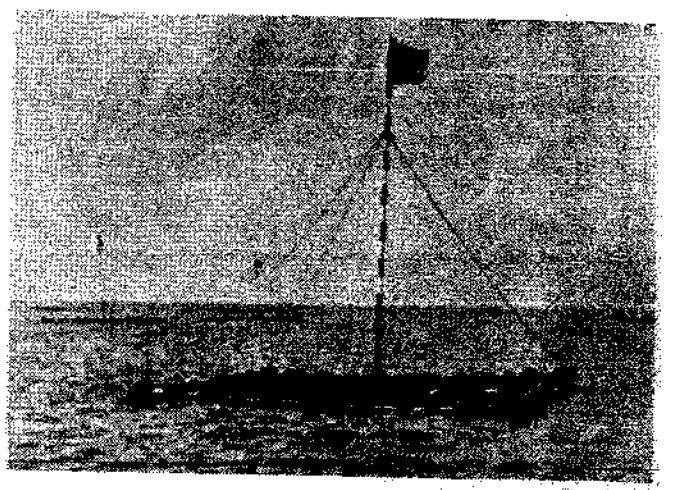
CENTRAL MARINE FISHERIES
RESEARCH INSTITUTE

Activities and Achievements

Calicut Research Centre



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The Calicut Research Centre of Central Marine Fisheries Research Institute started functioning in 1947 as a sub-station of the Central Marine Fisheries Research Institute. The Research Centre is functioning in its own building since October 1958.

ACTIVITIES AND ACHIEVEMENTS

The major research activities of this Centre are concerned with investigations on the resource characteristics of commercially important pelagic as well as demersal fish, prawns and molluscs. This Centre also carries out research on the management of fishery environmental parameters along with survey of exploited fish resources of the coast of northern Kerala. With a view to augmenting fish production attempts are also made to culture fish and prawns in polythene-lined ponds. The Centre has also developed technology for open sea mussel culture which is transferred to economically weaker sections of the traditional fishing community under the Lab-to-Land Programme.

Pelagic Fishery Investigations

The Kerala coast being an important contributor to major species of pelagic resources, emphasis is given on the investigations of the potential stocks of these resources.

The annual yield of oil sardine at Calicut shows wide fluctuations from year to year. The average production is estimated at 4990 tonnes with the highest of 7600 tonnes during 1973-74 and the lowest of 2980 tonnes in 1980-81 indicating a declining trend. The gradual decline in the yield along North Kerala may be attributed to the wide-spread operations of purse seiners along both south and north of this part of the coast, as it restricts the movement of shoals and also adversely affects spawning. Oil sardine forms about 12 per cent of the total annual fish landing of Calicut. The fishery is restricted to the narrow coastal belt extending to about 10 km from the shore and is exclusively exploited by artisanal fishermen. There is a sudden concentration of shoals of high magnitude in September and October in coastal waters and the fishing season extends from September to March with the peak during October-January. Fishes of 0-year class contributes to the major portion of the catch and the success of the fishery during the years of abundance is dependant on the abundance of this year class in the inshore waters. Maturity begins at a size of 15 cm and there is an offshoreward breeding migration with the onset of the monsoon. The maximum catch rate recorded along this part of the coast is from the inner shelf regions having depth ranges of 11 - 20 m.

The Indian mackerel is yet another important component of the pelagic fishery resources of this region. Similar to oil sardine, this resource also shows fluctuations in the yield from year to year with a maximum catch of 709 tonnes recorded in 1980 which progressively declined to 51 tonnes in 1983. The yield trend in the subsequent years steadily improved with a crust of 385 tonnes in 1985 as a result of fluctuations in recruitment. It is found that two or three broods contribute to the fishery, first brood born in May or June and the second brood around August and the last brood, comparatively weak, noticed sometime in October.

Among the other pelagic fishes, seer fishes and pomfrets rank high among the food fishes. Seer fishes contribute to about 90 tonnes per year on an average and mostly comprise two species *Scomberomorus commerson* and *S. guttatus*, exploited mainly during October to March. Pomfrets contribute on an average 100 tonnes, of which more than 70% comprise black pomfret, *Formio niger* and the rest silver pomfret, *Pampus argenteus*. This resource showed steady decline from 1981 to 1984 probably on account of the imposition of marine fisheries regulation restricting trawler operations in the inshore regions.

Resource characteristics of a few more pelagic fishes like tunas and bill fishes are also regularly monitored from this centre to study their distribution and abundance in space and time. The tuna landings show high fluctuations with average annual catch of 60 tonnes. The dominant species is *Euthynnus affinis* and the fishing season extends from October to March.

