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**MANDAPAM REGIONAL CENTRE OF
CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
MARINE FISHERIES POST - 623 520, MANDAPAM CAMP
RAMANATHAPURAM DISTRICT, TAMIL NADU, INDIA**

Mandapam Regional Centre of CMFRI, Mandapam Camp - Its Research Activities and Achievements

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The Mandapam Regional Centre of Central Marine Fisheries Research Institute at Mandapam Camp is one of the Premier Institutions for R&D in the field of Marine Fisheries Research and is an advanced centre of its kind among the subordinate establishment of Central Marine Fisheries Research Institute. It is located on an impressive and picturesque elevated sand dune spread over 84 acres overseeing the Palk Bay in the north and Gulf of Mannar in the south. The history of the Centre dates back to 1943. The proposal for establishing various Central Fisheries Research Institutes, under the Union Government, was first made in 1943. The Fish Sub Committee of the Policy Committee on Agriculture and Fisheries in its report in 1945 endorsed this proposal. Subsequently on the basis of the "Memorandum on the proposed Fishery Research Institute" submitted by Lt. Col. R.B. Seymour Sewell in 1946, the Central Marine Fisheries Research Institute (CMFRI) came into existence on the 3rd February 1947 at the Zoology Laboratory building of the Madras University. The establishment was later shifted to Mandapam Camp in 1949 where it was housed in the Naval Building Complex, which was acquired in 1946 and modified into laboratories, administrative wings and temporary residential accommodation.

Since then, the establishment at Mandapam Camp functioned as Headquarters of the Institute for more than 2 decades before being shifted to Cochin in the year 1971. The main function of the Institute was to assess and monitor the status of exploited and unexploited fish stocks in the EEZ, development of suitable techniques for sea farming of finfish, shellfish, seaweed and other cultivable marine organisms. After shifting

the headquarters of the Institute to Cochin, the establishment at Mandapam Camp was renamed as Regional Centre of CMFRI and attained the status next to Headquarters. The calm, serene, shallow, unpolluted seawater of the Palk Bay and Gulf of Mannar not only exemplifies the biological significance of the area but also offer an ideal background for carrying out Research and Development on marine fisheries.

Laboratories

The Regional Centre has a strong R&D base with well equipped laboratory facilities for undertaking research on the biology, ecology, physiology, pathology and culture of marine organisms, analysis of seawater and studies on primary and secondary production. The laboratories are equipped with many facilities which include compound microscopes, binocular microscopes, refrigerators, hot air ovens, incubators, spectrophotometers, calorimeters, pH meter and autoclaves. An air-conditioned microalgae culture laboratory has been set up in which seven species of commercially important microalgae are maintained as stock culture. Chemistry and biotechnology laboratories have also been recently developed.

Hatcheries and rearing facilities

A shrimp hatchery with a production capacity of 2 million postlarvae of *Penaeus semisulcatus*/*P. monodon* per year is available in the southern side of the aquarium. A small crab hatchery has been developed adjacent to the shrimp hatchery. An indoor pearl oyster hatchery with a capacity to produce 20 million

spat per year has been established by converting the existing building of the fishery biology block. The hatchery is likely to be extended further adjacent to the present hatchery. Eight onshore tanks of 100 ton capacity each, have also been developed for nursery rearing of pearl oyster spat and broodstock maintenance of grouper. A green house with seawater facility is also available.

Museum and Aquarium

The marine museum of the centre is one of the biggest museums in the Southeast Asia. It houses an enormous collection of fishes and other fauna and flora of economic and zoological importance from the seas around India, including Andaman & Nicobar and Lakshadweep Islands. There are about 1100 species of fishes, 152 sponges, 180 corals, 200 tube dwelling worms, 220 crabs and hermit crabs, 125 prawns stomatopods and 370 sea shells displayed and exhibited in the museum. An all glass aquarium with running seawater facility is available to maintain different species of live ornamental fishes, coelenterates, crustaceans and molluscs. Outdoor cement tanks are available for the maintenance of turtles and other marine animals.

