THE CENTRAL MARINE FISHERIES RESEARCH INSTITUTE: ITS ORIGIN, PAST AND FUTURE

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The Central Marine Fisheries Research Institute (CMFRI) has been in existence for the past 54 years. From the humble beginning in 1947, it has now become one of the premier marine fisheries research institutes in the world. Several people have contributed for its growth and reputation. It is felt desirable to document the history of establishment of the institute and the major events that took place over the years and the persons responsible for its growth in order to see that the posterity gets the benefit of such information. Incidentally, this exercise is likely to offer an opportunity for introspection.

HISTORICAL

Fisheries being a transferred subject, the Government of India did not take any direct interest till the early forties, except enacting the Indian Fisheries Act 1897. In the preindependence and immediate postindependence years, the Fisheries Departments of the Provincial Governments were attending mainly to revenue collections. The surgeon naturalists of the Marine Survey of India, the Officers of the Zoological Survey of India and the teachers in some universities were conducting studies on fishes and other aquatic fauna. Organised fisheries research, however, was absent in the country.

Lack of adequate supplies of good quality fish during the Second World War, especially for the British, American and other Allied army personnel made the then Government of India realise the need for taking direct interest in research and development of fisheries in the country. This resulted in initiating some fisheries research schemes by the Indian Council of Agricultural Research. The Industrial Commission of 1916-1918 recommended that the Central Government should promote studies on fish and fisheries by strengthening the Zoological Survey of India to give expert advice in fisheries to the provincial Governments and others and it was implemented by the Central Government for a few decades.

The fisheries personnel in the country should be indebted to the great visionary- Dr. Baini Prasad, the then Director, Zoological Survey of India, who in his Memorandum on the "Post-war Development of Indian Fisheries", submitted in 1943 to the Government of India, first proposed the establishment of Central Fisheries Research Institute. By that time the Indian Agricultural Research Institute at New Delhi, Veterinary Research Institute at Izatnagar and the Forest Research Institute at Dehra Dun were already established. Agriculture, Veterinary, and Forestry, like Fisheries, are also transferred subjects and Dr. Baini Prasad observed in his proposal that "the Government of India are maintaining fully equipped and well-staffed research institutes for the study of the problems related to these subjects, and there seems to be no reason why the development of Indian Fisheries, which in their importance are second only to agriculture and animal husbandry, should not be taken up along similar lines". He also rightly asserted, while being the Director of the Zoological Survey of India, that he was "definitely of the opinion that it would be best if a central research department of fisheries of the Government of India is constituted instead of tagging it on to the Zoological Survey of India" He also observed that "it would not be in the best interests of fishery research in

India to make it a subsidiary of the activities of the Zoological Survey of India". One would agree that in the present context of governmental set up, no Officer of the status of the Director of a large reputed organisation would recommend or even suggest that a portion of *his* organisation could be developed into an independent institute except those with vision and larger interest in the nation. This proposal was endorsed by the Fish Sub-Committee of the Policy Committee on Agriculture, Fish and Fisheries in their report in 1945, thus paving the way for considering the establishment of a central fisheries research institute. Some time elapsed after the submission of this document to the Government of India. Later, on the basis of the "Memorandum on the proposed Fishery Research Institute" submitted in 1946 by Lt. Col. Dr. Seymour Sewell, the Central Marine Fisheries Research Station was established.

THE ORIGIN

The Institute was established, prior to independence, on 3rd February 1947 under the then Ministry of Food and Agriculture, Government of India, at Madras in the temporary laboratory accommodation provided by the University of Madras at the Zoological Research Laboratories. On the basis of the report of an expert committee to locate the institute, the headquarters was shifted to Mandapam Camp in September 1949. The buildings, constructed originally for the Naval Hospital by the Defense Department during the World War II which were lying abandoned in a dilapidated condition overgrown with thorny jungles and infested by reptiles, were acquired and converted into laboratories and temporary residences for the staff. Subsequently about 100 acres of land by the side of the institute was acquired and permanent residential quarters were constructed in 1958. Marine Aquarium and fish farm were developed in subsequent years. However, the Mandapam region was a remote locality without adequate transport, medical and schooling facilities. This has mainly prevented the expansion of the activities of the Institute, as there was lack of willingness to serve at Mandapam Camp by many staff members; besides, the major marine fisheries activities were concentrated along the west coast, particularly along the Kerala coast necessitating the shifting of Headquarters to Ernakulam (now Cochin) in July 1971. At Ernakulam, the Institute was located in rented buildings for a period of 15 years and in 1986 moved into the present own building.

