus*), useful in fishmeal industry. These are caught to an extent of 10,000 to 18,000 tonnes per year around Mandapam. They exhibit a diurnal migration, resulting in large catches during day time and full moon periods. Among the other demersal fish resources, rays (*Dasyatis*, *Gymnura*) account for an annual production of 2,500 tonnes; jew fishes (Sciaenids) and catfishes (Tachysurids) each contribute to about 1,500 to 3,000 tonnes per year. Besides, groupers, perches and grey mullets are also caught in appreciable quantities. Investigations are carried out on these



Silver bellies — most important demersal fishery resource of Mandapam region.

resources with a view to improving their fisheries through better understanding of their population structure.

Molluscan Fishery Resources

Studies on molluscan resources of Mandapam area have shown that fishing intensity on species such as *Sepioteuthis* and *Sepia* which have great export potential, could be increased much more than at present. Resource characteristics of these important cephalopods

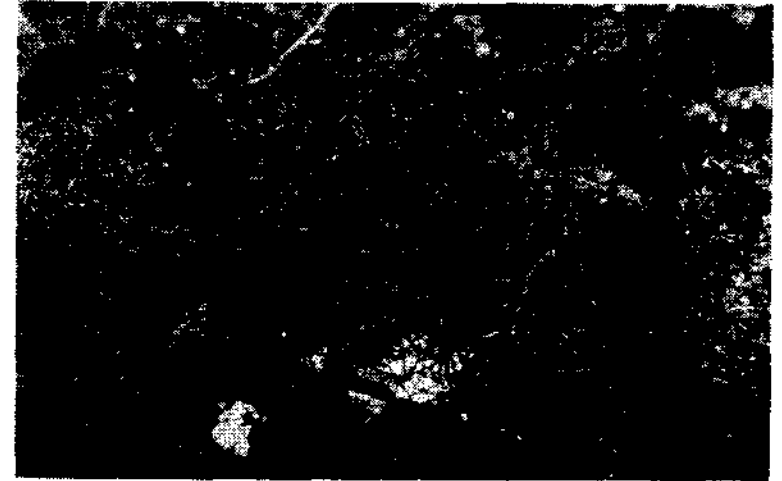
have been studied. Rich beds of clams such as *Donax* and *Meretrix* and edible oyster, *Crassostrea*, have been located around Mandapam affording good scope for exploitation and culture. Local grounds for sacred chank *Turbinella pyrum* are found to be the best in India. Studies have also shown that there are vast resources of sub-fossil deposits in the estuary of River Vaigai, composed mainly of the shells of *Meretrix*, for utilization in lime, cement and calcium carbide industries.

Crustacean Fishery Resources

Researches on the stocks of prawns around Mandapam have shown a rapid replenishing potential for species such as *Penaeus indicus* and *P. semisulcatus*, sustaining an annual yield of 2,000 - 3,000 tonnes. Similarly, fisheries for crabs (*Portunus*) and lobsters (*Panulirus*) have been remaining stable. Crabs are found to have a nocturnal shoaling habit, realising better catches at night. Continuous monitoring of the exploited crustaceans and the effect of increasing fishing effort on the resource and the changing pattern of exploitation form the main objectives of the ongoing research projects.

Seaweed Resources

Another very important marine resource of Mandapam area, forming raw material to many industries is



