

Human Resource Development

Krishna Srinath

Central Institute of Fisheries Technology
Cochin 682 029

Human Resource Development (HRD) is the integrated use of training and development, career development, and organization development to improve individual effectiveness. HRD means facilitating the development and implementation of strategies for transforming organizations (Nadler, 1989). The term HRD provides a conceptual umbrella under which the field began to unify, using the three-fold notion of training, education, and development. HRD provides purpose and direction for the continued growth of the field: organized learning to provide the possibility of performance change. Human resource development (HRD) is a critical input for sustainable fisheries development. HRD activities in fisheries include formal and non formal and informal systems of education. There are secondary level and university level education, vocational training programmes, extension education and the education received by people informally in their day-to-day interactive learning.

Fisheries Education in India - Historical Perspective

Organised thrust for development of fisheries in India started with the 'Grow More Food' campaign during 1940s and the First training centre for inland Fisheries was started in 1945 at Barrackpore now in West Bengal. A few months later the training centre for marine Fisheries was started at Mandapam Camp in Tamil Nadu. The Marine Fisheries course at Mandapam, which was attached to Central Marine Fisheries Research Institute was later closed, as it could not attract candidates for training. The inland fisheries course was later attached to Central inland Fisheries Research

Institute (CIFRI). Barrackpore in 1947 and to Central Institute of Fisheries Education (CIFE), Mumbai in 1967. This certificate course has been highly popular in meeting the requirements of development and extension officers at block and district levels.

Fish and fisheries science did not figure as a subject in any of the Indian universities even in 1950s, although some universities in the country were offering fish and fisheries as a special paper in post-graduate programmes in zoology and allied disciplines. The Central and State Governments had to recruit general graduates and post-graduates of zoology discipline for manning the management positions in the fisheries sector. These recruits had only limited knowledge of the multi-disciplinary subject of fisheries.

Following the expansion of fisheries developmental activities in the country with increasing outlay in the successive five year plans, the Government of India constituted an ad-hoc Committee of 'Fisheries Education in 1959 for assessing the manpower requirements and suggesting measures for providing trained manpower at various levels to give further boost to fisheries development. The committee suggested the establishment of a post-graduate training institute to impart training to district level fisheries officers of state governments. As a result, the CIFE was established by an order of the Ministry of Agriculture, Govt. of India on 6 June 1961 at Mumbai to offer two year post-graduate Diploma Course in Fisheries Science for inservice officers of state fisheries departments. To meet the trained manpower needs of ocean going fishing vessels and fishing industry, the Committee recommended the establishment

of Central Institute of Fisheries Nautical and Engineering Training (CIFNET) at Cochin in 1963. During the same year Marine Products Processing Training Centre (MPPTC) was also established at Mangalore under Indo-Japanese collaboration for training processing technologists. The introduction of mechanised fishing in the coastal waters in the 1950s led to the establishment of Fishermen Training Centres in all the maritime states. In course of time, most of the State Governments established a series of inservice training centres for their technical personnel at different levels.

Inland Fisheries Training Centre, till then functioning under the CIFRI, Barrackpore, was attached to CIFE in 1967. The CIFE also took control of the erstwhile Fisheries Extension Centres of the Government of India and reorganised them as Centres for Inland Fisheries Operatives Training Centre and Fisheries Extension- Training Centre which were, however wound up in 1995. In 1971, the University of Bombay accorded recognition to CIFE as a study centre for M.Sc. and Ph.D programme by research in the fields of Applied Zoology and Biochemistry. Several other universities such as Calcutta and Bhopal also recognised CIFE as a study centre for Ph.D. programmes. The charter of CIFE was later enlarged to cover research and extension activities besides academic programmes, with the Institute coming under the administrative control of the Indian Council of Agricultural Research,, New Delhi. in 1979.

Master's degree programme in fisheries Management was started by CIFE in 1984 under affiliation to the University of Bombay. Later in recognition of the pioneering role played by CIFE in Fisheries Education the University Grants Commission conferred on it the Deemed University status in 1989.

The CIFE at its Headquarters at Mumbai presently conducts Masters programmes in the disciplines of Fisheries Resources Management, Inland

Aquaculture, Fish Genetics and Breeding, Fish Microbiology and Pathology and Fish Biochemistry and Nutrition and Doctoral Programmes. Master' programmes in Freshwater Aquaculture is offered at Central Institute of Freshwater Aquaculture, Bhubaneswar . The Master's and Doctoral programmes in Mariculture which was earlier conducted by the Central Marine Fisheries Research Institute under Cochin University of Science and Technology were also brought under CIFE in 1995. Master's and Doctoral programmes in Post Harvest Technology under CIFE are offered at the Central Institute of Fisheries Technology, Cochin.. The D.F.Sc. course, which helped in the development of skilled and trained manpower till recently, was discontinued by CIFE in 1998 subsequent to initiation of Masters degree programmes in several disciplines.

