Technology Transfer in Fishing Technology

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As a result of researches conducted by the Central Institute of Fisheries Technology, Cochin since its inception in 1957, several technologies have been evolved in the field of fishing craft and gear technology. In order to increase the fish productivity per unit effort, the extension organisations in the various states and union territories have a major role and these organisations exert control over vast manpower resources and budgetary allocations. Due to the existence of wide choices among the artisanal fishermen for the adoption of various indigenous and improved fishing technologies, planned schemes are required to bring about desirable changes in the technology adoption so as to improve the productivity and standard of living of fisherfolk. Further, mere allocation of funds in the plans or implementation of selected projects without appropriate extension orientation will ensure the successful technology transfer to the clientele system.

Technology Trasnsfer System

i) The conceptual and practical understanding of technology transfer has undergone several changes in the recent years. Technology transfer starts after the development of technology in the research organisation and ends in its utilisation by the target clients. Generally, four sets of activities are involved in the task of technology transfer and each set of activities is performed basically by a system which is interlinked with others. The four systems are as follows:

ii) Research system to evolve appropriate technologies

iii) Extension system to transfer the technology from research stations to the end users.

iv) Technology utilisation system which adopts the technology and takes benefit from it.

v) Support system to provide the inputs such as fishing craft and gear materials, finance etc and facilitates the marketing of products.

Technology transfer systems are thus interlinked and this is an important area in which the extension personnel engaged in technology transfer work should have adequate orientation and skills. Further, in technology transfer management, three aspects are important in the early phase. The first is the knowledge of various technologies or package of technologies suited to the various target groups. Secondly, the orientation of extension personnel on the technology transfer concepts, modes and philosophies of technology transfer. Thirdly, the skills and the knowledge possessed by the extension personnel should be used by them in managing the various problems of technology transfer

Technology Transfer in CIFT

The Institute has developed several technologies over the years to improve the fishing craft, gear and other accessories so as to facilitate the sustained exploitation of the vast marine and inland fish resources in the country. The important technologies developed by the institute in the area of fishing technology are as follows:

1. Fishing Craft Designs, Materials and Maintenance

Designs of more than twelve wooden fishing vessels on the size range of 7.67-15.24 m. suitable for operation on the inshore areas, steel fishing boats for off-shore fishing, and FRP pole and line fishing vessels were developed, apart from the designs prepared against several requests by different State Fisheries Departments. It is estimated that of the 23,000 mechanised wooden boats now constituting the Indian fishing fleet, most of them have been built according to the popular CIFT boat designs and also based on the modifications of the basic CIFT designs.

With the rapid progress in mechanisation of craft, the need arose to find out cheaper construction materials to bring down the overall cost of the wooden boats. Investigations carried out resulted in recommending Venteak, a cheaper wood, in place of the costly teak and aini. Secondary species of timbers like Mango and Haldu, after suitable treatment were also found to be suitable as boat construction materials. With the advent of Fiberglass Reinforced Plastic (FRP) boats and marine plywood boats, they were also recommended as suitable substitutes for the wooden crafts.

In order to protect the hulls of wooden fishing vessels against deterioration under marine conditions, Aluminium - Magnesium alloy has been recommended in the place of costly and imported copper sheathing materials. Costwise there is a saving to the order of 1:6 when aluminium sheathing is substituted for copper sheathing. Fouling on the metallic surface of the fishing vessels could be eliminated through the use of an antifouling paint with cuprous oxide and modified indigenous resins developed at CIFT.

Studies on corrosion resistance have resulted in recommending ternary aluminium alloy anodes in place of conventional zinc anodes for use on the hulls of fishing boats. A protective coating based on epoxy resin has been developed for application on cast iron propellers in fishing boats. This technology enhances the service life of cast iron propellers by controlling graphitization which shortens the life span of these propellers.

Traditional fishing crafts deteriorate rapidly due to weathering and marine organisms which destroy wood. Fishermen are using preservatives like cashew nut shell liquid, fish oils etc and they have very little toxic properties. CIFT has developed chemical wood preservatives such as arsenic creosote, copper creosote and creoscor. The preservative treatment consists of giving two coats of copper creosote or arsenic creosote on all parts of the craft and then, the hull portion is coated with creoscor which not only protects the craft but also provides a smooth surface. This new preservative treatment costs only 40% of that for traditional treatment.

2. Development of fishing gear and methods

i) Materials:

For the fabrication of suitable fishing nets, the selection of appropriate gear materials and the choice of specifications for effective fishing operations were found to be crucial. In this context, the characteristics of different gear materials such as polyethylene (twisted monofilament/braided monofilament), nylon multifilaments, nylon monofilaments and polypropylene (multifilament twisted) were studied at this Institute. The institute has worked out specifications for different types of gear materials for fabrication of different types of fishing gear. The standards of quality as worked out by the Institute were adopted by the Indian Standards Institution for issue of the national quality standards. Several findings were also made on the use of floats and other fishing gear accessories, and their quality specifications. A combination wire rope was developed recently as an import substitution for deep sea fishing operations.

ii) Designs of fishing gear:

CIFT has developed several improved gear designs for various types of fishing gear like trawls, gill nets, purse seines, lines and traps for exploitation of the fishery resources.

Over 60 designs of trawl nets have been developed for operation from different size groups of vessels. Designs of suitable otter boards for operation with these trawl nets have also been developed. As a result of these developments, trawling became a very popular fishing method in Indian waters contributing significantly to the seafood export industry. Recently 'V' form steel otter boards were introduced in Gujarat and Kerala coasts to replace the wooden otter boards. To facilitate the escape of juvenile shrimps, CIFT has recommended 25 mm square mesh cod ends for shrimp trawls.

