

Accelerating Entrepreneurship

Development in Fisheries Sector through Agribusiness Incubation

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The Indian agriculture sector has witnessed a sustained growth both in terms of investment and technology during the past several years, with a disruptive rise of start-ups providing innovative solutions to the challenges faced by the farming community. As innovation and networking are being increasingly recognized as the crucial factors to enhance the business competitiveness and gain success in the global market, the private sector players are increasingly coming forward to collaborate with public funded R&D Institutes for developing novel technologies with commercial prospects. This is particularly significant in case of agricultural technologies, as most of the research in the domain is carried out by public R&D institutions. Agribusiness incubation centres act as a platform for the speedy commercialization of the technologies and reinforcing of public private partnerships, through an interfacing and networking mechanism between R&D institutes, industries and financial institutions, thereby contributing to a knowledge-based economy. This paper portrays the experience of Zonal Technology Management and Agribusiness Incubation Centre operational at ICAR-Central Institute of Fisheries Technology as an innovative developmental instrument for supporting the growth of competitive enterprises in the fisheries sector by advancing innovation in products, processes, and business models. This entrepreneurial support system handholds entrepreneurs to shift their economic resources through strong technical and advisory support, into new ventures that yield higher productivity and returns. Innovative concepts of Technology Readiness Level (TRL), de-risking and empanelling of manufacturing firms etc. were also introduced and practiced by the centre.

Key words: Agribusiness Incubation, Fisheries, Technology Readiness level, Zonal Technology Management

THE FISHERIES sector with its important role in the socio-economic development of the country has become a powerful income and employment generator, and stimulates the growth of a number of small, medium and large-scale industries. In order to translate the research results arising from the field of fisheries and other agricultural sectors, ICAR has set up an innovation based Zonal Technology Management-Agribusiness Incubation (ZTM-ABI) Centre at ICAR-Central Institute of Fisheries Technology (ICAR-CIFT), Kochi, Kerala. This industry-specific incubator also allows new firms to tap into local knowledge and business

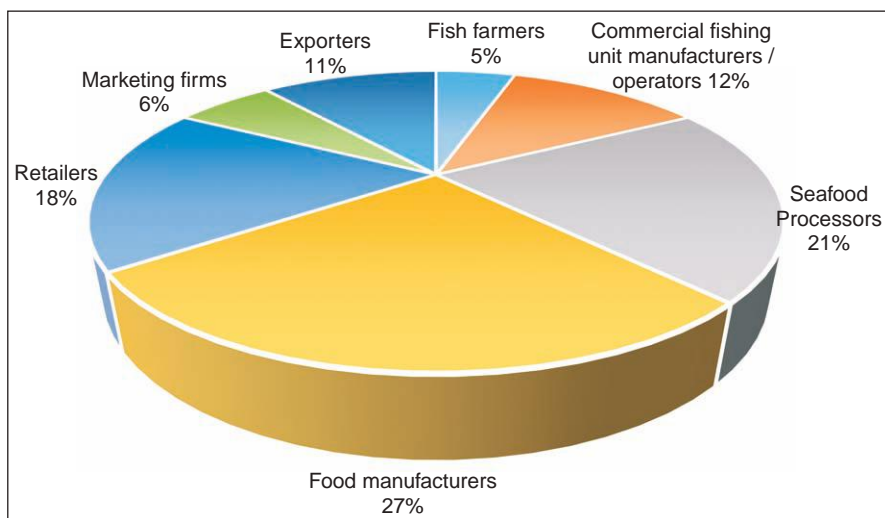
networks that are already in place. ZTM-ABI Centre offers their services to industries not only in Kochi but also in other parts of the country through virtual incubation. Beyond promoting business growth, the Centre is also trying to bring its benefits to all the fisheries communities in India. Through this Centre, the Institute has reached out to more than 150 small and medium-sized technology and technology-enabled enterprises and has helped to create a good number of jobs.

Categories of entrepreneurs approaching agri-business incubator

The fishing industry includes any industry or activity concerned with

culturing, harvesting, processing, preserving, storing, transporting, marketing or selling fish or fish products. The commercial activity is aimed at the delivery of fish and other seafood products for human consumption or as input factors in other industrial processes. Directly or indirectly, the livelihood of over 500 million people in developing countries depends on fisheries and aquaculture.

The commercial sector of the fishing industry comprises the following chain: (i) Commercial fishing and fish farming which produce the fish (ii) Fish processing which produce the fish products and (iii) Marketing of the fish products.



Categories of entrepreneurs incubated at ZTM-ABI Centre.