Fisheries education under the State Agricultural/ Veterinary University (SAU) system started only in 1969 with the establishment of the First Fisheries college at Mangalore under the University of Agricultural Sciences, Bangalore. Fisheries education in India is thus less than four decades old as compared to animal sciences and agriculture which are about a century old. At present 11 of the 30 SAUs and one Central Agricultural University offer Fisheries Education in the country (Table I). All these colleges offer four year degree programmes in Bachelor of Fisheries Science while Master of Fisheries Science is offered by six of them and Ph.D. by four of them. Maharana Pratap Agricultural University, Udaipur offers M.Sc in Fisheries Limnology University of Horticulture and Forestry, Solan, Himachal Pradesh offers Master's degree in Fish Processing Technology. There are also some regular universities offering M.Sc., M.Phil, and Ph.D. programmes in subjects like Industrial Fisheries, Marine Biology, Marine Sciences, Aquatic Biology and Fisheries. These universities are Cochin University of Science and Technology, University

of Kerala, Andhra University, Annamalai University, Karnataka University and Goa University. M. Tech. course in Aquaculture Engineering which is the first of its kind in Asia is offered at the Indian Institute of Technology, Kharagpur

Vocational courses

The objective of vocational courses in high school is to produce persons who are able to work in fisheries enterprises or take up self-employment. The courses are for practical industry-oriented skills development, and are terminal courses which do not prepare the student for college education. Students entering technical (post secondary) schools are graduates of general high schools with little or no technical background. The courses are designed to provide the student with necessary skills for technical work, i.e., routine or procedural tasks either in government or in private fisheries enterprises.

State governments have introduced vocational courses on fisheries at 10+2 level with the active assistance from National Council for Educational Research and Training (NCERT) in developing curricula, books and instruction material. Seven vocational courses viz.. Fisheries, Aquaculture, Fishing Craft and Gear, Fish Processing Technology, Inland Fisheries, Maintenance and Repair of Marine Engines and Marine Fisheries are conducted under this programme.

Summer Institutes and Winter Schools

Training programmes of short duration are also conducted by ICAR Fisheries Research Institutes and Fisheries Colleges under SAUs for the benefit of scientists and teachers under Summer/ Winter Schools and Centre for Advanced Studies. Need based short term training programmes are also organised for the benefit of Fishers, fish farmers, entrepreneurs and NGOs by the ICAR Fisheries Research Institutes and Fisheries Colleges as part of their extension programmes.

Quality control in HRD Programmes

Several measures have been taken by the Education Division of ICAR for bringing uniformity in curriculum of UG and PG courses in fisheries at the national level. Post graduate education followed in agricultural universities is similar to that followed in Land Grant Universities of U.S.A. i.e. a trimester/semester system with complete internal evaluation..

Strengthening of infrastructural facilities

Availability of adequate laboratory and field facilities is essential for imparting effective practical training. While some colleges are fairly well equipped with necessary facilities, many others do not have even the minimum basic facilities. ICAR's World Bank- funded National Agricultural Technology project (NATP) provides opportunity for strengthening laboratory facilities and infrastructure. The SAUs and Deemed Universities should take advantage of one time catch up grant for renovation and remodulating of laboratories. replacement of old equipment and modernisation, strengthening of library and networking.

Faculty improvement

An overview of higher education in fisheries indicates weak faculty both in quantity as well as quality along with a good percentage of sanctioned posts remaining vacant in several colleges. Non availability of qualified man power in specialised frontier areas of fisheries has also been a general handicap in many of the fisheries colleges.

The ICAR grants sabbatical leave in order to encourage movement of scientists/teachers among SAUs, ICAR institutes and other organisations to help in development of expertise, especially in less developed fisheries colleges/institutes.

The ICAR has also taken steps for improving the skills of existing faculty through refresher courses,

higher training within and outside the country under the World Bank- supported Agricultural Human Resources Development (AHRD) project of ICAR. Faculty members chosen from some selected SAUs and ICAR deemed universities have already undergone training in reputed institutions abroad, in frontier areas of agricultural sciences including fisheries.

Admission and evaluation system

ICAR conducts National Talent Search Examination to attract best students to UG courses in agriculture, including fisheries. In order to encourage diversification, ICAR has initiated steps to encourage students to move to different universities for their PG courses.

Instructional Material

Recognising the importance of standard instructional material, Education Division of ICAR has taken lead in identifying the subject areas and experts to prepare the text books for different courses. The ICAR has also accorded priority attention to equip libraries with multimedia and CD-ROM facilities.

