Employment Opportunities and Skill Development in Marine Fisheries Sector under Viksit Bharat 2047

S. D. Shanthi*,

*Assistant Professor of Economics,S. T. Hindu College, Nagercoil,Kanniyakumari District. Affiliated to Manonmaniam Sundaranar University, Tirunelveli-12, Tamil Nadu, India.

ABSTRACT
Indian fisheries sector is receiving increasing attention and policy support owing to the livelihood and foreign exchange potential of the sector apart from its nutritional significance. The Government of India has initiated Blue Revolution to augment the fish production and to strengthen the fish-based value chain. But unequipped manpower is often highlighted as one of the major deterrents for leveraging the full potential in harvest and post-harvest fisheries sector, which is highly skill intensive in nature. The issue would emerge more serious in case of marine fisheries. In this paper, we attempted to deliberate on the issue of skill-deficit that would emerge in harvest and post-harvest sectors of marine fisheries sector in India, and suggest measures to address them.

Keywords: Fisheries, Human resource, IPRs, Skill, Value chain

Introduction

Indian fisheries sector is undergoing a sea change. The sector which has been the livelihood of traditional fishermen. And processors has seen remarkable changes with advent of mechanisation across the value chain. The sector has seen remarkable policy support too. The Government of India has envisaged an ambitious plan to promote fisheries. Production in India and augment value generation out of fish-based industrial enterprises, in the form of blue revolution. Further, in tune with the international focus, India thrives to expand "blue economy" by harnessing ocean based economic activities. However, the moot question is whether India can cash in from the reinvigorated investments and activities in marine and inland based economic activities. The question become imperative in the context of large skill-deficit in all the spheres of the fishery-based activities. National Fisheries Policy 2020 has pointed out non-availability of skilled manpower as one of the major factors limiting the development of the capture fisheries (Department of Fisheries 2020). This skill-deficit would emerge as a serious concern in utilising advanced technologies adopted by developed countries in all spheres of fishery activities including fishing, fish processing, value addition, to mention a few. Further, the world is moving towards better quality products harvested and processed using sustainable technologies, which require adoption of environmentally sustainable technologies. The skill-deficit would have much significance in both inland and marine sectors, though the specific areas of skill-deficit would differ between them. The issue would emerge more serious in case of marine fisheries. In this paper we deliberate on the issue of skill- deficit that would emerge in harvest and post-harvest sectors of marine fisheries sector in India, and suggest measures to address them. While the article throws some light on the skill ecosystem in fisheries sector, the scope of the article is limited by the inadequacy of data on skill-gap and skilled human resource requirement in harvest and post-harvest fisheries sector.

Mechanisation of marine fisheries sector

While in term of the crafts and gears used, Indian marine fisheries have transgressed to mostly mechanical from the traditional or artisanal over a period of time, the productivity from fishing activities remains depending to a large extent on the skill of the skipper who utilises his traditional knowledge or wisdom on marine ecosystem, water currents and behaviour of the aquatic animals including fish. Mechanisation required new skill sets with respect to vessel operation and gear handling (Ramakrishnan 1994). Also, advances in information and communication technologies have transformed fisheries into a highly information and
knowledge-based enterprise. Consequently, the kind of skill requirement has also changed, with a need to have additional expertise in utilising these developments While India has a vast coastline of about 8,118 km with a production of around 3.7 million tonnes of fish (as on 20201 the skill generation is not commensurate. It caters important reasons is lack of awareness about the human to only a mimiseule of the total requirement. One of the resource requirement of fisheries among a large section of policy makers and inadequate investment in human resource development of fisheries sector in general and marine sector in particular.

Skill development-the new mantra

Skill development is the new mantra of the policy makers and development practitioners to promote the economic growth and equitable development of the country. The objective is to create an employable workforce as well as to optimally harness the resource with an aim to fuel subsequent chain of economic activities. Skilled manpower is sin qua non for

quality conscious activities, particularly for those related to efficient utilisation of natural resources, as in the case of agriculture, fisheries and animal husbandry.

The fisheries sector is characterised by the integration of natural resources with other stakeholders who have linkages with fisheries and other socio-political and economic variables (Ayyappan and Krishnan 2004), Harvest and post-harvest fisheries operations in marine fisheries are highly skill intensive. Further, marine fishing operations are one of the perilous occupations in the world. Since fishing has evolved from a traditional vocation, fishing and processing skills are considered inherent among fisheries communities and embedded in the local knowledge system. As D'Cruz (2004) has observed, fishermen have the culture of participative fishing, and are trained in the basics of fishing even from a very young age. They have inherited the skills over generations and sharpened it though experience and exposure. They continuously innovate and improvise the fishing techniques (1) Cruz 2004) sustain in the run for open access and limited reviros braving the odds of the nature. Informal apprenticeship kind of moulding is the norm, but targeted skill training number of crafts used has increased many fold, and the is a must to harness the resources efficiently. While the fishing gears, has undergone a sea change, the formal training in using them effectively is inadequate Reskilling and upskilling the traditional fishers W assimilate the technological changes is an area requiring policy focus. Responsible fishing, hygienic handling of fish on-board as well as post-landing. handling devices like echo sounder and GPS, sea safety practices, waste utilization, regulatory aspects in fishery sector, entrepreneurship development and value chain management, etc. are some of the areas among many, where skilling and reskilling are required. The formal skill development approach is through formal education and skill development mechanisms through colleges and other institutions.

