Technological Research in Indian Fisheries

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INDIA, with its coastline of about 4500 km. has an abundant marine fish resource. But until independence, fisheries development in the country did not receive the attention it rightly deserved. Marine fishing was almost exclusively confined to near shore waters and the rich offshore and deep-sea areas remained unexplored and unexploited. Further, except for traditional methods of sun drying and curing, other fish preservation and processing methods were hardly practised. With little or no facility for transport to interior markets, marine fish catches mainly moved within the coastal belt.

Although fishery development programmes gained an impetus with the dawn of independence, the activities in the initial years were confined to socio-economic aspects like formation of co-operatives, granting of loans and subsidies to fishermen etc. It was soon apparent that for any substantial increase in the production of fish the craft and gear had to be made suitable for efficient exploitation of the fishing grounds away from shore and introduce improved methods of handling, preservation and transport. This new approach called for reorientation of fishery development programmes as a whole aided by technological investigations in the fields of fishing and fish processing. The establishment of Central Institute of Fisheries Technology in 1957, thus fulfilled one of the basic needs of the Industry in the wake of its development on modern lines.

That the progress made by the fishery industry during the last two decades is outstanding, needs no special mention. During this period the industry proved its important role in augmenting food supply to the country and adding to the nation's economy by earning the much needed foreign exchange. Mechanisation of fishing crafts, introduction of mechanised boats of new designs, use of improved gear materials and gear designs, adoption of modern fishing technique, all contributed towards development of the industry on scientific lines and thus to effect increased catch. Equally spectacular is the development in the fish processing industry. In the early stages there were only half a

dozen fish processing factories. Now there are more than 150 canning and freezing factories distributed in almost all the maritime States in the country. Besides intensifying exports to the known markets abroad, a number of new markets were established for the Indian fishery products. Results of technological investigations had their remarkable influence on these striking developments that took place in the fishing industry.

Fishing boats

One of the urgent needs of the fishing industry was availability of suitable mechanised boats for operation in the off-shore and deep-waters. With the evolution of twelve standard designs of boats in the size range between 7.6 m. to 15.35 m. within a comparatively short period, this requirement was generally met. Introduction of these mechanised boats resulted in the expansion of fishing areas and more economic exploitation of the fish wealth. Dependence on weather for fishing operations declined and increase in the number of fishing days also resulted in more fish catch.

Now the country is on the threshold of introducing larger vessels for distant water and long distance fishing with diversified methods.

Boat Materials

A serious problem encountered in the mechanisation programme is the abnormally high cost of the different materials that are needed for the construction of the boats. The problem was given due attention and the results of investigations made it possible to effect a reduction in the overall cost, by use of cheap but effective substitutes for the different structural parts. Prototypes constructed and in operation for the past several years bear testimony to the satisfactory performance of such boats. Besides, new materials like FRP, ferro-cement, indigenous resins etc. are being increasingly used for construction and preservation purposes. Efficient measures recommended, enable protection from marine fouling, marine boring and marine corrosion and thereby enhance the life of the boats.

Fishing gear

Side by side with the designing of suitable types of boats, efforts were made for development of more efficient fishing gear and introduction of modern fishing techniques for the economic exploitation of the different species of fish. Trawling, a new method of fishing in the country, was established for the commercial exoloitation of the prawn resources in different centres. Many new trawling grounds are now under systematic exploitation. Besides trawl gear, designs of gill nets, purse seines, long lines, set nets and traps prepared for specific fisheries are slowly replacing traditional gear in vogue. The technique of trwaling popularised in different centres deserves special mention. Being a cheap method for Seer, Tunny, Barracuda etc. it is especially profitable as an alternate method for small and medium shrimp trawlers particularly during lean periods for trawling.