Accreditation

There has been a growing concern with regard to quality management in agricultural education established on the pattern of the Land Grant Colleges of USA. Certain minimum standards with regard to admissions, courses, faculty, infrastructure etc. need to be maintained to make our educational institutions internationally competent. ICAR constituted an Accreditation Board in 1996 to formalise norms and standards for improving quality of higher agricultural education. The accreditation process aims at strengthening and sustaining the quality and integrity of education, and improving transferability and marketability of students nationally and internationally.

Identification of course needs

UG and PG courses: Fisheries sector needs generalists and specialists with the necessary skills to effectively participate in research, development, technology and technical management, teaching and extension. A generalist is the one who has acquired skills in all the three major sectors of the industry viz.: capture, culture and post-harvest technology. The four years B.F.Sc. courses, more or less as they exist now will be ideal for producing generalists. On the other hand a specialist is the one who has specialised skills and knowledge in any one of the sectors or even in sub-sectors of fisheries. Curricula of B.F.Sc. and PG courses should aim at providing sufficient exposure to ecology, gender and social equity in fisheries sector, fisheries management and employment generation. There should also be adequate provision for laboratory work, field visits, rural work experience and internship. In order to prepare the students to face global competitiveness, courses in WTO, TRIPS, patent laws and IT are also being formulated.

Distance education: Distance education system offers a unique opportunity for ushering in a knowledge based society breaking the time and space barriers. This makes distance education well suited for meeting the major challenges in fisheries education such as access cost, equity, quality and relevance. The distance education also offers immense scope for in-service education of teachers, trainers, researchers and extension workers. The potential of Information Technology(IT) needs to be harnessed in popularisation of distance education. Computer-aided community learning centres provide exciting possibilities for reaching fishers with suitable educational inputs. Efforts are on at CIFE to initiate certificate courses of distance education in areas such as freshwater aquaculture, brackishwater aquaculture and fish processing technology in collaboration with Indira Gandhi National Open University (IGNOU).

Training and extension

The technology transfer and extension education was given further thrust by the ICAR by opening Krishi Vigyan Kendras (Farm Science Centres) and Trainer's Training Centres (TTC). KVKs train fish farmers in need based technologies. In the fisheries sector, there are four KVKs, one each at CIFA, Bhubaneswar, Orissa for inland fish culture, CMFRI at Narakkal, Kerala for mariculture, CIFI, Kakdweep, West Bengal for brackishwater aquaculture and for general training one at Lakshadweep. TTCs function at CIFA Bhubaneswar and CMFRI, Cochin where the personnel from the state department of fisheries. NGOs and other agencies are trained for short duration of 3 to 6 months.

With a view to bringing in a holistic approach to the training and extension in fisheries by channelising training efforts, the Working Group on Fisheries for the Tenth Five Year Plan recommended that Total Aquaculture Technology (TACT) Centres may be established for demonstration and training preferably under the existing FFDA. Publication of extension material in different languages for various categories of operatives and end users is required for creating technology awareness and for transfer of technology. The Committee also recommended that the training and extension programmes should also focus on empowerment of fisherwomen.

Constraints in fisheries education

Lack of coordination and collaboration between different fisheries colleges and institutes, lack of emphasis on vocational training, dearth of good teachers and delay in implementation of new schemes are the major constraints experienced in the development of existing system of fisheries education

Salient features of primary, secondary and tertiary levels of fisheries education

Level of fisheries education	Target group	Objective
Primary level	Students in school	To equip the school students with the basics of fish and fisheries science so that the knowledge gained by them can be used either for skill development for employment or for pursuing further studies in fisheries
Secondary level	Under-graduates in colleges	To produce fisheries graduates by offering academic courses in fisheries so that they can subsequently be groomed into technically competent manpower to serve as operatives/managers in fisheries based firms/companies or alternatively go in for higher studies in fisheries.
Tertiary level	Graduates in universities	To produce post-graduates in fisheries by offering M.Sc. and Ph.D. programme in specific fisheries disciplines so that they can subsequently be developed into scientifically competent manpower supportive to research and development programmes of fisheries and allied sectors in the country

Fisheries training

The first attempt in fisheries training was made during the period of 'Grow more food campaign' in the country when Government of India started two All India Training Courses, one for inland fisheries in 1945 at Barrackpore in West Bengal and a few years later a training centre for mechanized fishing in coastal waters which led to the establishment of fishermen's training centres in all the maritime states of the country. In 1950, a training centre was established for marine fisheries at Mandapam to cater to 3 categories viz., 1) Central government institutions 2) State government institutions and 3) Non government institutions. Short-term training programs, mostly of in-service in nature, are being conducted by the development departments of various state governments, agricultural universities and research institutes. Karnataka, Kerala, Tamilnadu and Maharashtra have introduced a 2-year vocational course in fisheries at 10+2 level. The training courses offered by polytechnics and fishermen training centres are generally at secondary or higher secondary levels. In-service training programs and community level training programmes are tailored to meet the requirements of the target group.