To evaluate the resource potential of mesopelagic fishes such as *Psenes indicus, Diaphus splendidus, Cubiceps natalensis* etc. from the outer continental shelf and slope, survey is being carried out using different types of trawls along both the coasts of India.

Demersal Fishery Investigations

Along the coast of North Kerala, marine tachysurid catfishes are an important component in the demersal resources exploited by long lines, gill nets, trawl nets and boat seines. The yield trend of this resource during last 10 years showed fluctuations from year to year with a general decreasing trend in the past one or two years. Four species are abundant in this region during August-March when there are migrations of shoals to south and north and also to the shore. Since the peak breeding season coincides with the peak period of catch, often there are mass destruction of gestating males leading to the mortality of eggs and embryos. The maximum catches is from depth zones 20 to 60 m. In view of the importance of *Tachysurus dussumieri* in the catfish resources of this part of the coast attempts are made to assess their stock. This species is highly vulnerable to both long lines and gill nets at the age of five years. It is roughly estimated that the potential stock of this species from the Indian coastal waters is 43,300 tonnes, whereas the average annual yield is only 15,300 tonnes, indicating the possibility to increase the yield, which may be achieved either by reduction in the size at first capture or by intensive fishing along the under exploited outer shelf.

Other demersal resources like ribbon fishes, threadfin breams, sciaenids, silver bellies and lizard fishes are also regularly monitored from this Centre for their gear-wise and species-wise catch, effort and other fishery and biological parameters.

Seed Survey

Periodic surveys were undertaken along the coastal estuarine and brackish water areas extending from Kasaragod to Ponnani, to study region-wise and season-wise abundance of cultivable species of fish/prawn and mol-

luscs, as part of the Institute's seed survey programme along Kerala and Tamil Nadu, aimed at assessing the region-wise abundance and identify areas suitable for aquaculture. The seed of *Penaeus indicus, P. monodon* and *Metapenaeus dobsoni* were common along the surf during February-April. The cultivable fish species like *Chanos chanos, Mugil dussumieri* and *Etroplus suratensis* were abundant in most of the estuaries. In Calicut and Cannanore districts at present more than 1,000 hectares of seasonally inundated brackishwater areas (Kaipadam) are

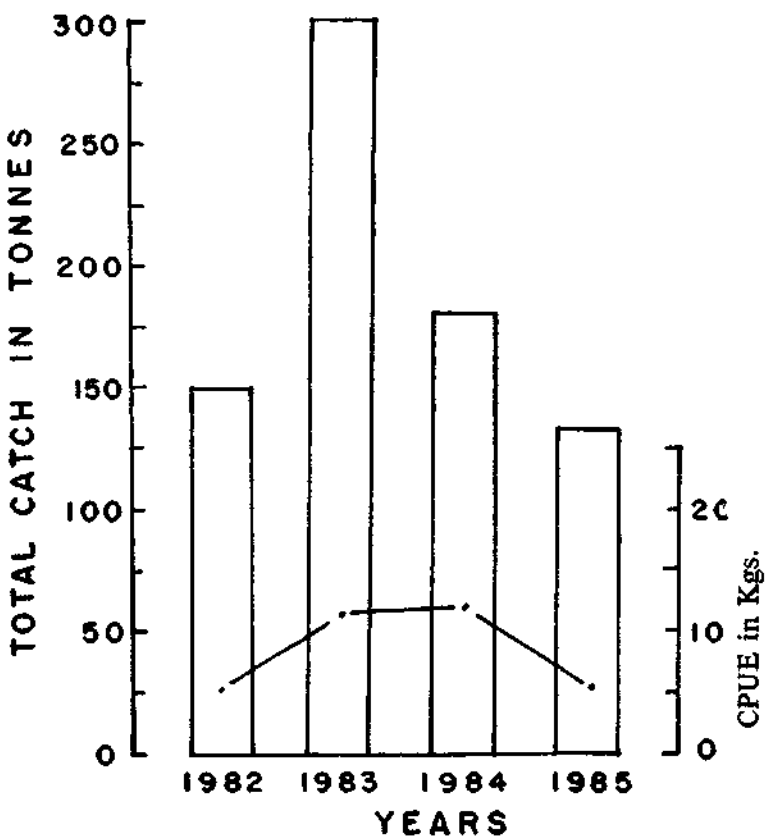
Pearl spot harvested from culture pond.