Design of a mini purse seine for operation from country crafts was also developed and successful trials were conducted in the nearby fishing villages. As a result of this, in many parts of Kerala and South Kanara Coasts, the

modified versions of this net locally known as 'ring seines' have become very popular fishing gear among artisanal fishermen.

About 20-25% of the total marine landings is accounted by the gill net fishing in India, through the use of gill nets such as set nets, drift nets and encircling nets. CIFT has developed improved trammel nets and framed gill nets besides the development of various gill nets with different mesh sizes and net material specifications for fishes like seer, pomfret, prawns, mackerel, sardine, lobsters etc.

Improved designs of traps for lobster fishing have been developed by this Institute and successfully tried in Kanyakumari district. These traps could be adopted in other lobster fishing centres for exploitation of this fishery on commercial scale. The Institute also introduced trolling, a new technique of fishing for seer, barracuda and other predatory fishes. In the long line fishing for tuna and sharks, the traditional gear has undergone changes due to the advent of new hooks and artificial baits.

iii) Inland fishing

For the development of inland fisheries and for increasing the present level of production, efficient fishing gear and methods have been introduced. The gill nets of the set type are the principal gear in reservoirs and CIFT has developed improved gill nets such as framed nets and trammel nets for operations in reservoirs. The CIFT research centre at Burla, Orissa has introduced trawling in Hirakud reservoir for the first time in 1979. This is a quite effective method for fishing the bottom dwelling trash fishes. Besides these, improved designs of drag nets, traps and lines were also developed.

These technologies developed by the Institute have been transferred to the various clientele groups through appropriate technology transfer activities. By organising need based and short term training courses, and demonstration programmes, several innovations have been passed on to the fishing industry,

artisanal fishermen, fisherwomen, associated entrepreneurs, government departments and non-government organisations. Through the research centres of CIFT located at Veraval (Gujarat), Visakhapatnam (Andra Pradesh) and Burla (Orissa), several technologies were transferred based on the demands received from time to time. Besides these, the extension activities conducted include technical correspondence, personal discussion, supply of designs and publications, film shows, exhibitions and open houses.

Constraints in the Adoption of Technologies

According to the report of Govt. of India (1992) in India about 25% of 71.5 lakhs of fisheries population are actively engaged in fishing and these people are living in 2431 villages in the various coastal states and union territories. Besides these, there are lakhs of people engaged in activities related to fisheries. The fisheries extension work to solve many of the problems faced by fishermen comes under the mandates of various state fisheries departments. Research studies by Rogers and Shoemaker (1971), Balasubramaniam and Kaul (1985), and Braj Mohan et al (1996) revealed the nature of problems in the adoption of innovations. Of these, some of the important constraints which influence the adoption of innovations are listed below:

I) Many of the technological practices need higher investment on account of costlier inputs viz., boat construction materials, gear materials, engines, wood preservatives, insulated ice boxes, fuel to engines and engine spares. When there is no substantial increase in income to the corresponding increase in expenditure, financial constraints are often reported as the reasons for the non-adoption of innovations.

II) Fishing is seasonal and during offseasons, the catch rate is very less. This forces them to use low capital intensive fishing techniques without risks and the annual productivity is often found to be low under such circumstances.

III) Non availability of adequate and timely inputs such as chemical preservatives, fishing nets, electronic equipments etc has also been reported as reasons for the non-adoption of innovations.

IV) Lack of adequate marine fisheries extension schemes so as to provide technological and financial assistance, lack of continuous monitoring, inadequate number of extension personnel and lack of sufficient feed back information also act as the constraints in the adoption of innovations

V) Non-functioning of multipurpose cooperative societies, inadequate marketing facilities and uncertainty in prices are found to be the reasons for poor motivation to adopt the improved practices in few maritime states.

VI) Unfavourable weather conditions, severe competition and lack of information often affect their fish catch and discourage them to spend on maintenance expenses and on risky innovations.

Suggestions on Technology Transfer Strategies

In view of the multivarious constraints faced by each technology transfer system, the following strategies are suggested:

i) Strengthening of marine fisheries extension wings of state fisheries departments and evolving organisational policies for extension activities with adequate number of trained personnel.

ii) Appropriate technological schemes and monitoring mechanisms by the various coastal states and union territories would ultimately improve the extent of adoption of selected innovations.

iii) Extension education could be used as means of programme implementation and it must be linked with the extension services offered.

iv) Support system activities such as adequate availability of inputs, marketing facilities to get better prices and credit requirements have to be provided and adequately coordinated with the various private agencies, cooperative societies , non-government organisations and development agencies through periodical linkages.

v) Periodical extension publications must be brought out and information support should be given to the clients for the diffusion and adoption of innovations.

vi) In view of the importance of interpersonal communication among technology users, mass media channels such as radio, films, publications and exhibitions have to be mixed with group oriented extension education programmes in the selected centres.

vii) Personnel management policies such as recruitment, job oriented inservice training, motivation, supervision, coordination and evaluation have to be periodically reviewed in the various extension organisations to achieve efficiency in technology transfer schemes

viii) Conducting adoptive field trials under various socio-economic and field conditions would help to assess the performance and economic viability of the technologies and this in turn would help to select the proven technologies for technology transfer schemes.

ix) A large number of extension field functionaries working under various state fisheries departments are to be trained in fishery technology subjects and periodically they have to be sponsored for training courses in Training Institutes like CIFT.

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