The agar yielding sea weed resource

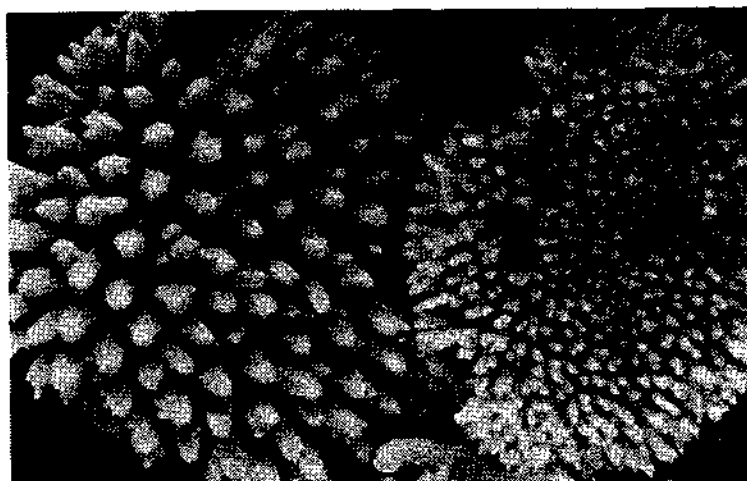
seaweeds, both agar yielding and algin yielding ones. These are harvested to an extent of about 15,000 tonnes wet weight every year. Over the years, the seaweed resources available in the shallow near shore grounds are subjected to heavy exploitation. The effect of such exploitation on the replenishment and regeneration of the seaweeds, and survey of under/unexploited grounds in the deeper waters are the important ongoing projects in this field.

Other resources

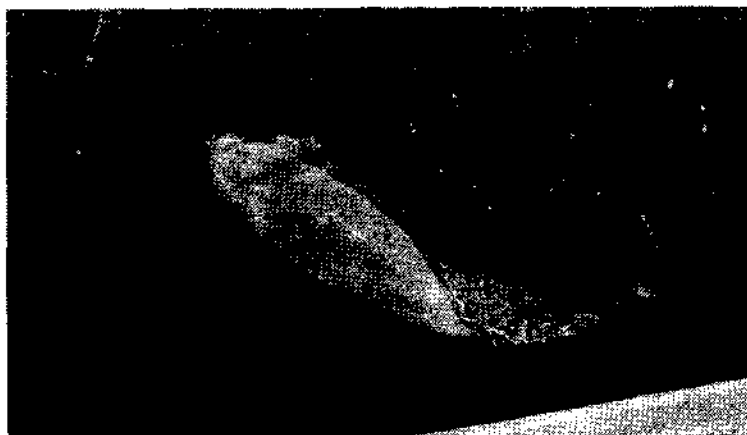
Apart from the above, Mandapam area is well known for resources such as corals, sponges, holothurians yielding exportable *Beche de mer*), marine mammals, turtles and birds. The sea cow *Dugong dugong*, the most endangered marine mammal of India, inhabits the local waters. Studies are being carried out on the biology and ecology of these resources so as to formulate appropriate conservation and management measures for protection/improvement of these resources.

Fishery Environmental Studies

The investigations carried out on the fishery oceanographic and ecological characteristics of the water masses and fishing grounds of the Gulf of Mannar and Palk Bay have given an insight into the influence of these factors on the seasonal and annual fluctuations of the fish production of the area. Besides, the results of the studies carried out on the primary productivity employing C-14 technique, on the standing crop of plankton and its interrelationship in the food chain and in different ecological niches, and the studies on the production of organic matter have helped to estimate the potential fishery resources of the region. Regular monitoring of the environmental factors is continued to correlate these factors with the fluctuation in fish production and ultimately to evolve a model for forecasting the fishery along with other biological and fishery dependent factors.



Coral, a part of the unique eco system requiring protection



The Dugong, the most endangered mammal inhabits the waters in Mandapam area

CULTURE FISHERIES

Seaweeds

A simple, inexpensive technology for culturing the agar yielding seaweeds, *Gracilaria edulis* and *Gelidiella acerosa* on coir mats kept suspended in the near shore waters has been developed by the Regional Centre. Demonstrating the techno-economic feasibility of this technology, it has been shown that 3 crops in a year with an yield ranging from 3 to 6 times the original weight of the seed material could be obtained by following this culture technique. To propagate seaweed culture, need-based training to fish farmers is offered by the Centre. The current research programmes are directed to develop techniques for intensive culture and their propagation through better understanding of their reproductive behaviour.

Fin fishes

The Centre has surveyed elver resources of the eel *Anguilla bicolor*, in Tamil Nadu and identified about 50 centres of collection. Feeding with compounded feeds, elvers have been cultured to marketable size, with a production rate of 38 tonnes/ha.