Central Government Institutions

ICAR research institutes and agricultural universities have an inbuilt component of extension wings in their organizational structure which take care of organizing training programmes. Training is offered through refresher courses, short-term training programmes, workshops, symposia, seminars, summer institutes, open houses etc. Non formal and informal education is also imparted through media, exhibitions, field days etc.

CIFNET conducts training in fisheries operatives for medium and large size fishing vessels. IFP is engaged in conducting training in deck and engine apprentices, service mechanics, master fishermen,

fish boat designing, refrigeration, and processing. Fishery Survey of India imparts training for skippers and engineers. MPEDA's training programmes aim at quality management in seafood industry and development of aquaculture. Central Institute for Coastal Engineering train people in the engineering of coastal aquaculture. CFTRI is recognized by FAO for training in food technology including fish processing.

Amongst the national level institutions, Departments of Science and Technology (DST), Biotechnology (DBT) and Ocean Development (DOD) and international organizations including Network of Aquaculture Centres in Asia (NACA), Bay of Bengal Programme (BOBP), European Economic Community (EEC), Danish International Development Agency (DANIDA), International Development and Research Centre (IDRC) etc. impart training in various specialized fields.

Manpower Categories for Fisheries Education

Education and training are the important tools for human resource development. The HRD needs are different for different categories of manpower. Understanding the needs of various sections of people is a basic requirement for formulating the interventions through structured learning. The major categories of manpower include:

Professional Skilled Fishermen

Persons who gain their livelihood from fishing and who have received formal training in modern fishing technology and who have the necessary technical knowledge and skills.

Professional Skilled Fish Farmers

Persons who gain their livelihood from the culture of aquatic organisms and who have received formal training in modern aquatic farming

technology and possess technical knowledge and skills in hatchery and/or farm practices.

Professional Skilled Fish Processors

Persons who gain their livelihood from fish processing and handling and who have received formal education and training in modern post-harvest technology.

Extension Workers

Persons who have received appropriate training and have the technical knowledge that enables them to transfer research and development technology to the industry.

Research Scientists

Persons who have received appropriate tertiary education and training in one or more aspects of fisheries science that enable them to undertake research and/or development for the improvement of fisheries.

Technicians

Persons who have received the appropriate education and training and have the technical knowledge and/or skills to enable them to assist in research and development.

Instructors/Educators

Persons who have received appropriate tertiary education and training in one or more aspects of fisheries science that enable them to provide education and training to all categories of manpower in fisheries.

Administration Personnel

Persons who have received the appropriate (broad-based) education and training and who possess the broad technical knowledge to enable them to plan, develop and execute fisheries development plans.

Skilled Labour

Persons who provide assistance to fishermen, fish farmers and processors (categories a, b and c above) and who have received vocational training in the appropriate discipline.

Designing training programmes

The word ‘training’ covers multitude of experiences. In this diversity lie both the opportunities and problems in designing training. Usually what an individual or a group look for in a training activity is a demonstrable change in behaviour.

Differentiating characteristics of education and training

Education	Training
Predominantly for children and young people	Predominantly for adults
General, rather than specific learning objectives	Very tightly focused objective
Normal ie., Often what everyone in a particular age group does	Special, ie time taken off normal activities
Emphasis on knowledge transfer	Emphasis on behavioural change

Training finds a way for facilitating change in adults whose pattern of behaviour and perception of the world are established. Training motivates learners to experiment and explore ideas. Training helps to demonstrate that learning is relevant, important and valuable to individuals who are already skilled and experienced providing an opportunity to undergo remedial education. Such change is long lasting and continues outside the training context.

In most organisations training has become a basic requirement of organizational life. Organisations

video conferencing. Interactive multi media refers to combination of different media along with the opportunity for learners to interact with them. Some of the main strengths of multi media are: is of use of storage, the interactive element, learner control, flexibility, self assessment facilities, feed back and students tracking system. To support multi media good infrastructure facility is required.

Visual aids

Use of visual aids helps to reinforce key learning points, summarise and organize information and act as a point of reference for the audience. Visual aids should be clear and understandable so that the learners can relate to them. While developing visual aids care should be taken to update them, improve design and layout, adapt the language and change the format if necessary. Visual aids come in many form such as flip charts, OHP slides and

computer generated presentation. They are best used to illustrate key facts. The information should be clear, simple and readable and attention paid to details such as page layout, colour and size and style of font.

In order to bridge the gap between production and potential, and to sustain fisheries in the new millennium, the quality, technical skills and managerial skills of fisheries manpower in the country will have to improve in consonance with the rapidly changing needs of our society. In this context. Human Resources Development (HRD) for raising a cadre of experts at various levels to support research and promote a sustainable development of the fisheries sector is critically important human resource development initiatives need to be constantly updated in order to meet the challenges of global market