The head of the institute was originally designated as Chief Research Officer; in 1961, the designation was changed to Director and the name of the institution from Central Marine Fisheries Research Station to Central Marine Fisheries Research Institute.

In 1967, the Government of India transferred the Administrative control of the Institute to the Indian Council of Agricultural Research.

The research work on Fisheries Technology (craft and gear and processing) being carried out in the Institute was separated and merged with the newly formed Central Institute of Fisheries Technology, Ernakulam in 1958. Much later, in 1985, the research work on brackishwater aquaculture being carried out at the Institute was also separated and merged with another newly established Central Institute of Brackishwater Aquaculture, Madras.

THE GROWTH

Establishment of Regional, Research and Field Centres: In 1967, Dr. S. Jones the then Director of CMFRI in his article "Two decades of marine fisheries research" (Souvenir, 20th Anniversary of CMFRI, 1967) very rightly observed:

> Fisheries research being different from fish research and marine fisheries being essentially capture fisheries, it goes without saying that the requirements of marine fisheries research are quite different from those relating to some of the other disciplines. All the basic work will have to be carried out necessarily in the areas of occurrence of the fisheries and the fishes constituting them as

a synoptic picture in relation to their environment is essential for proper assessment of stocks and their optimum exploitation. The research worker has therefore to be where the fish and fisheries are distributed.

Viewed from the above background it was painfully realised though rather late, that on account of the remoteness of the place and absence of any fishery or fishing industry of an appreciable magnitude, Mandapam Camp is not quite suited for the purpose for which it was selected and could serve mainly as the administrative headquarters only, incidentally tackling problems of local importance and giving the required preliminary training for the personnel recruited. This rightly called for considerable decentralization of research activities.

Hence, the Institute has established regional centres, research centres and field centres in a phased manner and presently the Institute has two Regional centres at:

Mandapam Camp, Tamilnadu (established as Headquarters in 1949 and became Regional Centre in 1971)

Visakhapatnam, Andhra Pradesh (established as Unit in 1956, became Sub- Station/Research centre in 1968 and Regional centre in 2001)

10 Research Centres at:

Chennai, Tamilnadu (established as headquarters in 1947, became Centre in 1949, Substation/Research Centre in 1965)

Calicut, Kerala (established as Substation/Research Centre in 1947)

Karwar, Karnataka (established as Unit in 1948, became Sub-station/Research Centre in 1965)

Mumbai, Maharashtra (established as Survey Centre in1947, closed in 1950; reestablished as Unit in 1953 and Sub-station/Research Centre in 1957)

Tuticorin, Tamilnadu (established as Centre in 1948, became Unit in 1959, Substation/Research Centre in 1973)

Vizhinjam, Kerala (established as Survey Centre in 1951 became Unit in 1965, Substation/Research Centre in 1969)

Veraval, Gujarat (established as Field Centre in 1954, became Unit in 1962 and Research Centre in 1978; being upgraded as Regional Centre soon)

Kakinada, Andhra Pradesh (established as Unit in 1956, became Research Centre in 1977)

Mangalore, Karnataka (established as Unit in 1957, became Sub-station/Research Centre in 1969)

Minicoy, Lakshadweep (established as Unit in 1965, became Research Centre in 1978)

The above centres were formed to attend to the research work on stocks having restricted as well as extended distribution in the country's Exclusive Economic Zone and to render scientific advice to the Governments, industry and others interested. Besides, in the changing scenario of marine fisheries in the country, these regional and research centres serve the purpose of developing technologies suitable for different hydro-climatic regions and transferring them to the end users.

The institute has also established 28 field centres all along the coastline of the country, to attend to the needs of monitoring the landings of exploited stocks.