Library

The Regional Centre has a well-equipped library to cater the needs of all those establishments/institutions engaged in Research and Development in India. It is one of the best libraries in the whole of South-East Asia for literature on Aquatic sciences in general and fisheries in particular. The library has over 10,000 volumes of books, monographs, periodicals and reports and 30,000 scientific journals. It subscribes for 15 foreign and 50 Indian journals besides receiving 150 periodicals on exchange or complimentary basis. The library possesses some of the rare and old publications on marine sciences and fisheries, expeditions and survey reports that are not available in any other libraries within the country. It has documentation and reprographic facilities too.

Field Laboratory and Fish Farm

The Centre has established a field laboratory and a marine fish farm in about 3.8 ha area adjoining the Palk Bay for mariculture activities. Twenty eight culture ponds with provision for seawater supply have been developed for experimental culture of fishes and prawns. Besides, a small lagoon of about 200 ha area is available for carrying out experimental studies on tropical lagoon ecosystem.

Buildings

The Regional Centre is housed in the Institute's own buildings in an area of 140 ha. The residential accommodation comprised of old and new colonies is available and the staff members are provided with family type quarters and bachelor accommodation. A Guest House is also available for providing accommodation to visiting dignitaries and scientists.

Other facilities

The Centre has a Research vessel MV Sagitta (9.8m OAL) for collection of hydrographic and plankton data from the inshore waters of Mandapam and for carrying out experimental fishing. The Centre is supported with one jeep and a tempo van for its programmes connected with field work. Besides, there is a workshop and a carpentry unit to look after the civil and electrical repair works. Two generators 70 KV and 50 KV are available to maintain the uninterrupted power supply. The centre is recognised by several universities as a nodal Centre for post graduate research leading to M.Sc. and Ph.D. degrees in marine sciences.

Manpower

The regional centre has a total strength of 141 staff which includes 12 scientific, 41 technical, 16 administrative and 72 supporting personnel.

Research activities

Zonal wise assessment and monitoring of exploited marine fish production and their dynamics in Thanjavur, Pudukottai and Ramanathapuram districts of Mandapam Regional Centre which helped to elevate the significant fishery of considerable magnitude and improved socio-economic status of coastal rural population.

Investigations on the fishery, biology and resource characteristics of all major exploited finfishes, crustaceans and molluscs around Mandapam and Rameswaram regions and studies on stock assessment.

Studies on the hydrology of Gulf of Mannar and Palk Bay sea; estimation of primary and secondary production and their inter-relationship in the food chain at various trophic levels paving way for estimation of potential fishery resources of the sea.

Development of hatchery techniques for mass production of the seed of marine prawns, crabs, and gastropod molluscs (Sacred chank) under controlled conditions and their sea ranching.

Development of suitable technologies for mass production of pearl oyster seed, farming of pearl oysters in the offshore and onshore facilities, production of cultured pearls, evaluation of techno-economics of pearl culture and upgradation of pearl culture through R&D in Bio-technology.

Development of technologies for broodstock management, induced maturation, breeding and seed production of groupers, seabass, rabbitfish and ornamental fish under controlled conditions.

Investigations on seaweed resources, their exploitation, culture, genetic improvement and extraction of agar, alginic acid and other products enabling promotion of seaweed industry in the region.

Studies on the nutritional quality and development of diet and optimisation of feeding regimes for cultivable crustaceans, finfishes and pearl oysters. Mass production of live feed organisms for feeding different larval stages of prawn and fishes by standardising the techniques and mass culture of *Chlorella* spp., *Isochrysis* spp., diatoms and dinoflagellates as feed for the live feed organisms and pearl oyster spat.

Pathological investigations in marine finfish and shellfish and treatment in the aquaculture system.

Transfer of viable seafarming technologies through extension education, training and consultancy services.

The above research activities are carried out under 25 research projects of which 11 programmes are carried out in the field of Mariculture and the rest under capture fisheries relating to assessment and monitoring of the exploited stocks. Besides this, two ICAR revolving fund projects and two DBT sponsored R&D projects are also in operation.

Research Achievements

Capture fisheries

The ongoing research projects on finfish and shellfish resources are directed to determine the population characteristics and their dynamics to assess the stock status of the resources to advise their rational exploitation. In this connection, fluctuations in the seasonal and annual production of pelagic resources such as sardines, anchovies, mackerel and seerfishes and demersal resources such as elasmobranchs, perches, silverbellies, threadfin breams, croakers, flatfishes and goatfishes and certain biological characteristics have been studied.