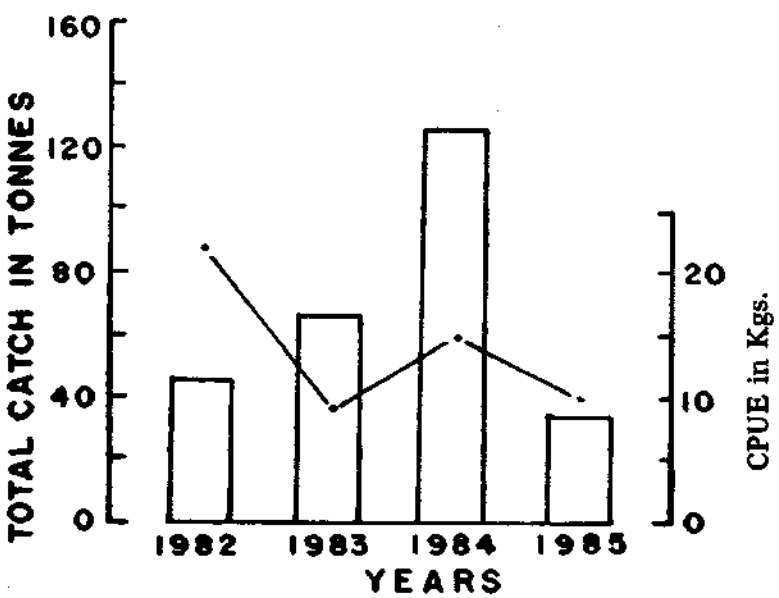
A pearl-spot with its young ones

utilised for prawn/fish filteration by traditional methods. The survey showed that many of such 'Kaipadams' could well be utilised for fish and prawn culture using seeds abundant in nearby areas. Seasonal changes in hydrographic parameters such as temperature, salinity and dissolved oxygen of the various 'kaipadams' were monitored to assess their suitability for fish and prawn culture. A study was also undertaken on the lunar and tidal influences on the qualitative and quantitative composition of fish and prawn seed in Korapuzha estuary.

Crustacean Resources

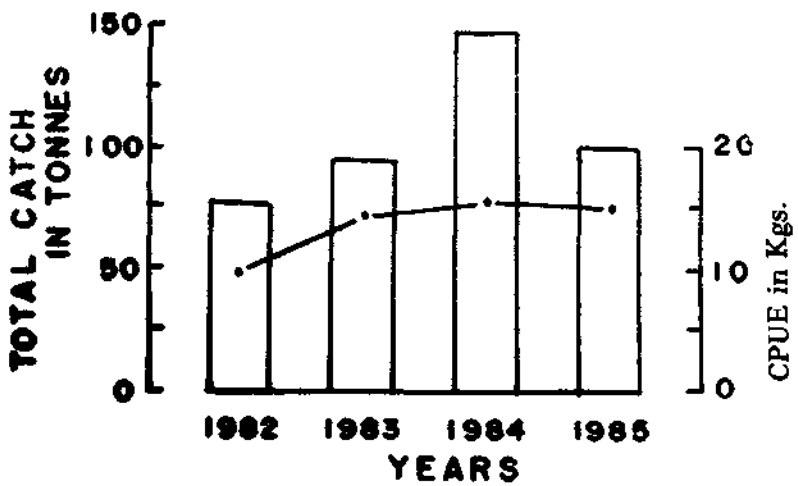
The penaeid prawn fishery by mechanised trawlers is seasonal and shows wide fluctuations in the monthly as well as annual catches. The yield varied from 303 tonnes to 138 tonnes during 1982-85. Similarly prawn fishery by indigenous gears also showed wide fluctuations with a maximum yield of 127 tonnes in 1984. The most dominant species contributing to the trawl fisheries is *Parapenaeopsis stylifera* caught from depth range of 8-20 m; followed by *Metapenaeus dobsoni* fished from the same depth range. *Penaeus indicus* and *Metapenaeus monoceros* are more common at depth range of 40-50 m during January to March.