The research Units established at Kandla and Calcutta were closed in 1962 and merged with Veraval and Visakhapatnam centres respectively. The research Unit established at Port Blair,

Andamans was also closed.

RESEARCH PRIORITIES

The Beginning: In the beginning, the scientific work of the institute was implemented under three broad-based divisions: Fishery Biology, Marine Biology and Oceanography and Fishery Survey on a national and regional basis. When the Institute was established, the marine fisheries were still underdeveloped and knowledge on fisheries was also very poor. While dealing with the progress of research over a period of twenty years, Dr. Jones remarked

> "the Institute continued to grow inevitably at a slow pace, mainly for want of adequate suitable technical personnel. Such difficulties in the early stages of any organisation are only natural even under normal conditions and could all the more be so in regard to an Institute of this kind as no set up for fisheries research or education existed then in the country from which experienced personnel could be drawn. The scientists required to shoulder the responsibilities were recruited mainly from the Universities, Colleges and Provincial or State fisheries departments and it necessarily took some time for many of them to get themselves acquainted and oriented to handle the problems that had to be tackled"

At that time the focus was mainly:

> -on collecting landing statistics and making estimates of fish production.Untill about 1985, these estimates were furnished to the Government of India for formulating development measures.
>
> -to study the biology (food and feeding habits, maturation and spawning, growth and age) of various commercially important fish and shellfish. The focus, however, was on sardines, mackerel, Bombay-duck and penaeid prawns.
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> -on taxonomy of different species of phyto- and zooplankton, fish, crustaceans, molluscs, echinoderms, sponges and corals
>
> -on oceanography using the vessels provided by the Indo-Norwegian Project from 1957
>
> -on analysis of data of the trawlers of the Government of India, New India Fisheries company and vessels of the Indo-Norwegian project and, assessing the distribution pattern of different species.

Focus on Mariculture: By the beginning of the seventies, some knowledge was gained on the biological characteristics of exploited stocks but not much awareness was there, given the type of expertise mentioned above, to apply the knowledge gained towards assessment of exploited stocks and offer advice on the status of the exploited stocks and the fishing effort required to achieve the optimum yield. There was also no pressing need for stock assessment advice as majority of the stocks were still not fully exploited. The estimated annual marine fish landings crossed one million tonne mark in 1970 only. The Institute also did not attempt to develop HR in the area of stock assessment. By this time, the prawn already became a very important commodity in the export market fetching very high economic returns and trawling in the inshore waters became more intensive all along the coastline. The fishing was restricted to narrow coastal belt aiming on shrimp and the total landings were not increasing at desired rates leading to a *belief* that production from capture reached the maximum levels and increased production could only be achieved through mariculture for which technologies were not available. Naturally the focus of the institute shifted towards mariculture and the same was initiated during 1971. The breakthrough in the production of cultured pearls was achieved during 1973.

In the latter one decade (1975-85), the mariculture research was given the highest boost. It was the period of availability of plenty of funds for research. The Government's policy of increasing fish production for increasing exports gave

immense support for this thrust and the Institute focused its attention on mariculture of the penaeid prawns, bivalve molluscs, seaweeds and finfish such as mullets and pearl spot and considerable progress was made in the areas of breeding, hatchery seed production and growout culture. The shift in priorities to mariculture research has indeed paid rich dividends in that a substantial expertise was developed and notable contributions in mariculture (Prawn culture and hatchery production of seed of prawns, pearl culture, edible oyster culture, clam culture, hatchery production of seed of bivalves) were made and some transfer of technologies was also done. This has also led to development of Human Resources in Mariculture. However, finfish mariculture did not receive the required thrust apparently because there was virtually no demand for finfish in the export market then.

Research Vessels: Towards the early eighties, the Institute procured, for the first time, nine vessels of 13.1 m OAL for conducting vessel-based research in the inshore waters. In 1982, a large vessel R.V. Skipjack (32.6 m) was procured to cover wider, relatively deeper areas in the EEZ. These vessels did their best in generating onboard data. In early 1985, the Department of Ocean Development, Government of India procured the FORV *Sagar Sampada* (71.5 m) and placed at the disposal of the Institute. The programmes of this vessel were organised for about a decade and voluminous and valuable data on fishery resources and the fishery environment in the EEZ were generated and productive grounds identified. On the basis of the data generated by this vessel, two workshops on the "Scientific Results of FORV *Sagar Sampada*" were conducted by the Institute in collaboration with sister organisations and the results discussed.