The shark which is an important demersal resource of Mandapam region contributing an annual yield of about 1500 to 2500 tonnes.

Silver bellies are the dominant demersal fishery resource of Mandapam region, useful in fish meal industry. The estimated annual average landings are about 18500 tonnes.

Researches have shown that the larger penaeid species like *Penaeus semisulcatus* and *P. indicus* could sustain an annual yield of 2000 to 3000 tonnes. The study has further revealed the changing scenario in the species composition of prawns in the area. The organised fishery for juveniles of *P. semisulcatus* along the Palk Bay in depth ranges of 2-3 m in alarming proportions is likely to affect the recruitment and fishery. In this connection it is worth mentioning that sea ranching and tagging experiments carried out by using laboratory grown seed of *P. semisulcatus* have proved that shrimp production at Palk Bay area can be substantially increased by ranching seed of *P. semisulcatus*.

Studies on molluscan resources have shown that fishing intensity of cephalopods such as *Sepioteuthis* spp. and *Sepia* spp. could be increased much more than the present level.

The local ground for sacred chank *Xancus pyrum* is found to be the best in India.

Data on commercial exploitation of seaweeds at 12 centres along the region indicated a declining trend in their production. New ground along the intertidal areas was located. The study has shown increased exploitation of the coastal resources over the years.

The investigations carried out on the fishery oceanographical and ecological parameters have given an insight into the influence of these factors on the seasonal and annual fluctuations in fish production and helped to estimate the potential fishery resources of the region.

Mariculture

A viable technology for induced maturation and artificial insemination in the tiger prawn, Indian white prawn and green tiger prawn has been perfected.

A protocol was developed for larval rearing of the crab *Portunus pelagicus*. F-1 generation of *P. pelagicus* was maintained upto F4 generation. Rematuration for mud crab was perfected to obtain repetitive spawning.

There farming of green shrimp, *P. semisulcatus* in the experimental culture ponds with hatchery-produced seeds revealed encouraging results to adopt this species for commercial culture.

Attempt made on the development of captive broodstock of *P. monodon* has given encouraging results and revealed the potentiality of captive broodstock development.

Several species of commercially important crustaceans were bred under captivity and their eggs and larvae were reared successfully. Hatchery technology was developed and standardised for *P. indicus*, *P. semisulcatus* and *P. monodon*.

A commercial scale marine pearl oyster farm of 1000 sq.m was established and maintained at Gulf of Mannar. Packages of practices for cultured pearl production was developed and standardised. A total of 9000 pearls of different grades have so far been produced having a total value of Rs.7.0 lakhs. About Rs.1.75 lakhs have so far been realized through sale of pearls.

A pearl oyster hatchery with a production capacity of 2.5 million spat/annum was established and made operational.

A breakthrough was achieved in the spawning of abalone through thermal and chemical stimulation. The larvae resulted from the spawning was reared upto adults under controlled condition.

In the endeavour to develop technologies for controlled breeding and seed production in mullets and rabbit fishes, initial success has been achieved.

The induced maturation and breeding of seabass and groupers are being succeeded.

The pen culture of finfishes in the coastal lagoon showed encouraging results indicating the feasibility of developing the unproductive area to a productive one.

A simple low cost technology for culturing the agar and algin yielding seaweeds on long line coir ropes and coir nets in the near shore waters has been developed. Techniques for

the mass production of live feed organisms such as rotifer, moina and brine shrimp to feed different larval stages of crustaceans and finfishes were developed and perfected.

Techniques for the mass culture of mirco algae *Isochrysis galbana* and *Chlorella salina* to feed the pearl oyster larvae and spat have been perfected.

Techniques for the preservation of dormant cysts of rotifer and artemia in dried condition were developed.

Cryopreservation of *P. semisulcatus* nauplii using DMSO-Glycerol was achieved with 40-50% survival at a low temperature of -10°C.

A breakthrough was achieved in the spawning, larval rearing and nursery rearing of the Clown fish, *Amphiprion sebae* under controlled condition.