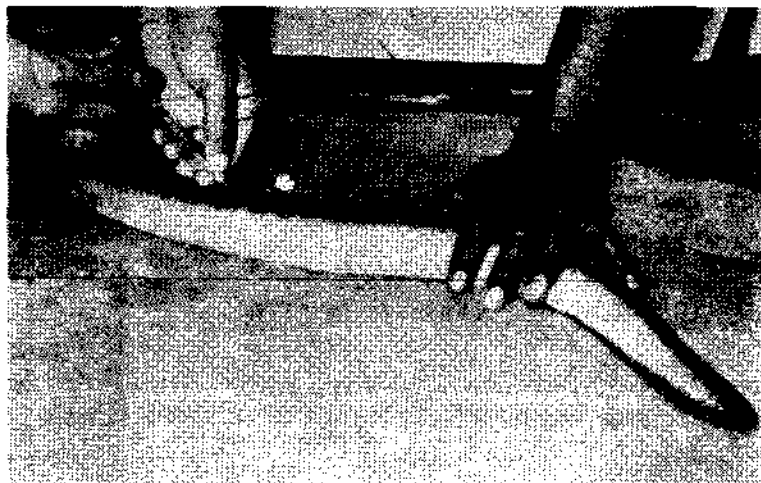
Natural seed resources of culturable fin fishes have been surveyed, revealing rich grounds for the seeds of



Installation of a net frame for algal culture

milkfish (*Chanos chanos*) and mullets (*Mugil spp*). In the endeavour to develop technologies for controlled breeding and seed production, induced breeding of the mullet, *Liza macrolepis* and *Siganus orna* has been achieved. The experiments on the culture of milkfish and mullets in the oligotrophic high saline coastal ponds have shown a production rate upto 1145 kg/ha/7 months in monoculture of milkfish and 1,600 kg/ha/year in polyculture of milkfish and mullets. The farming of milkfish

in the coastal lagoon with net enclosures, have given encouraging results. Following this, the local fish farmers have taken up the culture of milkfish in net enclosures on a commercial scale. Concerted research efforts are being continued on the controlled breeding and seed production of *Chanos chanos* and *Mugil cephalus* and their intensive culture in the high saline coastal ponds through feeding, pond ecosystem and water quality management.



Injecting an eel for induced breeding



Part of the marine fish farm

Molluscs and Crustaceans

The cuttlefish, *Sepia pharonis* is successfully reared in the laboratory from the egg to the edult stage, indicating the possibility of its large scale culture and propagation. Similarly, experiments on the culture of prawns in coastal ponds and lagoons have given promising results.

Farm construction

A low-cost technology for construction and maintenance of ponds in the sandy, incohesive and erosion-prone soil prevailing at the Mandapam region has been developed.

TECHNOLOGY TRANSFER

The Regional Centre has been imparting the technology developed for the culture of seaweeds in the coastal waters. Fishermen from neighbouring villages have been selected and trained in different aspects of culture and processing of the raw material.

The Centre is rendering technical assistance and consultancy service to entrepreneurs in the manufacture of agar-agar and sodium alginate and on the culture of prawns and fishes. It is maintaining close liaison with the State Government agencies and industries dealing with fisheries for the accelerated development of the sector in this economically backward region, where the marine fisheries has great growth potential.

STAFF STRENGTH AND INFRASTRUCTURE FACILITIES

The Regional Centre has at present a total staff strength of 135 including 17 scientific, 37 technical, 17 ministerial and 64 supporting personnel.

The Centre has adequate laboratory facilities for undertaking research on the biology and ecology of marine organisms; analysis of water quality and for studies on primary and secondary production. A running sea-water aquarium is available. The marine Museum houses a vast collection of fishes, marine animals of economic and zoological importance and plants from the seas



Aquarium

around India, including Lakshadweep and Andaman-Nicobar Islands. Besides, 115 new species of marine fauna, described by the scientists and scholars who worked at the centre are deposited in the Museum.

The Centre has established field experimental laboratory and farm facilities in about 3 ha adjoining the Palk Bay. There are 28 earthen ponds, supplied with seawater for experimental culture of fishes and prawns. In addition, about 200 ha of salt water lagoon is available for studies on the unique tropical lagoon ecosystem.

