

Boosting fish processing industry in India

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Fish processing industry in India plays a vital role in the national economy and need to be boosted through strengthening various links between production and utilization. Increasing fish production, value addition, waste utilization, minimization of post-harvest loss, infrastructure establishments, and attitude changing are some of the key areas to be addressed for better fisheries resource utilization, enhancement of national food and nutritional security, assured livelihood of millions of population and overall socio-economic status.

Keywords: Fish processing, Fish production, Infrastructure establishments, Post-harvest loss, Value addition, Waste utilization

INDIA has a huge number of inland water bodies including rivers, lakes, ponds, and tank. The east, west, and south of India is surrounded by the Bay of Bengal, the Arabian Sea, and the Indian Ocean, respectively with a vast coastal length of 8,118 km which spans across nine maritime States and five Union territories including Andaman and Nicobar and Lakshadweep Islands. The exclusive economic zone (an area of the sea in which a sovereign state has special rights) and continental shelf area (part of the continental margin which is between the shoreline and the shelf break) of India is 2.02 million sq. km and 0.53 million sq. km, respectively. With this resource availability, there is a lot of activities related to exploiting aquatic life are being encouraged to ensure the food, nutrition and livelihood

security of the nation.

Fishing is a major economic activity undertaken by India in the seas around it. About 2.5 lakh vessels of various kinds are deployed on fishing activities, employing nearly 15 million people directly or indirectly. In addition to providing staple food to millions across the country, it also earns foreign exchange close to \$6 billion (Water quality index). During the year 2019-2020, India has reported the fish production of 14.16 million metric tonnes (marine-3.72 MMT; inland-10.43 MMT) and fisheries sector has contributed ₹ 212,915 crore to the Indian economy for the year 2018-2019. The value of fisheries export has reached ₹ 46,662.85 crore from the export quantity of 1,289,651 tonnes. Data (Table 1) showed that still the major disposition of fish in

India is the fresh form. The frozen and canning form of fish/shellfish disposition is mainly from seafood export industries.

Fish distribution channel moves through the fisherman/farmer, auctioneer/middle man, whole sale dealer / retailers and processor/consumer. There are various players at each level. The cold chain is strictly followed and implemented throughout the supply channel when it is processed to international market. Lesser attention is paid on cold chain when the fish is supplied to local consumers. With this background, the list of strategies suggested to boost the fish processing industry of India is presented in Table 2.

Domestic fish marketing is the key

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Table 1. Major form of fish disposition

Year	Major form of disposition (%)							
	Marketing fresh	Frozen	Canning	Reduction	Miscellaneous	Offal for reduction	Unspecified	Others
2015-16	79.90	7.48	4.17	0.84	0	1.71	0.35	0.32
2016-17	78.99	6.48	3.75	0.70	0	1.68	0.40	3.37
2017-18	78.03	8.44	3.48	0.43	0	2.27	0.45	2.87
2018-19	75.72	9.54	6.50	1.04	2.32	0	0.05	1.45
2019-20	75.07	13.80	4.26	0.29	2.49	0.06	0.04	1.18

Table 2. Strategies to boost fish processing industry of India

S.No.	Strategies
1.	Increasing the raw material availability and maximizing the utilization
2.	Introducing schemes by government through planning
3.	Practising the value addition
4.	Strengthening the basic requirements (potable water, sanitation, electricity, good road and transportation facilities)
5.	Enhancing the safety and quality of fish products
6.	Fish waste utilization and value addition
7.	Scaling up the production
8.	Strengthening the domestic market
9.	Improving the seafood export
10.	Introducing newer technologies
11.	Strengthening the post-harvest infrastructure (landing centre, fishing harbours, cold storage warehouse, fish market, ice plants etc)
12.	Market chain enhancement and modernization
13.	Harnessing the role of women in fish processing sector
14.	Capacity building
15.	Strengthening the network between various organizations/institutions
16.	Strengthening the rules and regulations
17.	Creating awareness and attitude changing
18.	Enhancing the role of service providers
19.	Integrating with other sectors

Source: Ward A and Beyens Y. 2015. *Fish handling, quality and processing: training and community trainers manual*. Smartfish Working Papers. 001. Port Louis, Mauritius: Commission de l'Océan Indien

important role in sustenance of Indian fish processing industry due to the fact that the major fraction of fish produced (around 80%) is consumed within the country and only around 15% of fish produced utilized for export market. In the past, there is a huge competition in the international market from South-East Asian countries and also trade restrictions are becoming more and more over the days. Under this circumference, strengthening the domestic market system is an important strategy for ensuring the sustainability of Indian fish processing industry. In the present day, domestic consumers are willing to pay better price for the good quality fish and variety of fish products. India is foreseeing the doubled fish production by 2025. Post-harvest loss in the fisheries sector accounts about 20-24% which remains an issue to be addressed at the country level. Hence, there is a need to strengthen the link between production and utilization.

