Chapter 17

Entrepreneurship opportunities in fishery products

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Introduction

Fish is a source of valuable animal protein and is now considered a health food. This has resulted in increased consumer demand. Fish is now more expensive than meat and other animal foods. Being a highly perishable commodity, fish require immediate processing and various options are available for the value addition of fish. Fish processing, particularly seafood processing and marketing have become highly complex and competitive and exporters are trying to process more value added products to increase their profitability. Value can be added to fish and fishery products according to the requirements of different markets. These products range from live fish and shellfish to ready to serve convenience products. In general value-added food products are raw or pre-processed commodities whose value has been increased through the addition of ingredients or processes that make them more attractive to the buyer and/or more readily usable by the consumer. It is a production/marketing strategy driven by customer needs and perceptions.

Freezing represents the main method of processing fish for human consumption; it accounted for 56 % of total processed fish for human consumption and 27 % of total fish production in 2016 (FAO, 2018). Post-harvest losses of fish account for about 35% of the total global fish production (Gustavsson et al., 2011). According to the recent statistics, the annual capture and culture-based fish production in India is around 90, 00000 MT. Seafood export sector is one of major foreign exchange earner in India. In 2019-20, India has exported 1,28,9651 MT of Seafood worth Rs.46,663 crores. USA and South East Asia are continued to be the major importers of Indian seafood. Frozen Shrimp continued to be the major export item followed by frozen fish . Marketing of value-added products is completely different from the traditional seafood trade. It is dynamic, sensitive, complex and very expensive. Market surveys, packaging and advertising are a few of the very important areas, which ultimately determine the successful marketing of a new product. Most of the market channels currently used is not suitable to trade value added products. A new appropriate channel would be the super market chains which procure directly from the source of supply of the products and control most of the components of production and supply chain like packaging, advertising and retail marketing. Appearance, packaging and display are all important factors leading to successful marketing of any new value added product. The retail pack must be clean, crisp and clear and make the contents appear attractive to the consumer. The consumer must be given confidence to experiment with a new product launched in the market. Packaging requirements change with product form, target group, market area, species used

and so on. The packaging technology needs to be evolved which should be attractive, convenient and adding to the shelf life of the processed products.

Technology developments in fish processing sector offer scope for innovation, increase in productivity, increase in shelf life, improve food safety and reduce waste during processing operations. A large number of value added and diversified products both for export and internal market based on fish, shrimp, lobster, squid, cuttlefish, bivalves etc. have been identified (Ninan & Ravishankar,2018). However, the commercialisation of fish products still pose lot of challenges to the entrepreneur and researcher in terms of optimization of technologies and ultimately developing the technologies into a commercially viable business plan.

The Indian Council of Agricultural Research (ICAR) is the apex public research organization which has been playing a key role in the innovation processes concerning agriculture in the NARES system. ICAR harnesses and synergizes the innovative research mechanism and business support ecosystem by utilizing the efficient scientific manpower and vast resources. This ensures the efficient utilization of innovative technologies, processes and products, thus leading to significant enhancement of the Agri-economic system as a whole. As part of this drive and to ensure dissemination/commercialization of its research outcomes and knowledge base, ICAR created an institutional mechanism connecting its 101 Research & Development (R&D) institutes, serving diversified fields like fisheries, horticulture, crop science, animal science and natural resource management. This chain of Agri Business Incubation (ABI) centres across India, became one of the successful initiatives of ICAR, where scientific knowledge is translated into innovation led commercial ventures developing market-driven products (ICAR, 2006).

Constitution of Intellectual Property and Technology Management (IPTM) Division at Headquarters, and integration of aspects of intellectual property rights (IPR) in the technology management of R&D institutions was the initial step taken by ICAR (ICAR, 2014). The IPTM division formulated the guidelines for Intellectual Property Management and Technology, and created a decentralized 3-tier IPR and technology management mechanism. The implementation of these guidelines helped in the systematic organization of IPR filings and commercialization intellectual assets developed by its research institutes catering to diverse and specialized fields of agriculture (ICAR, 2018).

Taking into consideration the vast potential of the fisheries sector and the needs to promote techno-entrepreneurship among fishermen community, ICAR started India's first fisheries Business Incubation Centre at ICAR-Central Institute of Fisheries Technology, Kochi, Kerala, for establishing sustainable businesses in fisheries and allied agricultural fields. The role of the Agri-Business Incubation Centre (ABI) is to facilitate the innovator and the researcher to turn their ideas into commercial ventures with focus on incubation and business development programme, including entrepreneurship, skill development and Grassroot innovators activities. Numerous technologies have been transferred by the Institute through this incubation mechanism and one of them is the technology for Hybrid Solar Dryers. The technology achieved so much popularity due to its economic feasibility and easy adoption by fishers, micro, small and medium scale entrepreneurs and women Self Help Groups (SHG). This technology goes in tandem with the flagship programmes of the Government of India such as Atma Nirbhar Bharat, Swatch Bharath and National Mission for Green India. It effectively contributes to the country's commitment in reducing carbon emission, and aids in improving the livelihood of fishermen community by assuring returns even during off-season period.