Facilities for field studies include two mechanised boats, Cadalmin II (43½') and M. V. Sagitta (32') for collection of biological and oceanographic data and for carrying out experimental fishing. There are three automobiles for catering to the research needs of the scientists. Besides, there is a workshop and carpentry section.

The Library of the Regional Centre possesses a vast collection of books, monographs and periodicals dealing with fisheries and marine science. It also includes certain rare and old publications, expedition and survey reports normally not available in other libraries. The present holdings include 6,000 books and 15,000 volumes of journals. It has documentation and reprographic facilities.

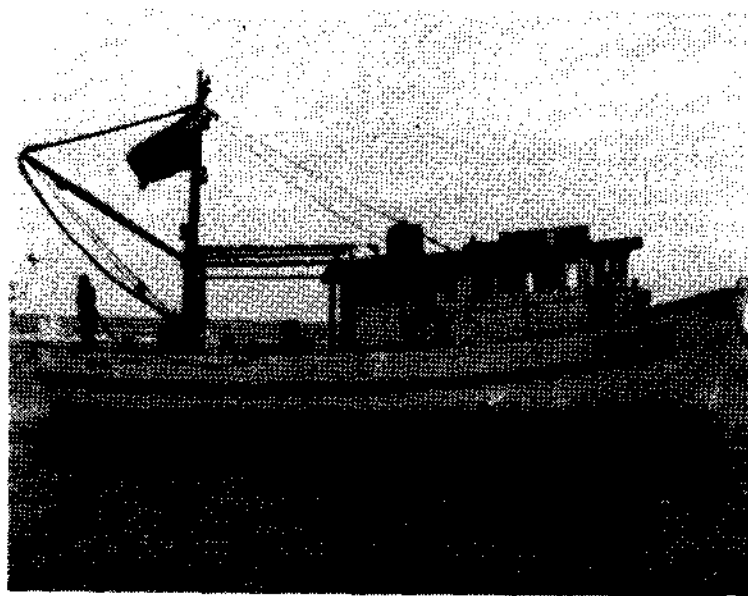
The Centre is recognised by several Universities as an advanced Centre for Post-graduate research leading to M.Sc. and Ph.D. degrees in marine sciences.

The Centre has a furnished guest house for visiting scientists and residential quarters for staff.

The civil and electrical units of the Central Public Works Department are also stationed in the Campus to look after the construction and maintenance needs of the Centre.

FUTURE PROGRAMMES

Emanating from the overall mandate of the Institute, the future research programmes of the Centre would be



Research Vessel, Cadalmin - II

directed in the thrust areas of stock assessment of commercially and potentially important fishes and shell fishes in the Exclusive Economic Zone off Gulf of Mannar and Palk Bay. Data would be collected and disseminated to formulate judicious and rational management measures for sustained exploitation of the fishery resources of this region and to forecast the fishery prospects.

In culture fisheries, research effort will be intensified on induced breeding, seed production and culture of fishes such as *Chanos chanos*, *Mugil cephalus*, *Lates calcarifer* and *Sillago sihama*. Besides, studies on the culture of snappers and groupers which have great promise as candidate species for culture in this region would also receive considerable importance in the future research programmes of the Centre. To augment the natural prawn resource of the area, ranching of seed produced in the hatchery would be undertaken.

Although considerable progress has been achieved in the culture of seaweeds, the potential to produce higher quantity is great. Intensified research would be taken up to perfect the technology for intensive cultivation in different systems. In the endeavour of improving the na-

tural seaweed resources, investigations would be directed to understand and biological, economical and man-made factors influencing the growth and replenishment of the seaweeds in the natural beds and to locate under/unexploited grounds.

The Centre envisages to intensify efforts in the conservation and management of the endangered marine species inhabiting the region and in the preservation of the unique ecosystem possessing corals, sponges, echinoderms and other valuable living resources of biological and ecological significance.

The research results emerging from the Centre and the technologies developed would be made available and transferred to fish farmers, fishermen and fishing industry through need-based training and extension activities.