Government schemes inherently should have some strategies to address-

- (i) timely implementation,
- (ii) strengthening the administration from higher level to down the line till reaching the beneficiary, active

participation of private sector, and (iii) networking between the institutions like CIFT, MPEDA, skill development organizations, NGOs to dissipate the technologies developed in the fish processing sector and to identify and address the technological gaps.

Value addition in fish processing for better value realisation

Value addition is one of the important fish processing activities, which boosts the industries growth as it brings high value to the raw material. The value addition can be achieved by simple interventions like producing different forms of products (dressed, steak, fillet, marinated, convenient products (ready to cook, ready to eat etc). Products diversification and packaging interventions (retail packaging, boil-in pack etc.) can improve the value. ICAR-Central Institute of Fisheries Technology conducting periodic training on value addition of fish and fishery products. Producing high value products like collagen peptide, gelatin, pigments, bioactive peptides, chito-oligosaccharides from fish and shell fish waste another important area of value addition.

Strengthening the basic requirements

Development projects should be designed to address the following underlying issues to address the fish post-harvest improvement activities:

- strengthening the infrastructure,
- ensuring the sanitation in coastal regions (avoiding open defecation and implementing proper treatment of human excreta and sewage before discharging),
- providing clean potable water,
- creating awareness among the coastal communities to improve their own sanitation levels,
- reducing the risks from contaminated water and systematic monitoring programme on the quality of water available for coastal communities, and
- monitoring coastal water quality and developing the solutions.

Enhancing the safety and quality of fish products

Enhancing safety of fish and fish products will create a positive demand and supply chain which is needed for boosting the fish processing sector. This is only possible by taking certain measures from the moment the fish is taken out of water. The harvesting techniques also play a major role in determining the length of shelf life. For example, transferring the harvest from the culture pond to an ice-slurry tank would extend the post-mortem period and hence it delays the quality deterioration. Development projects/strategies should focus on introducing simple and user friendly techniques and technologies which are practical, achievable and low-cost as well as have the potential to result in hygiene improvements in the short-term. At all the levels of fish/shellfish supply, cold chain and hygienic practices are key elements in ensuring safety of fish and fish products.

Strategies for enhancing safety of fish and fish products

- Training on sanitation and hygienic practices
- Training on basic chilling techniques
- Creating consumer awareness on

illness upon consuming the poor quality fish

- Creating consumer awareness on nutritional benefits of consuming better quality fish
- Providing ice machines
- Providing insulation/cool boxes
- Water quality monitoring
- Establishing ice plants
- Providing gloves, boots or sorting tables
- Providing scientifically designed fresh fish selling kiosks
- Awareness to change the attitude towards producing and buying fish
- Demonstrating the economics of selling good quality fish.

Strengthening the post-harvest infrastructure

For boosting the fish processing sector of India, a due focus should be given in establishing the well-equipped infrastructures like landing centres, fishing harbours, processing parks, refrigerated vehicles, cold storage ware houses and fish markets. In India, as on 2019-2020, there are 1,548 landing centres, 7 major fishing harbours and 62 minor fishing harbours. Landing centres and fish markets play a key role in determining the standard (safety and quality) and value of fish and fisheries products. There are multiple activities associated with the landing centres and harbours, including several ancillary ones like supply of ice and potable water; market functions like weighing, sorting, auctioning, storage etc.; besides transportation and communication which are links that play important roles in getting the produce to its consumers/users. However, the efforts are being made to improvise the conditions of landing centres, fishing harbours and fish markets.

Strategies for better functioning of existing landing centres

- Supporting the provision of clean water and power supply
- Installation of ice machines
- Mechanism to gather catch data
- Conducting training on proper usage of landing centres/markets
- Involving the community people in developmental activities

- Repairing the floor wherever possible
- Conducting participatory consultation programme for fish traders, fishers, boat owners, and the local government
- Appointing coordinators from amongst the fishers and vendors to better manage the landing centres/market places
- Installation of better lighting and the provision of garbage bins
- Providing adequate potable water and ice, auction platforms, catch sorting and weighing platforms, and effluent treatment systems
- Automation/ mechanization of activities can be introduced, like transferring the fish from fish hold to the onward transportation vehicle etc.
- A centralized facility for providing potable water, good quality ice and fuel pumps with necessary automation, should be provided in all landing centres/ harbours so that the activities can be efficiently managed.
- Dedicated manpower for inspection and enforcement of hygiene and sanitation must be in place.
- A suitable e-auction facility can be introduced as a means of reducing the influence of intermediaries in the chain.
- To solve the twin issues, provision of ice, by establishing ice plants, and of potable water can be made available for a few closely located fishing villages and made operational through fishermen cooperatives or trained Self Help Groups of fisherwomen.
- Cooperative societies may be encouraged among stakeholders and assistance may be provided for establishing infrastructure and its management.