The clients approached the centre during the period 2010–19, for various services that are classified based on the area of their expertise in the above figure.

Addressing the common challenges faced by small/medium business owners

As a first step, a pre-incubation surveys all the entrepreneurs approaching the ZTM-ABI will be conducted. Based on the analysis of requirements sought by the entrepreneurs approaching the ZTM-ABI Centre, the common challenges faced by them are identified and represented in the figure. The redressal mechanism of ZTM-ABI is given in Table 1.

Stages of business incubation

The clientele of ZTM-ABI Centre includes young start-up firms who need basic level technology support and training, to high-end business firms in need of R&D back up for development of diversified products. The Centre possess multi-tenant infrastructure facilities suitable to start a corporate level office for direct incubatees, within the premises of the Institute. Direct incubation is intended to handhold clients during their infancy period. Business Meets and industry-interface programmes are regularly conducted for sensitizing entrepreneurs, and identified candidates with viable business ideas are selected for incubation. Registered incubatees are

allowed to meet scientists and business associates whenever required to optimize product formulation and identify suitable business strategies.

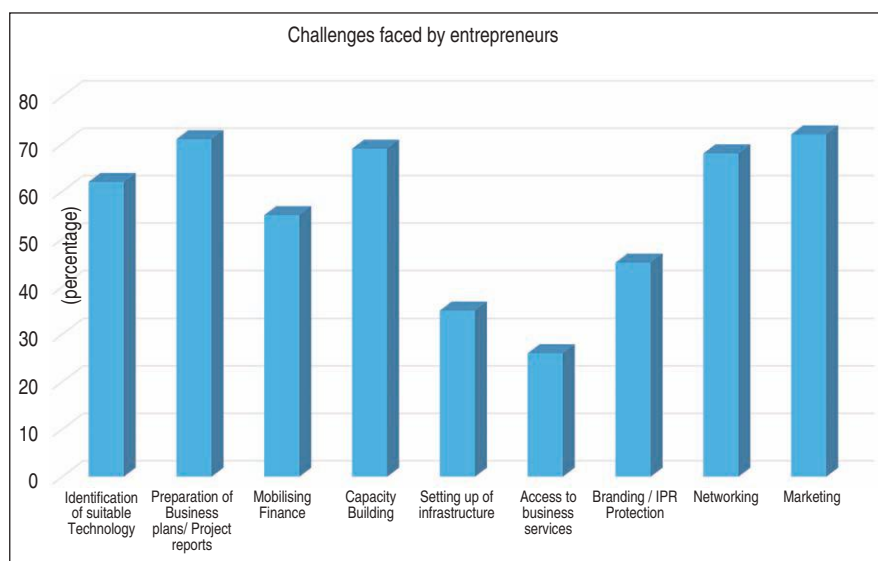
This simple networking helps in easy delivery of incubation services and guides the client on basic principles of incorporating a business entity, understand its legal aspects, product branding, measures to ensure intellectual property protection, finance management, market study etc. Normally the residency period for direct incubatees is for one year, which may be extended based on the nature of the business and progress of company development. Whenever the start-up firms mature enough to operate a profitable business, the services and concessions provided, shall be withdrawn. The client, apart

from the registration fee to the Incubator, makes monthly payments for office space and pilot plant operations at a subsidized rate than the rates prevailing in the market. After exiting from the incubator, mentoring is continued on need basis.

The centre provides an array of services from idea stage to the product launch. Incubatees are assisted in translating their idea to a technology and further to a market ready product or service. They can also select among the showcased technologies developed in the internal research laboratories and enter into a licensing deal.

These technologies are further classified according to their Technology Readiness Level (TRL). Other services like patent portfolio management, fund mobilization, financial advisory, test marketing, prototype testing, feasibility analysis etc. also would be provided by the ZTM-ABI. Databases and software on IP search, market data analytics, funding sources etc. also are available in the Business incubation centre. The Technology Transfer/Professional Service Functions undertaken by ZTM-ABI Centre, ICAR-CIFT during 2015-19 are depicted in the figure.

The ZTM-ABI 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



Challenges faced by small/medium business owners.