Reorganisation: In the context of the increasing need to address the various issues with specialized attention, the scope has been widened to implement the research programmes of the Institute under eight need-based (and approved) Divisions: Fishery Resources Assessment, Pelagic Fisheries, Demersal Fisheries, Crustacean Fisheries, Molluscan Fisheries, Fishery Environment Management, Socioeconomic Evaluation and Technology Transfer and Physiology, Nutrition and Pathology.

Focus on capture fisheries: By the late seventies, puse-seiners started heavy exploitation of fish particularly along the southwest coast, the trawl fishing operations extended to relatively deeper waters along the entire coast and night trawling was initiated and, the total landings started increasing. By mid eighties, the landings started showing the indications of leveling off at least in some cases and there was evidence of overexploitation of certain stocks such as cat fish along the southwest coast and near optimal exploitation of penaeid prawns along different parts of the coast. The annual estimated marine fish landings ranged from 1.2 to 1.6 million tonnes during 1971-1984. This has brought the realisation that capture fisheries research should be further strengthened to be able to effectively fulfill the mandate of rendering advice on biological and economic sustainability of the resources and to offer support to the Government for formulating strategies for effective development and management.

Fortunately, by around 1981, the Institute started a training (in-house) programme of eight week duration in Fisheries Statistics and Fish Population Dynamics to those engaged in capture fisheries research though the major focus continued to be on mariculture. Fortunately again, in 1983, the FAO/DANIDA Project on Training in Fish Stock Assessment organised training to Indian Scientists at CMFRI, Cochin in which many scientists from the Institute participated. These programmes have immensely improved the confidence of the scientists and they started vigorously pursuing research in fish stock assessment. This was followed by yet another training in 1987 by the FAO/DANIDA project in India in CMFRI (follow-up training). Thus capture fisheries research received due attention by the late eighties.

There was a silver lining in capture fisher-

ies research by 1989: a concerted effort was ordered towards consolidating the knowledge on exploited stocks. The teams of scientists involved in this work spent nearly an year in processing their data and brought out scientific reports on stock assessment of major exploited stocks in three issues of the *Indian Journal of Fisheries* which are regarded as the most comprehensive contributions in marine fish stock assessment in India.

Towards the late eighties, the state governments along the west coast (particularly Kerala) announced closure of trawling during monsoon which is the active upwelling period, on the basis of reports of expert committees. The CMFRI, in this case also, made another concerted effort to examine the data generated along the west coast over a period of time and see whether the closure during monsoon was indeed necessary along the west coast. The efforts in this direction led to an excellent scientific document: "Monsoon Fisheries of the west coast of India, Problems, prospects and management".

In early 1987, the Institute conducted a survey of the fisheries resources of the Lakshadweep and the data collected led to useful results for the development of fisheries in the Lakshadweep. Indeed, this study led to taking up a new project on survey and assessment of ornamental fishes of Lakshadweep sponsored by the Government of India, Ministry of Agriculture. This project dealt with the important species available, their stock sizes, the maximum possible yields and the management measures to sustain the yields.

During the decade 1990-2000, the Institute made considerable improvements to the mariculture technologies developed earlier and location testing experiments conducted. Technology transfer and infrastructure development for mariculture received a boost during the later half of this decade. Economics of fishing and mariculture operations have been given the required thrust during this period.

