

# MARINE FISHERIES RESEARCH AND ITS CONTRIBUTION TO THE FISHING INDUSTRY OF INDIA

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Establishment of an industry and its sustained development and growth depend largely on the fund of basic information available on contemporary conditions and future prospect of the concerned field. Type of information required by a particular industry depends on its objectives and activities. For the fishing industry dealing with capture and trade of fish with, an object of profit-making, the information required chiefly relates to the availability of fish, fishing grounds, means of capture, cost of operation, price and demand structure and the profit which can be

realised through production and marketing. Thus one of the important basic information needed by the fishing industry is on the fishery resource and its characteristics.

Fishery resource, being a self generating resource, living in dynamic environment, is highly influenced by the species constituting the resource and the characteristics of their biology, recruitment, migrations, mortality; the distribution pattern and abundance in time and space, behaviour of the population to environmental conditions,

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and fishing pressure. For efficient exploitation and rational management of the resource all these features are to be fully elucidated. It is in this context that continued research on different aspects of the resource and its environment becomes imperative. Information on distribution and abundance of the resource helps the industry to save time in searching for fish and catching them; on the biology, growth, mortality, recruitment etc. of the constituent species would help to understand the fishable stock, on the basis of which knowledge, the industry could take decisions regarding investments or extension of the operations. Research on the characteristics of the resource would provide the industry the required information on what quantity and how much can be expected from a particular area at a given time. The research survey would help to locate new resources and their grounds.

Realising the importance of research for the coherent development of the marine fishing industry, investigations on various aspects of marine fishery resources of the country were undertaken particularly with the establishment of Central Marine Fisheries Research Institute. Since then valuable data have been collected.

Reliable statistical data on marine fisheries so essential for the proper exploitation and management of the resources, are being collected and supplied to the industry. Detailed studies on major fisheries resources of the country are being undertaken; infor-

mation on the distribution pattern, abundance, bionomics, life history, age and growth, maturation and spawning of the commercially important fishes, crustaceans and shell fishes are being collected. A survey of the spawners and distribution and abundance of the larvae of mackerel, oil sardine and penaeid prawns, have indicated their spawning grounds. Studies carried out on the resources of oil sardine, and mackerel have indicated that the standing stock of the former in the range of its fishing ground is of the order of 400,000 tonnes and that of the latter 283,000 tonnes. The scope for further increase of their catches in the inshore fishing grounds by the indigenous gears is found to be only marginal, but their resource in the offshore grounds can be exploited by suitable fishing operations using, the purse-seine and pelagic trawl. This information has led to the introduction of small vessel purse-seiners, particularly along the coast of Goa, Karnataka, and Kerala by the Industry.

The discovery of rich prawn grounds rather close to the shore in the early fifties helped the industry to enter in a big way in prawn fishing. This discovery gave a fillip to the introduction of a large number of mechanised boats for trawling, and establishment of processing facilities. As a result of these, a valuable prawn fishery and an export trade for prawns earning considerable foreign exchange got established in the country. However, unrestricted introduction of large number of mechanised fishing boats for prawn fishing in certain centres along the coast and the consequent increase of effort resulted in the

decreasing catch return and created an apprehension in the industry whether the prawn stock is being overfished. The investigations carried out on this aspect, have indicated that while the biological characteristics such as high fecundity, protracted breeding, faster rate of growth and short life span of the species supporting the fishery help to maintain the stock, the catches of these prawns along the southwest coast are not likely to increase by further stepping up of the fishing effort. However, there are possibilities of increased exploitation of prawns only in the northwest and northeast coasts. The prawn fishing industry is developing rapidly in the east coast.

Studies carried out on the Bombay duck fishery of the Maharashtra and Gujarat coasts in the early seventies indicated a declining trend. The demersal fishery resources in the grounds upto 50 metre depth have been charted out and mapped. The species composition, their distribution and abundance have been studied. The results of these investigations have considerably helped the industry to exploit these resources.

One of the most significant contributions of research to the industry in recent years, in the field of capture fishery, is the discovery of new fishery resource comprising of prawns, deep sea lobsters and fishes in the continental shelf edge and upper continental slope along the southwest and southeast coasts. This information will be immensely useful to developing the deep sea fishing in the country. Besides this, researches

have also indicated the availability of potential resources and possibilities of commercial exploitation of anchovies, horse mackerel, and thread fin breams in the inshore and mid shelf areas, 'Kalava' in the offshore grounds, tunas, squids, cuttle fish and crabs in the offshore and oceanic waters.

In the context of dwindling catch from the marine region and the need for augmenting fish production to meet the increasing demand, greater emphasis has been given in recent years on culture fisheries. In this field too, research has made considerable progress and has indicated the possibilities of culturing a variety of marine organisms such as fishes, prawns, mussels, oysters, and seaweeds in the coastal waters. With the culture of milk fish, *Chanos chanos*, a production rate of 450-800 kg/ha/year has been obtained. The commercial penaeid prawns (*Penaeus indicus*) *P. monodon*, *P. merguensis*, *Metapenaeus dobsoni*, *M. affinis*, *M. monoceros*, *Parapenaeopsis styliifera* and palaemonid prawns (*Machrobrachium rosenbergi*, *M. malcolmsonii* and *M. idella*) have been spawned under controlled conditions, and the techniques of their culture from egg to marketable size have been developed. This technique can easily be taken up by the industry for large scale culture of prawns in the vast stretches of brackish water regions and coastal waters, with a production rate of over 1000 kg/ha/year. Similarly, techniques of culture of mussel on ropes have been developed and perfected. A production rate of 235 tonnes of mussel with shell per ha. for a season of 5 months has

been obtained in the culture experiments. Preliminary experiments on the culture of edible oysters have indicated the feasibility of their large scale culture in the inshore waters on rafts.

An outstanding contribution of research in the field of culture fisheries, has been the successful development of an indigenous technology of production of cultured pearls. This has opened up an opportunity for the establishment of a pearl culture industry in the country.

Studies carried out on the biology and chemistry of seaweeds and development of methods of extraction of agar and algin from seaweeds have helped the country in establishing a seaweed industry. Recently the techniques of culture of seaweeds have also been developed, the adoption of which would go a long way in meeting the requirements of the quality raw material by the industry.

In order to propagate the technologies developed on the culture of the above organisms among the entrepreneurs, training of personnel at various levels has been taken up. These training courses are need-based. Besides, Pilot projects to demonstrate the economic viability of prawn, mussel and pearl culture are being taken up. Operational research projects for testing, adapting and demonstrating the

technology to the rural fishermen, the industry and financial institutes are also formulated.

The above findings form only a part of the results of investigations carried out or progressing on marine fisheries research which either help or aim at promoting the fishing industry of the country. Voluminous data which are essential for real-time decision and planning of strategies for marine fisheries development are being collected. As wide fluctuations is a characteristic feature of the fishery resource, the need of research is greatly felt when the fishery is lean or the industry passes through a crisis. However, the real contribution of research is not only to explain the causes of these fluctuations and to provide information essential for organisation, development, planning and guiding of the industry, but also to act as "a quality control which keeps a watch on the processing behaviour and warns the industry when the processing is out of control". Towards this direction, "the fishery research must be living and growing its vitality, preserved through constant renewal by reconfirmation of its facts, fed by a constant flow of new data; it must grow and develop transforming its description and models in step with the changes taking place in the natural and industrial system with which it is concerned".