Table 1. Constraint redressal mechanism of ZTM-ABI

Key challenges	How ZTM-ABI Centre helps	Value to the entrepreneur
Identification of suitable technology	A set of management metrics named Technology Readiness Level (TRL) has been devised to help in the assessment of the maturity period of a particular technology within a specific system and operational environment. ZTM-ABI Centre helps the clients in decision making through a seven-point TRL scale, developed on the basis of various categories of technology development stages and is very useful to clearly understand the project viability, maturity cycle and resource requirements	Cost-effective management of advanced technologies and research results, and this has become an essential entity to ensure the success of new initiatives in a field
Preparation of business plans/project reports	Helps in the preparation of technology specific business plans/project reports detailing technical, financial, commercial and operational strategies for the implementation of the project	Assessment of project feasibility, other requirements, and also very important for securing assistance from financial institutions
Mobilising finance	Even though ZTM-ABI Centre does not have a provision for seed funding, it has tie ups with organisations like District Industries Centre (DIC), Kerala State Industrial Development Corporation (KSIDC) through which the clients can apply for financial assistance	Adequate financing assists in development and growth of a business enterprise
Capacity building	Clients and their team members are provided adequate training to obtain, improve, and retain the skills, knowledge, tools, equipment, and other resources needed to adopt the particular technology and do their jobs competently	Strengthens the skills and resources that are essential for the business entities to survive and adapt
Setting up of adequate infrastructure facilities/machinery	Apart from providing well furnished, air-conditioned office spaces for the clients to set up their office, ICAR-CIFT also provides access to its semi commercial pilot plant facilities. Thus, incubatees can take up commercial production using the machineries and instruments set up in the Pilot plant, without setting up a facility of their own, until successful test marketing phase	Decreases the cost of starting a new business
Access to business services	The Centre provides assistance and guidance in obtaining statutory approvals, registration, licenses, certifications etc.	Accelerates business development activities, saves time and money
Branding/IPR protection	Assist in the development of a product brand and provides guidance regarding proper intellectual property safeguards. Various IP protections can include trademarks, copyrights and patents, and the Centre addresses the client's requirements through Patent Attorney	Safeguards the product identity, develops brand value and gets market advantage
Networking	Mentoring, coaching and interaction with business support entities, fellow entrepreneurs, skill development units, central and state government agencies etc.	Learning, exchange of ideas, partnerships, business relationships etc.
Marketing	The Centre promotes the incubatee products through the Institute's social media, websites, publications and showcase them in national and state level exhibitions, industry meets etc.	Accelerates brand promotion and gets a platform to promote the products and build business network

fish production. This industry-specific incubator also allows new firms to tap into scientific knowledge

and business networks. Apart from providing the regular incubation and handholding supports, the new

system offers innovative programmes such as 'derisking', TRL based technology showcasing joint

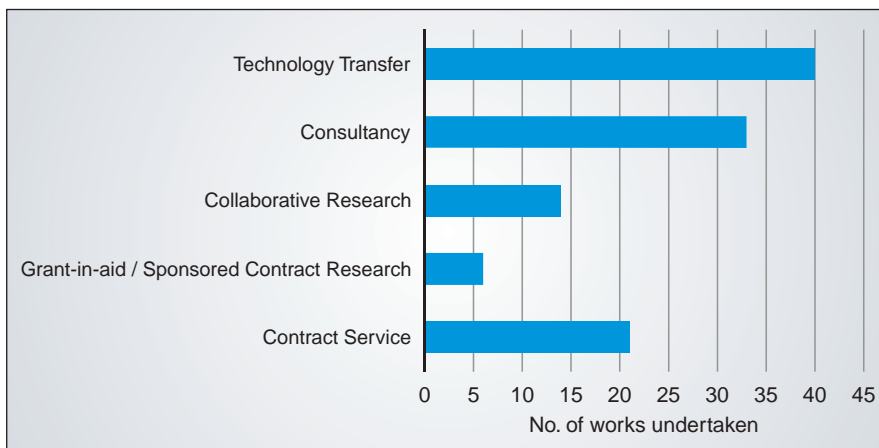
HARVEST	VALUE ADDITION	ENGINEERING	WASTE UTILIZATION	HEALTH CARE / QUALITY ASSURANCE
<ul style="list-style-type: none"> Fuel Efficient Multipurpose Vessel for Deep Sea Fishing CIFT Turtle Excluder Device (CIFT-TED) Device for Juvenile Fish Excluder cum Shrimp Sorting Fish Aggregating Devices Foldable Traps Square Mesh Codend CIFT - Multi Seam Trawl CIFT Semi-pelagic Trawl System (CIFT SPTS) Large Mesh Purse Seine Short Body Shrimp Trawl Cut-away Top Belly Shrimp Trawl Treated Rubber Wood Canoe FRP Coated Rubber Wood Canoe Treated Coconut Wood Canoe CIFT Sun Boat 	<ul style="list-style-type: none"> Micro-encapsulated Sardine Oil Seaweed Nutri Drink Ready-to-serve food products Ready-to-serve Smoked Products in TFS Cans Fish Kure - Extruded Product Seaweed and Fish Enriched Noodles Seaweed Enriched Cookies Fish Sausage Cured and Dried Fish Products Smoked Masmin Flakes Fish Wafers Fish Pickle Battered and Breaded Products Laminated Bombay Duck Diversified Products from Black Clam 	<ul style="list-style-type: none"> Solar Dryer with Electrical / LPG back up Solar Cabinet Dryer with Electrical back up Fish Descaling Machine with variable drum speed Table Top Fish Descaling Machine with fixed drum speed Hand Operated Fish Descaling Machine Energy Efficient Effluent Treatment Plant Modern and Hygienic Mobile Fish Vending Kiosk 	<ul style="list-style-type: none"> Fish Ensilage Foliar Spray Collagen Peptide Collagen Chitosan Membrane Chitin & Chitosan from Crustacean Shell Carboxymethyl Chitosan Fish Feed from Processing Discards Surgical Sutures from Fish Gut Collagen Succinyl Chitosan based Hydro-alcohol Hand Sanitizer 	<ul style="list-style-type: none"> Squalene and Squalene Powder Oyster Protein Hydrolysate (CIFTOPEx) Fish Protein Isolate from Bombay Duck Glucosamine Hydrochloride Natural Hydroxyapatite Protein Hydrolysate from Tuna Red Meat Deodorant for Seafood Processing Units and Fish Markets Antiseptic Ointment for Prawn / Fish Handlers Fish Calcium Capsules Test Strips for Sulfite Residues Chloritest Paper CIF Test Kit for Ammonia and Formaldehyde Adulteration in Fish Design and Development of Modern Hygienic Fish Markets