Thus the CMFRI largely fulfilled its responsibilities of addressing the research needs of marine fisheries and mariculture over a period of half a century

EDUCATION

For the first time in the ICAR Fisheries Research Institutes, a Postgraduate programme in Mariculture was initiated in CMFRI during 1980 as UNDP/FAO/ICAR sub-project, the Centre of Advanced Studies in Mariculture with the objectives of producing highly specialized and competent professionals required to plan, execute and coordinate mariculture education, research and development in the country, developing and executing research programmes of strategic importance in mariculture to resolve the constraints in realizing maximum production from culture systems, developing close collaboration between CMFRI and other institutions/Universities to foster interdisciplinary approach to mariculture research and education, organising short-term specialized courses/ workshops/seminars on an all India basis to enhance the professional competence of teachers and researchers working in various institutions/Universities in the country and creating adequate facilities for establishing a centre of excellence in mariculture. In collaboration with the Cochin University of Science and Technology the institute offered M.Sc. and Ph.D. programmes in Mariculture during 1980-1993. Consequent on the recognition accorded to the Central Institute of Fisheries Education Mumbai as Deemed University, these programmes were brought under the purview of CIFE from the academic year 1993-94. Under this programme so far 166 candidates received M.Sc/M.F.Sc degrees and 80 candidates the Ph.D. degree. This is indeed a great achievement for an organisation that has no background of teaching prior to starting this programme and considering the time that has gone into this.

While this education programme has been very successful in developing the HR in the specialized area of Mariculture, it has been recognised very late that the HRD in marine fisheries resources assessment and management would have been initiated simultaneously if not earlier,

as there is a dearth of qualified R&D personnel in this area. It has also been recognised that the available expertise in this area and certain other important areas like Taxonomy and Biodiversity is fast dwindling by retirements and if immediate steps are not taken to develop expertise in these areas, the country cannot address the research and conservation needs of marine fisheries effectively in future. Under the circumstances, the institute proposes to play greater role in HRD in these areas in the coming years by initiating suitable courses at Masters and Doctoral levels.

fisheries. The library at headquarters subscribes to 86 foreign and 40 Indian periodicals besides receiving 190 periodicals on exchange/ complimentary basis. The total number of books in the library are over 8200 as of now. This is in addition to those available at the various centres which maintain sectoral libraries for their immediate use and obtain the required publications from the main library at Headquarters.

THE PEOPLE RESPONSIBLE FOR THE GROWTH OF CMFRI

Dr. H. Srinivasa Rao,	Chief Research Officer	1947 - 1950
Dr.N.K.Panikkar	Chief Research Officer	1950 - 1957
Dr. S. Jones	Chief Research Officer	1957 - 1961
Dr. S. Jones	Director	1961 - 1970
Dr. S.Z. Qasim	Director	1971 - 1974
Dr. E. G. Silas	Director	1975 - 1985
Dr. P.S.B.R.James	Director	1985 - 1994
Dr. M. Devaraj	Director	1995 - 1999
Dr. V. N. Pillai	Director	1999 - 2000
Dr. Mohan Joseph Modayil	Director	2000 - continuing

INFRASTRUCTURE

The headquarters, Regional centres at Mandapam Camp and Visakhapatnam and research centres at Minicoy, Calicut, Karwar and Veraval are housed in own office and laboratory buildings. Residential accommodation is available at Cochin, Mandapam Camp, Visakhapatnam and Minicoy and there are plans to develop these facilities at other centres during the X Plan.

All essential facilities (research vessels, holding and hatchery facilities, computers, different types of microscopes, equipments for conducting biochemistry, nutrition, pathology and an electron microscope) are created at headquarters and regional / research centres for carrying out the research programmes in capture and culture

TRAINING

In 1976 the *Krishi Vigyan Kendra* was established at the Institute to Impart vocational training, to organise frontline demonstration and to arrange In-service training to field level extension workers, fishermen, farmers, women etc in different areas in fisheries agriculture, animal sciences and home science. A total of 1038 programmes were conducted for 22400 beneficiaries so far.

In 1983 the Trainer's Training Centre was established for imparting training to in-service personnel, extension personnel, teachers of colleges and universities and staff of government organisations. The total number of training programmes conducted by the TTC during 1995-

2001 is about 135.

AD HOC PROJECTS AND CONSULTANCY

The institute has developed working linkages with several organisations in the country and abroad to effectively implement the research programmes through *ad hoc* projects. In recent years the institute started offering consultancy services in different areas of marine fisheries, mariculture, marine fishery environment, pollution and other related areas. So far 45 *ad hoc* projects funded by external organizations have been successfully carried out . Presently there are 15 projects in operation and several are in the pipe line. The value of the consultancy projects implemented so far has crossed Rs 1.9 crores.