Courses on fisheries sector is provided at graduate post graduate and doctoral levels. mainly by fisheries colleges under and state governments. Indian Council of Agricultural Research (ICAR) provides the guidance in the curriculum and facility for higher studies at Central Institute of Fisheries Education (CIFE), Mumbai and fisheries colleges across the country. Also, CIFNET (Central Institute of Fisheries Nautical Engineering and Training). Indian Maritime University and may private institutes provide training on different aspects of fisheries and nautical sciences. However, the trained man power under fisheries sector is quite inadequate to meet the demand. Ramarao et al. (2011) made an assessment of the human resource requirement in the marine fisheries sector for fulfilling various value chain related activities.

Table 1. Annual requirement (numbers) of fisheries human resources in marine sector by 2019-2020

Particular	Certificate	Diploma	UG	PG	PhD	UG and above
High Growth	1956	1225	1569	299	64	1932
Average Growth	1671	1088	1304	57	57	1610
Low Growth	1386	951	1038	51	51	1288

Source: Ramarao et al. (2011)

Further, the aquaculture, ornamental fisheries and other inland fisheries sector in India is fast growing to cater to the need of both domestic and international market. The Hindu (2018) has reported that the estimated demand of fisheries professionals and para professionals will be in the range of 26,900 a year by 2022. With the existing intake capacity of 30 pecentage of professional colleges in the country (i.e. 1079, 417 and 181 respectively for undergraduate, post-graduate and PhD programmes) there exists huge demand supply gap. There is also a need of skilled field workers.

Deep sea fishing

Deep sea fishing is an area, the potential of which is yet to be fully tapped. One major reason for the stagnation in production from marine fisheries sector is lower levels of exploitation of deep-sea resources. Sinha et al. (2016) pointed out that future source of growth in marine sector will be deep sea and oceanic waters as near coastal area are fully utilised. Sinha et al. Limiting factor of deep-sea fishing, which is further augmented by constraints in infrastructure development and lack of a strong Monitoring, Control and Surveillance (MCS) regime. CIFE standards, as mentioned in LMIS report on fisheries sector (ASCI, undated), prescribes that each deep-sea vessel should have 15 fishermen, in addition to technicians and other professionals. The manpower drawn from non-fisher folk population has to be trained in all aspects of the fishing-from weather prediction to navigation and hauling. Rama et al. (2011) has projected number of deep-sea fishing vessels by 2020 as 200 and required manpower as 900 certificate holders, 900 diploma holders. 150 under-graduates and 30 post graduates. Recently, Government of India, has initiated an ambitious programme to explore the deep-water fisheries through the Blue Revolution initiatives, and proposed to fund deep sea fishing vessels. This would need additional skilled manpower.

Fishermen from Thoothoor- Colachel region of South India are known for their deep-sea fishing skills and seaworthiness, the outcome of traditional wisdom passed over generations and informal learning through experience (Shinoj et al. 2020) Making this tacit knowledge explicit can contribute a lot to the skill development of the fishers venturing to deep sen. For instance, deep sea fishing requires number of skills sets like operating large fishing vessels, fabrication of suitable gears, know how about propeller, hydraulies, equipment, ocean currents, fish availability ste. However, in view of changing labour profile of marine fisheries sector and lack of opportunity to learn the skills. Traditionally, new entrants into the labour market needs to be formally trained with safe and productive fishing from deep waters. These warrants documenting the traditional, knowledge and imparting it through formal training. It requires a sea change in the

institutional set up to train the labours and provide them required certificate. Only those who were trained successfully based on these training need to venture into sea for fishing.
The Ministry of Agriculture and Farmers Welfare, Government of India was developing a scheme for deep-sea fishing, which envisages financial support for traditional fishermen for skill up-gradation as well as for procuring suitable fishing vessels. Traditional fishermen group. Fishers associations and fisheries cooperatives will be benefined (P1B 2016).

Fish processing
The importance of post-harvest fisheries sector lies not only in employment and livelihood perspective, but in terms of foreign exchange earnings also. The marine products export market is currently valued at USD 4.7 billion. Technological advancement has contributed a lot to the progress in the sector. Even then, skilled human resource has vital role in different realms of post-harvest fisheries. Apart from conducting the array of operations like cleaning, grading, operating machineries and packaging adhering to the quality parameters for food safety is also important.