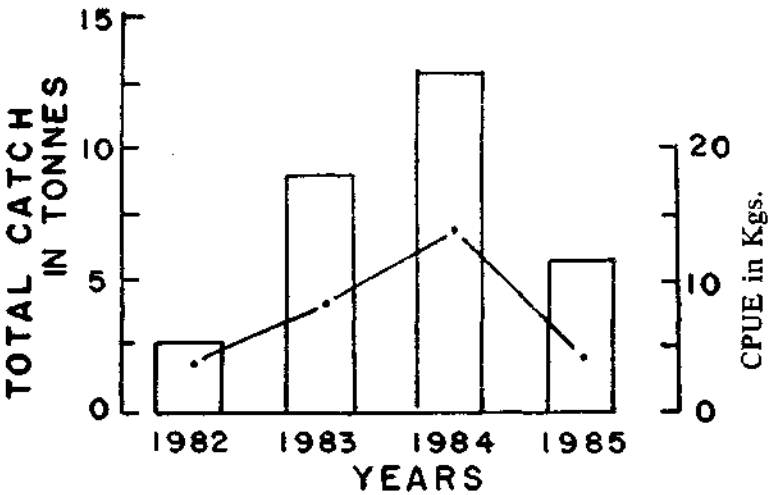




The prawn resources in the nursery grounds of Korapuzha estuary shows yearly fluctuations with the average yield 106 tonnes. The catch rate showed a steady increase during 1982-85, the maximum being 16 kg in 1984. The fishery constitutes species like *M. dobsoni*, *M. monoceros* and *P. indicus*. The former species spawns during the monsoon and post-monsoon months of July and September, whereas *M. monoceros* breeds during January to June *P. indicus* in February-May.

Stomatopod forms the bye-catch of trawlers. The fishery is highly seasonal extending from January to May and is composed of a single species *Oratosquilla nepa*. The

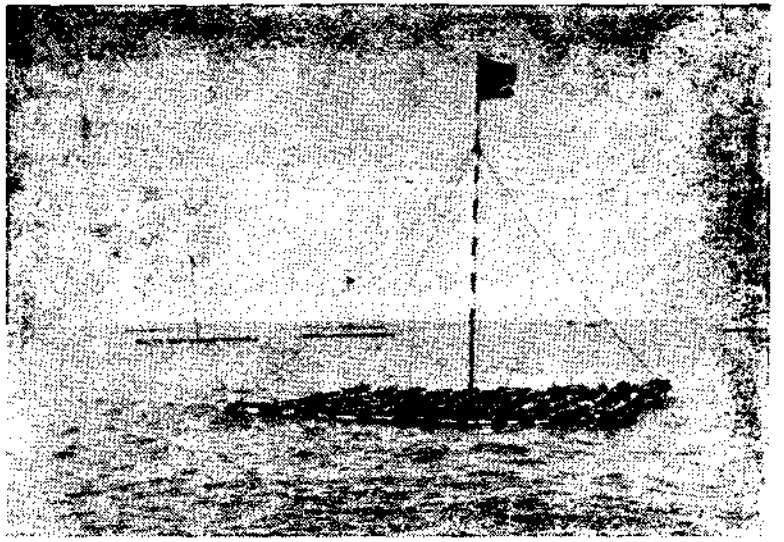




annual average catch is estimated to be 7 tonnes and the catch fluctuates from year to year.

Mussel Culture

A simple and viable technology has been developed for the culture of green mussel *Perna viridis* in the open sea for the first time in India in 1975. Raft culture method suitable for west coast sea conditions was adopted. Methods for collection and transportation of mussel seed from natural beds to the farm sites over a distance of 65 km were developed and the size and quantity of seed at stocking were determined. The average seed size for farm-



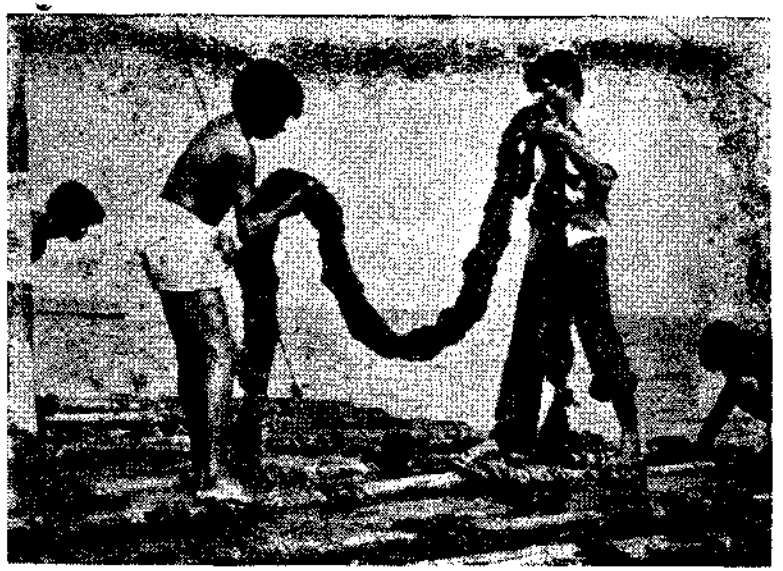
Rafts in the open sea.