PUBLICATIONS

The institute has been bringing out its own publications (Marine Fisheries Information Service, Bulletins, Special Publications, News letters), and *Indian Journal of Fisheries.* Besides, the CMFRI is supporting the Marine Biological Association of India which publishes the *Journal of Marine Biological Association of India*. The scientists of the Institute have published over 5000 papers in various national and international journals so far.

THE FUTURE

With the growth over half a century, the Institute has contributed significantly in different areas of marine fisheries, mariculture, HRD and policy support to the Governments.

The country's marine fish requirement by the year 2020 is estimated to be around 5 million tonnes. The resources are exploited fully in the current fishing grounds suggesting that any substantial increase in the yield from these grounds is unlikely. More over the maximum yield that is expected from the EEZ is only 3.9 million tonnes and it is rather possible to achieve an annual yield of 3.5 million tonnes if the oceanic resources are also tapped. Hence the priorities should be towards scientific advice on sustaining the current yields to be able to protect the industry, addressing the research needs of biodiversity conservation, contributing towards HRD of marine fisheries and mariculture R & D personnel and further strengthening of mariculture research and transfer of technologies. In this context, the institute is looking forward to:

- **Intensifying** research in marine capture fisheries, multispecies stock assessment, assessment of regional stocks, influence of the ocean environment on the availability and abundance of fish stocks and to render advice on sustaining fish yields over the long term. (This situation affords challenging opportunities to the country, as a large number of species of finfish and shellfish are currently exploited and a large number of new or non-conventional species will be caught when exploitation is extended to the entire EEZ of the country).

- **Assessing** the oceanic fisheries resources such as the tunas, squids and sharks and evaluating the commercial viability for investment in the oceanic sector.

- **Conducting** HRD programme leading to M.F.Sc. and Ph.D. in marine fisheries resources assessment and management, marine biodiversity and biotechnology to meet the requirement of R&D personnel in these important areas

- **Examining** the feasibility of utilizing vast areas of lagoons, bays and coastal areas which exhibit differences in their characteristics between different regions and which are suitable for the mariculture of different candidate species

- **Conducting** research for incorporating a large number of additional candidate species of finfish, shellfish, seaweed and marine invertebrates of pharmaceutical value into coastal mariculture and seafarming R&D.

- **Developing** appropriate technology for Producing pearls by large scale environment friendly culture of pearl oyster in onshore

captive systems and in the open sea and, black pearls through culture of blacklip pearl oyster in the Andamans

- **Carrying** out research in breeding and hatchery production of finfish seed and developing economic and ecofriendly technologies suitable for adoption by the end users.

- **Improving** the wild stocks that are under heavy pressure of exploitation by improved methods of seed production and sea ranching

- **Developing** disease-resistant strains of the presently cultivated species and for studying the pathological characteristics of the cultivated species in the context of disease threats in culture systems

- **Establishing** a research centre in Orissa to address the research needs of the northeast coast and an additional field centre in Gujarat and one field centre each in Andamans and Lakshadweep to effectively implement the programme of monitoring the exploited stocks.

-**Carrying** out research through biotechnological approaches in the areas of nutrition, physiology, pathology, genetics and tissue culture which offer immense potential for increasing the production of the cultivated stocks.

-**Developing** a strong database on aquaculture engineering in the design and construction of onshore farms and sea farms and carrying out research leading to establishment of commercial off shore farming facilities.

-**Providing** assistance through consultancies to industry, entrepreneurs, government and non government organizations on various issues and aspects related to the living marine resources of the Indian seas, marine capture fisheries and mariculture

-**Advising** the governmental agencies and organizations on various issues related to marine fisheries management, monitoring, regulations, development, mariculture, coastal resource sustainability and utilization, biodiversity research and conservation, environmental impacts and management, mariculture policies and regulations, export of live marine organisms, and other policy issues related to the EEZ.

-**Establishing** the division of Marine Biodiversity and addressing the research needs of marine biodiversity conservation and sustainable and equitable utilization. The proposal has already been approved during the ninth Plan.

-**Establishing** a division of Mariculture to accord the required focus to the subject