Health benefits of fish

As a rich source of nutrients, fish provide a good balance of protein, vitamins and minerals, and a relatively low caloric content. In addition fish are excellent sources of Omega-3 polyunsaturated fatty acids which appear to have beneficial effects in reducing the risk of cardio- vascular diseases and are linked with positive benefits in many other pathological conditions particularly, certain types of cancer and arthritis.

Fish represents an excellent option as a major source of nutrients. On a unit caloric basis fish can provide a broad range of nutrients. A high intake of fish is compatible with a reduction of both calorie and saturated fatty acid intakes. Coronary heart disease, hypertension, cancer, obesity, iron deficiency, protein deficiency, osteoporosis and arthritis are contemporary health problems for which fish provide a number of nutritional advantages and some therapeutic benefits. Nutritional factors of importance are calories, proteins, lipids, cholesterol, minerals and vitamins.

Conventional finfish and fishes potentially provide from 100 to 200 kcal/100g, which is mainly attributed to the protein and fat contents of fish. The amount of carbohydrates in fish is very small. Finfish usually contains less than 1% carbohydrate whereas shellfish have very low fat content. Compared to other muscle food, they contribute very low fat calories to the average diet. For example, each gram of fish muscle provides only 0.05 – 0.2g of fat compared to 0.25 – 0.5 fat per gram of red meat. The most important constituent of fish muscle is protein. The protein content in fish varies from 17 to 25%, though values as low as 9% are sometimes encountered as in the case of Bombay Duck. Fish protein is highly digestible because of very low stroma protein and has an excellent spectrum of essential amino acids. Like milk, egg and mammalian meat proteins, fish protein has a high biological value. Cereal grains are usually low in lysine and/ or the sulfur containing amino acids, whereas fish protein is an excellent source of these amino acids. In diets based mainly on cereals, fish as a supplement can, therefore, raise the biological value significantly.

Fish oil contains primarily the Omega -3 series of fatty acids. The polyunsaturated components of fish lipids can be effective in reducing plasma lipids. Epidemiological data from Japan and the Netherlands indicate that frequent consumption of fish even in quantities as low as 30g/ day may have beneficial effects in reducing heart disease. Consumption of medium (100g) to large amounts especially triglycerides, prevent thrombosis and ameliorate ischemic heart disease. These effects are mediated by the Omega -3 PUFA of fish lipids which alter the production of certain biologically important components called eicosanoid. The efficiency of the Omega -3 PUFA components is influenced by the amount ingested and the concentration of other unsaturated fatty acids in the diet, especially Omega -6 PUFA. Squalene, an isoprenoid molecule present in shark liver oil in higher quantities, has been reported to possess antilipidemic, antioxidant and membrane stabilizing properties. Fish and shellfish, particularly anchovies, clams, oysters and sardines are rich sources of vitamin B 12.

Fish consumption is compatible with optimum dietary practices / recommendations and that substitution of fish for other foods can help to maintain a balanced nutrient intake compatible with a low-fat consumption. In addition, the consumption of fish- or more precisely, fish lipids – may provide significant health benefits.

Entrepreneurship Initiatives in Fisheries Sector

Fisheries sector with its important role played in the socio-economic development of the country has become a powerful income and employment generator, and stimulates the

growth of a number of subsidiary small, medium and large-scale industries. In order to translate the research results arising from the field of fisheries and other agricultural sectors, ICAR have set up an innovation-based Agri Business Incubation Centre (ABI) at the ICAR-Central Institute of Fisheries Technology (CIFT), Cochin. ABI aims at establishment of food business enterprises through IPR enabled ICAR technologies.

ABI supports operations on business projects as a measure of enhancing the foundation for new technology based industries and establishing a knowledge-based economy. It focuses on finding new ways of doing business in fisheries and allied agricultural fields by finding doors to unexplored markets. The Centre helps prospective entrepreneurs, by providing pro-active and value-added business support in terms of technical consultancy, infrastructure facility, experts' guidance and training to develop technology based business ideas and establish sustainable enterprises. It acts as a platform for the speedy commercialization of the ICAR technologies, through an interfacing and networking mechanism between research institutions, industries and financial institutions. The Incubator at ICAR-CIFT differs from traditional Business Incubators as it is tailored specifically for technology based industries and is operational at an area with a high concentration of fish production. This industry-specific incubator also allows new firms to tap into local knowledge and business networks that are already in place. BIC offers their services to industries not only in Cochin, but also all over India through virtual incubation. Beyond promoting business growth, the Centre is also trying to bring its benefits to all the fisheries communities in India.