Seeding the ropes.

ing is 20-25 mm and 600 g seed are required for one metre length of rope. Synthetic and coir ropes have been tested and although the former has the advantage of longer life, the latter has been found to result in quicker attachment of the seed and prevent slipping of mussels. The seed is placed around the rope and securely wrapped with knitted cloth and this has been found to give good, quick and lasting attachment for the five-month culture period.

The seeded ropes are suspended from rafts moored in the open sea, the optimum number of ropes per raft having been determined. Growth of mussel in the farm ranged from 11.6 - 12.9 mm in length and 5.9 - 7.3 g in weight per month, whereas in the natural beds, the growth was only 7.0 - 8.6 mm and 2.8 - 3.8 g per month. While the mussels in the farm reach the harvestable size of 75.0 - 88.2 mm in 5 months from seeding, the mussels of the same brood the wild grow only to 60 - 67 mm requiring another 5 months to reach comparable marketable size. A production rate of 12.3 kg per metre length of rope has been achieved, which is 21 times the average seed weight. The farm-

Harvested mussels



Growth of mussels on rope

grown mussel gives a higher meat yield of 34.8 - 40.5%, as compared to 27.2 - 33.2% obtained from the wild mussels.

Culture of fish and prawn in polythene-lined ponds

The Research Centre has developed a culture system for utilizing the barren sandy beaches for mariculture purposes. Ponds of size ranging from 0.025 to 0.1000 ha having a depth of 1.50 to 1.75 m were made and were lined with black polythene film having 115 micron thickness to prevent seepage. Experiments were carried

Milkfish harvested from a pond

out in the various species of fish such as *Chanos chanos, Mugil cephalus, Etroplus suratensis* and *Sillago sihama* and different species of prawns such as *Penaeus indicus, P. monodon* and *Metapenaeus dobsoni* and the technology is found to be feasible. Seeds from wild were used for the experiments. Farm-grown seeds were used in the case of prawn. In polythene line ponds, *Chanos chanos* grew well and the highest estimated production of 2133 kg / ha / 6 months was recorded. This species showed a maximum survival rate of 93% when stocked at the rate of 1.5/m^2 with a mean seed size of the 54.8 mm. Mugil cephalus yielded a production of 1100 kg/ha/7 months with a survival rate of 99% under 1/m^2 stocking density with an average seed size of 36 mm. *Etroplus suratensis* gave 99% survival rate with a production rate of 390 kg/ha/6 months. The ponds were fertilized with NPK at the rate of 400 kg/ha. The fish and prawns were also fed with artificial diet. Culture of *Penaeus indicus* in polythene-lined ponds showed a high production rate of 355-431 kg/ha/3 months when stocked at a rate of 4-10/m^2 with a survival rate of 50-96%. Tiger prawn, *P. monodon* in a polyculture experiment with *Mugil cephalus* gave 83% survival rate. Throughout the study the water quality was regularly monitored and the environmental conditions were suitably manipulated which resulted in the spawning of pearl spots in the cultured ponds.

Fishery Environmental Studies

Under this programme, the environmental parameters like salinity, dissolved oxygen, nutrients, gross primary production and qualitative and quantitative composition of planktons of the inshore waters is regularly monitored for the management of the nearshore environment and finding out their relationship with the fishery. The horizontal distribution of the nutrients indicates that more active transport of nitrates and silicates is taking place from the river to the sea than phosphates.

TECHNOLOGY TRANSFER

The Technology for mussel culture developed at the Research Centre was taken up for transfer to the fishermen under the Institute's Lab-to-Land Programme. Training is also given to the officials of state fisheries departments in the use of the technology.

A fish harvest mela

LIBRARY

This Research Centre has a library with more than 320 text books and 3200 volumes of periodicals dealing with marine bioligical and fishery aspects. In addition to the staff of this Centre, other institutions also utilise the reference facilities of this library.

PUBLICATIONS

210 Scientific publications relating to various aspects of fish and fisheries have been brought out by the scientists of this Research Centre in different Indian and foreign journals.

STAFF STRENGTH AND DISTRIBUTION

The total staff strength consists of 8 scientists, 17 technical, 5 ministerial, 17 supporting and one auxiliary staff.