Entrepreneur ready technologies developed by ICAR-CIFT

Innovation projects from students and young entrepreneurs, exhibition and selling platform for clients etc.

Empanelling of manufacturing firms: ZTM-ABI has come forward with an innovative process of technology transfer and commercialization. An expression of interest was called from all interested manufactures and industrial firms who are willing to manufacture/

fabricate CIFT developed machineries and equipments as per the design and specifications provided by the institute. Accordingly, after due diligence process, more than 10 manufacturing firms have been empanelled by the ZTM-ABI to manufacture the CIFT developed machineries for needy clients. ZTM-ABI charges a licence fee and royalty from the empanelled



Technology transfer/professional service functions undertaken by ZTM-ABI Centre, ICAR-CIFT during 2015-19.

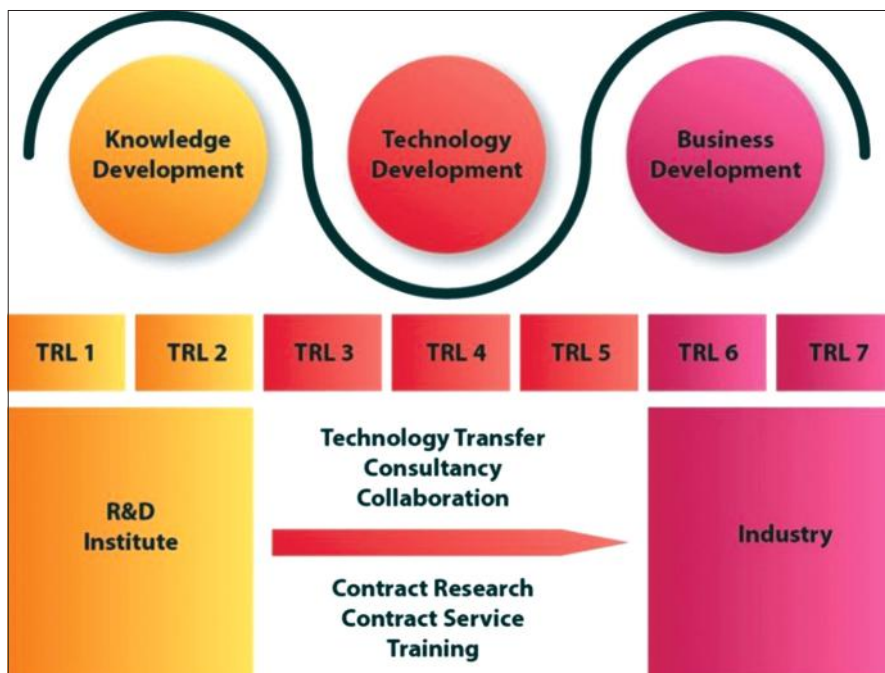
firms and financial transaction for an average amount of ₹ 40,000 has been realized by the empanelled firms annually.