This unique Business Incubator is now known as a "One Stop Shop", where entrepreneurs can receive pro-active, value-added support in terms of technical consultancy, and access to critical tools such as entrepreneur ready technologies, vast infrastructure and other resources that may otherwise be unaffordable, inaccessible or unknown. With the aim of transforming the incubator into a symbol of entrepreneurship and innovation, the ABI Unit has created an environment for accessing timely scientific and technical assistance and support required for establishment of technology based business ventures. The activities of the ABI Unit focuses on finding creative and innovative ways for linking public sector resources and private sector initiatives within and across regional and national boundaries for promoting economic growth. The Centre uses the right expertise in relevant fields to identify and analyze the constraints and barriers hindering the growth of a business, and devise appropriate strategies. It explores the various structures and strategies to help small enterprises to grow and ensure a promising future in the global market. It fosters corporate and community collaborative efforts, while nurturing positive government-research-business relationships.

Process of Incubation

The Business Incubation Centre targets entrepreneurs, from fledgling start-ups in need of basic small scale processing capacity to sophisticated businesses in need of R&D back up, office infrastructure and pilot / test market processing facility for the development of new products. It possesses good infrastructure facilities suitable for providing direct incubation of nine entrepreneurs in a corporate environment within the premises of ICAR-CIFT, at a time. The purpose of direct incubation is to support emerging companies through their infancy. ABI apart from being a multi-tenant facility with on-site management that delivers an array of entrepreneurial services to clients operating with the facility, it also serves clients that are not located in the facility through virtual incubation or incubation without walls.

The Centre regularly conducts industry interface and technology promotional programmes for sensitization of entrepreneurs and to identify interested potential candidates for physical and virtual incubation. The Clients at ABI gets the privilege of meeting Scientists, Business Manager and Business Associates directly, to discuss and finalise the strategies to be adopted to take the business forward. It is also the peer-to-peer relationships that develop within the incubator, that ensures the delivery of basic services such as how to actually incorporate a business; what are the legal issues; how to take intellectual property protection; how to do basic accounting and cash flow; how to do business presentations etc. Those kinds of skills are what are transmitted as part of the incubation process.

The residency period for direct incubatees is normally for two years, extendable by another year in special cases, depending on the progress of incubation. As the business venture becomes mature enough, the concessions and the facilities provided to the incubatee companies will be gradually withdrawn. Each incubatee of the Unit will have to pay to the Institute a charge for utilization of space, at a rate concessional to the benchmark rate which is the prevailing market rent realizable. Incubatee mentoring will continue in virtual mode after graduation, on need basis.

Services and facilities offered by ICAR-CIFT Business Incubator

The Centre through its business support services provides links to supporting industries; upgrade technical / managerial skills; provide scientific / technical know-how; assist in market analysis, brand creation and initial test marketing; protect IP assets; and find potential investors and strategic partners.

Fig. Techno-entrepreneurial support system of ABI (Arakkal et al,2020)

Incubation facilities under one roof are:

- Furnished office suites within the premises of ICAR-CIFT, with shared facilities like secretarial assistance, computing, copying, conferencing, video conferencing, broad band internet and communication services.
- Pilot level production lines
- Culinary facility
- Access to modern laboratory facilities for product testing and quality control
- Access to well-equipped physical and digital libraries

Pilot Level Production Lines

A state-of-the-art generic semi-commercial production facility is made available to incubating entrepreneurs for developing value added products from fish. BIC provides access to these facilities along with support of manpower, and assists the entrepreneurs in production and testing of new product formulations. For the tenants, the pilot plant is an ideal testing arena to determine the commercial viability of new products. The plant also serves as a process lab, a place to see how processing equipment impacts food products under varying conditions. There are production lines for pre-processing, cooking, retort pouch processing, canning, sausage production, extruded products, chitin & chitosan, smoking, curing & drying, breading & battering and product packaging. By providing access to these resources, the Centre greatly reduces one of the major barriers to the commercialization of institute technologies by smaller firms - the high capital cost of intermediate or large scale process equipment.

Business Services

The business oriented services offered by BIC include assistance in complying with business regulations and licensing procedures, financing, information services, marketing, and tailor-made services designed for the various tenant enterprises. Incubator clients can also gain special advantage in terms of tax savings through special regulations for Business Incubators. BIC also offers a wide variety of services, with the help of strong associations throughout the Business Incubation Network

Conclusion

Fish processing and value addition has evolved over the years as the sunrise sector in Agriculture domain. Globally many new species are being introduced in the Aquaculture sector. A comprehensive study on the suitability of these species for value addition has to be carried out to propose optimized utilization protocols. Functional fish products will be in much demand in future; the challenge will be to retain the functional benefits of fish & shellfish meat by way of adopting product specific processing protocols or alternate delivery systems for sensitive components. These issues offer ample scope for Innovation coupled with entrepreneurial skills for the creation of wealth and employment in fisheries sector.

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