Strategies to improve the market chains/fish marketing system

- Training fisher communities/ fisheries department officials/ fisheries society/farmers association/NGOs etc., on marketing skills. Basic marketing techniques can make a big difference.
- Fisheries department need to have

a marketing division with officials having expertise in various marketing strategies and providing marketing information.

- Database should be made available on potential buyers with reference to various fish and fish products.
- Conducting trade fairs and encouraging participation can create exposure to products/producers/potential customers.
- Simple database about fishers with their contact details including telephone numbers can connect them to prospective buyers.
- Encouraging to building brand identity for products at local/ district/ state/ national/ international.
- Developing marketing channels through social network/social media/ women's collaborative groups or other NGOs.
- Introducing government work plans to strengthen the marketing-related activities.
- Regularizing the auctioning system prevails in fish marketing chain.
- The transportation and storage of fishes need to be facilitated by creating and maintaining the needed infrastructures such as approach roads to landing centres/ fishing villages/pond-river-reservoir sites from the main markets, establishing cold storages at major collection points, ice factories, etc.
- A system to convey the prices prevailing at the nearby fish markets for various species daily through online (delivering messages to the fishers' mobile phone).
- Modern retail outlets have to be promoted vigorously through public-private partnership in every major city so that fish consumption becomes an easier proposition in days to come.
- Formulating a uniform market policy for fishes so that it becomes easier in operation and regulation. It will not only handle country's fish production but will deliver it also to the consuming population, ensuring at the same time remunerative prices to the fishers.

Capacity building

The strategies for improvising the capacity building are as follows:

- Building a motivated body of trainers from varying backgrounds.
- A body of mentors through working closely with staff from local government, NGOs and educational institutions should be built to develop a cadre of local post-harvest trainers.
- Training programmes should include the government staffs from fisheries departments which increase the replication potential.
- Providing equipment or any other support should also provide instructions and mentoring on how to use and to maintain it.
- Local trainers should be identified and developed, and encouraged to use their new skills into practice early on. Before training the local people / community representatives, engage them to help trainers to gain confidence.
- Under capacity building programmes arrange the study visits for producer groups or community members to gain the practical experience and confidence to carry out improvements to their own products.
- Providing business incubation facilities.

Creating awareness and promoting attitude shift

Hygienic handling of fish has been stressed since many years but the changes are slow and insignificant. However, awareness and attitude changing takes a longer time and need continuous efforts from various

organizations. However, unless the producer and consumer change their attitude all the efforts to improvising the fish processing sector will become waste. Some of the strategies for changing the awareness and attitude of fish handlers and consumers are as follows:

- Introducing a nationwide movement through awareness campaigns using school children, college students.
- Broadcasting the advertisements about good fish handling hygiene practices through mass media and social network.
- Consumers oriented awareness programme about the human health and food safety benefits of more hygienic fish products.
- Awareness raising programmes should be conducted on the use of potential dangers of using potentially dangerous chemicals to prolong fish life or make it appear 'fresh' at local and communities level with the help of fisherman societies/federation.
- Organizations like health centres, NGOs, schools etc. should be linked to raise awareness on basic health related issues which can broke-out due to improper handling of fish and fish products.
- Clean potable water, sanitizer, and other appropriate equipment etc. should be provided to fisher communities.

Up-gradation of existing technologies and adopting better and greener technologies

Progress on up-gradation and adopting newer technologies in the field of fish processing and relevant sectors would be a key aspect for

boosting the fish processing. Communities or producer groups need to help identify or be fully supportive of any new products, techniques or technology that are introduced in from outside is unlikely to lead to success. New products should be proven to be technically, economically, environmentally and socially feasible and acceptable by the local community as well as by foreign buyers. It may be more realistic to improve existing post-harvest technologies or livelihoods rather than introduce something completely new. The basic infrastructure should be strengthened for example providing electrical equipment like sealing machine, and vacuum sealers for better packaging of fish will not be lead to the success unless a reliable and stable power source is available and affordable. Monitoring and mentoring service from technology institutions should be made available on the use of equipment to build lasting relationships with the recipients and service providers. Instructions on the use of machineries should be available in the local language. Obtaining a successful lead by introducing new techniques may take considerable trial and error. Introduction of new equipment or techniques will have better adoption or uptake if it results in the increased income (e.g. providing aerators for the live fish/shell fish transportation). Indigenous machineries and techniques would be more preferable for ease of equipment maintenance, repair and servicing.

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Solar fish cooler

ICAR-CIFT has developed a solar-powered cooling system that can be used by retail fish vendors. This solar fish cooler is powered by two solar panels and can hold 50 kg fish at 0 to 5°C. The solar-powered cooler is expected to reduce the dependency on ice, prolong the shelf-life and ensure the quality and hygiene of fresh fish sold in the retail markets.

Source:

ICAR Annual Report 2020