TRL based technology showcasing: Accurate and timely ‘technology readiness assessments’ (TRAs) are very important for the cost-effective management of advanced technology R&D portfolios, whether at the program manager level, the prime contractor level or the supplier level. The ability to make good decisions concerning the inclusion or exclusion of new technologies and novel concepts, and to do so in the absence of perfect information, is essential to success of new initiatives in any field. Technology Readiness Level (TRL) is a set of management metrics that enable the assessment of the maturity of a particular technology and the consistent comparison of maturity between different types of technology, all in the context of a specific system, application and operational environment. Businesses conducting product development and commercialization activities often refer to a seven-point Technical Readiness Level (TRL) scale. This scale helps categorize development stages which is helpful to define project scope, progress, timelines, and resource requirements.

The TRL system measures a technology’s maturity, from Level 1 (Concept Evaluation) to level 7 (Successful Deployment). Each of the seven levels demonstrate a clear milestone in the technology development project where significant activities are performed. While some stages aren’t applicable for certain projects, most research and development projects will pass through each of the nine levels until it’s been successfully integrated into the market. Each technology is classified into various levels of TRL based on a few indicators and attributes.

De-risking technologies for successful commercialization

Most of the times, the entrepreneurs find it difficult to take up the technologies which was successful in a lab scale on upscaled



Transition from innovation to business

the CIFT stall in national and international exhibitions.

ICT support to clients: Digital and social media platforms have been used to network among the incubatees, graduated clients, buyers, sellers and other market and industry players.

Technology transfer through empanelled private firms: The developed equipments are made available to the needy clients on payment basis through selected empanelled manufacturing agencies. The agencies are selected by inviting expression of interest and subsequently conducting a due-diligence study.

B2B and B2C Meets: Business-to-Business and Business-to-Customers meets are held at regular intervals to connect new clients to market, industry and empanelled firms. Two-way communication is facilitated among (i) the empanelled/licensed manufacturing agency and clients seeking institute technology; (ii) Sellers like graduated entrepreneurs and incubates with buyers, both wholesale/retail and national/international.

SUMMARY

Fisheries is sunshine sector of food production providing nutritional security, livelihood support and gainful employment to millions of people. Entrepreneurship is an important tool for promoting this sector and improving the economic development of a country. In this context the role of business incubators that supports the creation and growth of business through organizational and technical assistance, which at the same time contributes to the reduction of entrepreneurial failure, assumes great importance. The ZTM-ABI Centre operational at ICAR-CIFT manages technologies/ innovations, assists the entrepreneurs in seizing new business opportunities, and thus become key players in the growth of industries in fisheries and food processing sector.

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manner. This is mainly due to the constraints with respect to the economics of scale, precision in process/protocols, management of big scale/sophisticated machineries and instruments, HR management etc. Hence, ICAR-CIFT has experimented a new mechanism called De-risking of technologies using pilot scale facilities. Under this scheme, incubates can take up commercial production using large scale production facilities including machineries and instruments set up in the Pilot plant attached to the institute. This facility is limited to identified entrepreneurs for a limited period, essentially linked with test marketing and market behaviour analysis phase. They have to discontinue the use of pilot plant facilities once they are graduated with successful product in the market. The major facilities provided by the business incubator for de-risking are listed below.

1. Provides technology and know-how backed up with scientific results
2. Initial assessment of product and business
 - Assess the commercial viability of the business plan
 - Benchmark against best practices in the industry
 - Identify technology gaps and requirements

3. Regulatory, compliance and standards support
 - Training in quality regulations and related aspects
 - On-site inspections and formulate remedial measures
 - Provides assistance to secure regulatory and standards certifications
4. Infrastructure and production unit
 - State-of-the-art pilot level production facility
 - Well-furnished office space at prime business location
5. Training and skill development
6. Product development and testing
7. Formulation of company policies
8. Setting up of new facilities and up-scaling

Joint development with student/young entrepreneurs: In this approach, student entrepreneurs, young innovators and start-ups are encouraged to work with institute scientists and develop new products and technologies out of innovative ideas. The non-official innovators can use all equipments and other facilities for carrying out their research. Once a new technology is developed, it will be further validated, tested and commercialized. If patentable, joint patent applications will be filed.

Exhibition and selling platform for clients: The graduated entrepreneurs are allowed to showcase and sell their products in