Gear materials

Cotton, hemp, coir, sisal and manila are the traditionally used materials for fabrication of fishing gear. Twines of nylon of proven advantage and popular elsewhere, were introduced for fishing in this country. Initially the requirements were met by imports. Later, indigenous production of nylon twines started and this called for the evaluation of quality characteristics and formulation of specifications of twines for different types of nets. Other synthetics like polyester, polyethylene

and polypropylene were also introduced into fishing. Although the preference is towards synthetics exclusive use of them cannot be expected at least in the near future for various reasons like low production and comparative high cost. Realizing this, specifications have also been worked out for cotton, hemp, sisal and coir for the benefit of twine manufacturers and users. Efficient methods recommended for preservation of twines of vegetable origin are of help to the users in prolonging the life of the gear and increasing their efficiency.

Marine engines and accessories

Indigenous production of marine engines started only recently. Testing of these engines for assessing their performance, comments on their quality and measures for improvement, wherever necessary, enabled the concerned engine manufacturers to improve upon the quality of the engines. Besides, the engine installation drawings prepared for the different engines helped the boat builders in the proper installation of the engines and ensured better performance of these prime movers.

With the introduction of mechanised boats the indigenous availability of different fishing accessories became an urgent necessity. Fishing accessories like winches, gurdies, line haulers, gallows, power take-off clutch etc. designed and recommended made it possible to manufacture these items within the country and at present all these equipments necessary for small and medium sized vessels are manufactured indigenously. Manufacture of electronic fishing aids within the country is also on the threshold of introduction.

Fish preservation and processing

Utilization of catch is equally important as catching. Handling, transport, preservation and storage posed a number of problems. Development of new and improved methods for economic utilization of the fish catch by distribution within the country and expansion of internal and external trade of fishery products became an absolute necessity.

Information regarding the pattern of spoilage of the important commercial fishes during normal temperature and during storage, the storage and shelf life of individual species is now available and is of great practical importance in the utilisation of fish catch. Details of optimum conditions of icing are available. These can improve the quality of fish transported to different markets or received in the processing factories.

Remarkable improvement has been achieved in the quality of processed products exported as a result of the recommendations made at the different levels of production. Efficient cleaning schedules for the primary fish processing centres as well as processing factories had their impact on the maintenance of strict hygiene in these premises and also in keeping fish boxes, carrier waggons, etc. free from foul smell. Cheap but efficient containers are now used for fresh or iced fish transport.

Conditions standardised for freezing and storage provide the processors with necessary technical know-how in the production of quality products. Improved methods recommended especially for frozen prawns, lobsters and frog legs have helped the exporters in the trade. The problem of weight loss due to 'drip', dessication and changes in texture have been successfully overcome. Of particular importance is the treatment developed and recommended for prevention of thaw-drip-loss in frozen prawns.

Standard conditions worked out for commercially important fish and shell fish enable

the processors to produce quality products. Many of the technical problems like blackening, maintenance of correct acidity and drained weight, bacterial spoilage and softening of canned meat were successfully solved.

Improved methods are now available for curing different fish and packing and storage of the dried products. Several types of artificial dryers have been designed and these can now be fabricated with indigenously available parts. A cleaner developed, can remove sand from beach dried fish and thereby improve the quality of the product.

Methods have been developed for preparation of several speciality products like fish flake, fish paste, fish soup powder etc. from cheap varieties of fish and these products are now available in the market.

It is now possible to extract sardine oil of excellent quality. Methods worked out for preparation of a variety of products like mineral rubber, printing ink, paints and lubricating oil from good quality sardine oil, can open new avenues for the economic utilisation of this raw material.

The process of microbial fermentation could be successfully employed for production of ensilage from trash fish and fish wastes for utilisation as cattle and poultry feed. Similarly, bacteriological peptone prepared from cheap fish is comparable in quality to any of the imported samples. Methods have also been worked out for preparation of chitosan from prawn shell waste. The last mentioned product is of immense value for textiles.

Shark skin could be converted into good quality leather. A process developed makes it possible to extract shark fin rays and make available a cleaner product for export. ●●