Table 2. Manpower requirement in fish processing

Year	No of working factories	Total number of persons	Average no of persons per unit
2000-01	260	27,065	104
2001-02	256	23,649	92
2002-03	264	31,844	121
2003-04	281	32,426	115
2004-05	283	32,240	108
2005-06	318	34,496	126
2014-15	404	51,154	114
2019-20	460	60,227	132

Source: ASCI, undated

Presently, the fish processing industry is utilizing less than 30 to 40% of its installed capacity due to many issues including non-availability of quality manpower (NABARD 2018). As per ICAR-CIPHET study, losses in inland and marine fisheries were estimated to be 5.23% and 10.52% respectively. The study on mapping of human resource skill gaps in India till 2022 by National Skill Development Corporation of India has preliminary processing, leading to inferior quality pointed out the lack of awareness of fishermen about products Further, inappropriate waste management practices are adding to the environmental woes. The familiarised with use of cold chain networks for logistic study further pointed out that supervisors are yet to be and storage as well as the operation of the new machines activities are labour absorbing, particularly for women and other skilled labourers. As Indian fish, processing sector transgress to higher levels of processing, skill-deficit would emerge as major limiting factor. A serious issue that hampers deep sea fishing and utilisation is the lack of skill in post-harvest handling of deep-sea fishes, particularly that used for export, as in case of Sashimi grade tuna. Japan offers excellent market for exporting tuna, a capture fish from deep waters. Sashimi grade tuna requires specialised post-harvest handling. Including inflicting least injuries to the fish while harvesting. For which India is not ready enough (CMFRI report). However, the tuna qualified as Sashimi grade fetches higher market prices compared to the chilled and frozen tuna. At present, India is not exporting Sashimi grade tuna to Japan, for want of such specialised skill and infrastructure. Since Sashimi grade tuna is consumed in raw form, without subjecting to processing and value addition, it needs to be maintained of high quality during the entire value chain operation. Harvesting practices and on-board handling being the major determinants of the quality and freshness of Sashimi grade tuna, high level of precision has to be mastered by the employees concerned. With the growing market for Sashimi grade tuna and tuna loins/steaks, the Indian tunas have considerable prospects. Skilled employees are required for canning facility, as maximum processing take place in canning in addition to preparation of steaks and Joins for export market.

Small scale fish processing
Beyond the organised fish processing sector, small scale unorganised sector provides self-employment avenues for many prospective entrepreneurs who are trying to tap the increasing demand for processed and Small scale unorganised sector contributes to 82% of ready-to-eat marme products in the domestic market employment in Indian food processing sector (Rais and Sharma 2014) Value added fish and fishery product battered and breaded products etc are capturing the like dry fish, fish based extruded snack products market Even then paucity of skilled human resources is creating hurdles for the growth and the sector. Skill development in these areas can add a lot to the livelihood improvement of the rural poor especially women. An assessment of skill deficit and needs in the fish processing segment in areas where unorganised/informal employment exists pointed to the issue of inadequate knowledge of processes. Apart from the fisheries research institutes, colleges and universities, Krishi Vigyan Kendra (KVK) with their versatile presence in every district can play a major role in this. In case of small-scale fish (SSF) processors, skill development has to be complemented with access to infrastructural facilities. Like hygienic working location, processing equipment, availability of inputs like running water, electricity, packaging materials as well as handholding in marketing and promotional activities. Custom hiring facilities can be set up by local self-governments/technology institutes for catering the

requirements of small-scale processors. Since, a number of women groups in rural areas are involved in small scale fish processing, such facilities can add to their productive capacity which in turn will help achieving greater financial autonomy. Rejula et al. (2017) has observed that previous experience, existing skill, and duration of skill development programme are positively correlated with effectiveness of women led small scale fishery enterprises in Kerala. Recognizing the importance of skill development for the development of the national economy, the government of India, has come out with the Skill India Mission. Such initiatives have to be appropriated for the small-scale fish processing entrepreneurs.

These issues point out the importance of human resource development in the area of intellectual property protection. Fishery research institutes in ICAR have already initiated steps to protect the intellectual property in their domain. Skill development in this area can facilitate identification of the technologies with potential for IPR protection, commercialisation and diffusion.

Food safety and quality assurance

Food safety standards with respect to general hygiene and contaminants (microbial and chemical) fish and fishery products are evolving over time in response to emerging challenges, scientific advancements. apprehensions of consumers and policy directives. Many countries are making rules and regulations more and more stringer to ensure the quality of imported fish and fishery products (Raymond and Ramachandran 2017). Seafood safety and quality assurance is an area which is increasingly being recognised with changing dimension in the arena of food safety. Despite the severe food safety measures initiated by the Indian government, horder rejections were.

Conclusion

Fisheries is a sunrise sector. The multidimensional growth of the sector offers employment avenues to venture some aspirants. At the same time, the sector needs skilled human resource at various levels to sustain the growth. Of late, the sector is gaining policy attention owing to the potential contribution of the sector to the national economy. Diverse set of skills are required to leverage the potential of the fisheries sector to the benefit of the nation, it is important to augment the skills of various stakeholders. Assessing the human resource requirement and skill gap in various domains of the development in the area of hygienic handling as well as formulation and implementation standards and rules is dissemination of technologies and information to the sector has to be carried out at the outset. Human resource the need of the hour. Efficient mechanism for relevant stakeholders is important to maintain the vibrancy of the sector, but often neglected and demands policy attention. Fisheries extension system needs to be strengthened by enhancing the human and financial resource base.

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